DRIVE INNOVATION · DELIVER EXCELLENCE

ASM

WE CARE, WE INNOVATE, WE DELIVER

ASM INTERNATIONAL **ANNUAL REPORT 2022**

NOTES TO THE READER

PDF/PRINTED VERSION

This document is the PDF/printed version of ASM International N.V.'s 2022 Annual Report and has been prepared for ease of use. The 2022 Annual Report in European Single Electronic Reporting format (the ESEF reporting package) is the official version. The ESEF reporting package is available on the company's website. In case of any discrepancies between this PDF version and the ESEF reporting package, the latter prevails.

UNROUNDED FIGURES

Amounts in the Annual Report may not add up due to rounding differences. The total amounts may therefore deviate from the sum of the parts. Percentage changes are based on the unrounded figures.

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CEO MESSAGE

ASM delivered a strong performance yet again in 2022. Sales increased by 33% at constant currencies, despite challenging supply-chain conditions, and a weakening economic outlook in the second half of the year. We made good progress against our strategic targets, continuing to invest in the growth of our business and further expanding our engagements with key customers for new applications.

"OUR CORE VALUES ARE WE CARE, WE INNOVATE, WE DELIVER. THEY ARE CENTRAL TO ALL WE DO AT ASM, AND A CORNERSTONE OF OUR CULTURE."

Benjamin Loh
President and Chief Executive Officer

I want to thank all our people at ASM as they went again the extra mile to meet our customers' requirements, and contributed to another successful year for our company.

WFE INCREASED AGAIN BUT IMPACTED BY SLOWING END-MARKETS

The semiconductor market began the year with the expectation of continued solid growth, following strong demand in 2021. But momentum slowed down in several segments during the year. The war in Ukraine, rising inflation and interest rates, and a drop in consumer spending started to impact the smartphone and PC markets. This triggered slowing demand and significant inventory corrections in parts of the market. For the full year 2022, the semiconductor market grew by just 5%, down from approximately 25% growth in 2021.

The wafer fab equipment (WFE) market increased by a high single-digit percentage in 2022, but started to slow down in the course of the year. It was impacted by the weakening semiconductor end-markets, combined with persistent supply-chain constraints. Logic/foundry WFE continued to grow in 2022, driven by advanced nodes investments, while memory WFE, particularly impacted by the weakness in PCs and smartphones, dropped.

STRONG FINANCIAL PERFORMANCE

Against this backdrop, our company yet again delivered a very solid performance in 2022. Revenue increased by 33% at constant currencies to a record high of €2.4 billion, our sixth consecutive year of double-digit growth. With equipment revenue growth of 38% at constant currencies – despite difficult supply-chain conditions throughout the year – ASM clearly outperformed the WFE market.

Operating profit grew by a solid 29%, even with a substantial increase in operating expenses as we stepped up R&D and further strengthened our organization. Excluding the cash used for acquisitions, free cash flow increased by 43% to €381 million. Our company's financial position remained strong.

Our ALD business continued to be a key growth driver, accounting for more than half our equipment sales. ALD benefited from solid logic/foundry spending on the most advanced nodes, while we also won important new applications in the memory segment. Epi, our second-largest product line after ALD, was our fastest-growing business in 2022. After announcing our second Intrepid ES customer in 2021, we continued to work towards new customer selections in 2022, expanding our position in the advanced CMOS epitaxy market. In the power, analog and wafer market, we also had solid momentum, supported by our new Intrepid ESA tool for 300mm Epi applications. We believe we're on track to double our Epi market share from 15% in 2020 to at least 30% by 2025. In vertical furnaces and PECVD, our strategy is to invest selectively. A great example of this is SONORA, our new 300mm vertical furnace platform that we introduced last July. We've already booked multiple new wins for SONORA, and expect a solid revenue contribution in 2023.

ACQUISITIONS OF RENO AND LPE

Another highlight was our two acquisitions in 2022. In March, we announced the acquisition of Reno Sub-Systems, a US-based supplier of RF matching subsystems. Reno's high-performance RF matching networks and RF generators will enhance our plasma products. In July, we announced the acquisition of LPE, an Italian-based supplier of silicon carbide (SiC) epitaxy systems. SiC is a high-growth market with particularly strong demand in power electronics for electric vehicles (EV), given that it offers higher efficiency, and so extended range or smaller battery size. We expect LPE to generate revenue in excess of €130 million in 2023, up from more than €100 million previously expected. The acquisition of LPE fits perfectly with our strategy and positioning. We expect to drive growth in LPE's business by leveraging our strong customer base in power electronics. We also aim to further differentiate LPE's tools on the back of our strengths in areas such as 200mm platform expertise, process chemistries, and cost of ownership. In addition, we see opportunities for synergies in leveraging ASM's scale and capabilities in areas such as supply-chain management, and our global-service network.

As far as our M&A strategy is concerned, we will continue to scan the market for other acquisition opportunities that could further strengthen our position in the deposition equipment market and drive additional growth.

"THE ACQUISITION OF LPE FITS PERFECTLY WITH OUR STRATEGY AND POSITIONING."

GROWING IN ALL CUSTOMERS SEGMENTS

Logic/foundry continued to be our largest customer segment. Leading customers continued to invest in advanced node capacity to prepare for the new end-market products that will be introduced in 2023 and beyond. In the newest logic/foundry node, which some of our customers were ramping into high-volume manufacturing by the end of 2022, the number of ALD layers and applications has increased by a strong double-digit percentage. We saw strong traction in R&D engagement and evaluations, especially in ALD and Epi, for the next logic/foundry technology nodes.

Our memory business also delivered solid double-digit growth, driven in particular by 3D-NAND, and despite the slowdown in market conditions in the second half of the year. Demand continued to be strong for ALD high-k metal gate in advanced DRAM devices, in which we believe we have a leading share. In 3D-NAND, we successfully gained a number of new positions for our advanced ALD gap-fill solutions, driving record-high order intake for us in this segment in 2022. At 19% of equipment sales in 2022, memory is still the smaller part of our business. We are working with customers in R&D on several new opportunities, as we remain focused on further strengthening our position in the memory market in coming years.

In the mature node part of the market, we are mainly active in the niche segments of power, analog and wafer manufacturers, with our vertical furnace and part of our epitaxy portfolio. From a smaller base, this part of our business has expanded significantly over the past few years, and is contributing more and more to overall growth for ASM. Next to solid market increases, our growth in the power, analog and wafer segment has been fueled by successful new products, such as Intrepid ESA, and the A400 DUO, our 200mm vertical furnace. With the addition of LPE, we have further strengthened our position in the power segment.

SUCCESSFULLY NAVIGATING CHALLENGING SUPPLY-CHAIN CONDITIONS

A key challenge of the year was the tight supply-chain situation, while at the same time our customers' demand continued to increase significantly. Supply-chain conditions remained tight throughout the year, particularly in the first three quarters. This resulted in extended lead times and a shortage of materials and components for various parts in our tools, with legacy semiconductors being one of the most critical examples. I'm impressed by our team's execution and dedication, in close collaboration with our suppliers, in meeting our customers' requirements. Also, supported by earlier actions such as qualification of additional suppliers and maintaining strategic inventories, we were able to grow our shipments quarter to quarter, and reach record-high sales in 2022.

Regarding our own manufacturing capacity, we benefited from timely investments in our new and expanded facility in Singapore, celebrating the official opening in March 2022. Including the second manufacturing floor in this facility, completed in January 2023, we have boosted our global capacity by 3x compared to 2020.

INVESTING IN THE GROWTH OF OUR BUSINESS

Next to the increase in our manufacturing capacity, we also invested in further upgrading and expanding our R&D facilities. We increased our headcount in R&D by 49%. The number of R&D engagements with customers reached a new record-high in 2022. A key focus in our R&D engagements was the transition in the logic/foundry sector from FinFET to gate-all-around (GAA) device architecture. We expect this transition to result in significant increases in ALD and Epi requirements. As growth opportunities in the mid-term continue to increase, we plan to further increase R&D spending in 2023. In 2022, we also invested in strengthening our organization in many other areas, such as customer field support, IT, supply chain, and HR.

To support growth beyond our mid-term guidance we need to further expand our innovation and manufacturing infrastructure. In February 2023, we announced our intention to significantly increase our R&D and manufacturing facility in Korea. We are also exploring options to expand our activities in Phoenix, Arizona, and in Europe.

PEOPLE ARE OUR BIGGEST ASSET

We continue to invest in the growth, engagement, and development of our people. We increased the total headcount by 29% to 4,258 in 2022, despite a continuing tight labor market. I am particularly pleased with the progress on our Diversity & inclusion (D&I) agenda, as the number of female employees increased to 17% of total at the end of 2022, up from 15% in 2021. Our core values are We Care, We Innovate, We Deliver – they are central to all we do at ASM and a cornerstone of our culture. In 2022, we continued to take steps to further embed these values throughout the organization. Safety remains our highest priority. We strengthened our safety culture and contributed meaningfully to the safety of our value-chain partners.

SUSTAINABILITY HIGHLIGHTS

In 2022, we continued our focus on sustainability, one of the key pillars of our strategy. After announcing our Net Zero emissions by 2035 target (all scopes) in September 2021, we took an important next step by submitting our Net Zero measurements and targets for Scope 1, 2, and 3 GHG emissions to the Science Based Targets initiative (SBTi) in December 2022. The SBTi is recognized as the leading body for validation of net-zero targets, and this validation is currently scheduled to start in H2 2023. ASM became a founding member of the new Semiconductor Climate Consortium (SCC), playing a key role in its creation, and ASM has now also been elected as the SCC's first Chair. One of our key circularity programs is the reuse of packaging. In close coordination with our partners in the value chain, we more than doubled the reuse of shipping materials in 2022. In short, we stepped up our investments in sustainability and have been making great strides in the past few years. It is good to see that our increased focus on sustainability has been reflected in improved ESG ratings, such as with S&P CSA and MSCI, as well as industry accolades.

"IN 2022, WE CONTINUED WITH OUR FOCUS ON SUSTAINABILITY AND TOOK IMPORTANT NEXT STEPS."

TRADE WARS AND CHIPS ACTS IMPACTING OUR INDUSTRY

Several 'Chips Acts' were proposed and passed in 2022, such as those in the US, Europe and Japan, as governments around the world work to build and strengthen their domestic chip industries. This reflects the growing importance of semiconductors in our society. Several of our customers have announced plans to expand their overseas manufacturing footprint, a response to their customers' demand for more geographically diversified supply in view of geopolitical tensions and recent supply-chain disruptions. We expect these investments to start contributing to WFE spending in 2023.

At the same time, geopolitical tensions have triggered new export controls, which negatively impacted the WFE market in 2022. The new US export controls that came into force last October also affected our company. With the 2022 Q3 earnings, we conservatively reduced our backlog with all orders for fabs in the Chinese market that could be impacted by the new export restrictions. And at the end of November, we reported our updated assessment that an expected 15%-25% of our sales in the Chinese market would be negatively impacted. Despite an impact in the fourth quarter, we were still able to book solid growth in our equipment sales from China in 2022, which accounted for 16% of our total sales in 2022. This growth was mainly driven by the mature node segments of power, analog and wafer manufacturers in China, which have not been meaningfully impacted by the recent changes in export controls.

OUTLOOK 2023

Looking at 2023, the global semiconductor market is forecast to contract by some 5% with continued inventory corrections in the first half of the year and a reduced economic outlook. Looking at WFE, logic/foundry spending on the most advanced nodes and automotive-related power/analog demand is expected to remain resilient in 2023. The reduction in memory spending is expected to continue in 2023, while demand for trailing-edge nodes in logic/foundry, especially consumer related, is expected to soften. In total, the WFE market is forecasted to drop by a mid-to-high teens percentage in 2023, a level that we expect to outperform, supported by our strong positions in the leading-edge logic/foundry market, and also by the momentum of newly introduced product and applications. ASM started 2023 with a record-high order backlog of €1.7 billion. On a currency comparable level, we expect revenue for Q1 of €660-700 million, with a slight increase in Q2 revenue compared to this level. Based on the current visibility, we expect revenue in the second half of 2023 to remain at a healthy level, albeit somewhat lower than in the first half of 2023.

"THE NUMBER OF R&D ENGAGEMENTS WITH CUSTOMERS REACHED A NEW RECORD-HIGH IN 2022."

LONG-TERM PROSPECTS CONTINUE TO BE BRIGHT

Looking at the longer term, we believe the prospects for ASM continue to be bright. Despite the slowdown in 2023, the structural drivers for our industry are still very much intact. Third-party research firms continue to expect the semiconductor market to grow to more than $1 trillion by the early 2030s. Semiconductors have become essential in all aspects of life, and help to create new applications such as in cloud computing, artificial intelligence (AI), and the electrification of cars. Our customers continue to invest in the development of faster and more power-efficient next-generation semiconductors. These will require further scaling, new device architectures such as GAA, and the introduction of new materials – all of which will drive further demand for our advanced deposition technologies, in particular ALD and Epi. We believe ASM is well positioned to deliver a continued healthy performance.

March 2, 2023

Benjamin Loh
President and Chief Executive Officer

2. HIGHLIGHTS 2022

FINANCIALS

Revenue	Gross margin	Operating result	Free cash flow ex. acquisitions
€2,411M	47.4%	€632M	€381M
(+39% vs 2021)	(47.9% in 2021)	(+29% vs 2021)	(+43% vs 2021)

PEOPLE

Employees	Female employees	Total injury rate
4,258	17%	0.55
(+29% vs 2021)	(15% in 2021)	(0.50 in 2021)

SUPPLY CHAIN

Key suppliers disclosed to CDP

51%

INNOVATION

Gross R&D spending	Patents in force
€302M	2,619
(+46% vs 2021)	(2,250 in 2021)

PLANET

Electricity from renewable sources	Packaging material reuse
75.6%	+109%
(75.6% in 2021)	(vs 2021)

EVENT HIGHLIGHTS

March 2022:
- Acquisition of Reno Sub-Systems, provider of RF matching technology
- Official launch of our new manufacturing facility in Singapore

May 2022:
- Hichem M'Saad appointed Management Board member and CTO

July 2022:
- Introduction of SONORA vertical furnace and TENZA ALD for gap-fill at Semicon West

October 2022:
- Acquisition of LPE, entering the high-growth silicon carbide epitaxy market

November 2022:
- ASM is a founding member of the Semiconductor Climate Consortium

3. AT A GLANCE

We are ASM, a leading player in advanced technologies in the semiconductor equipment market

A heritage of

54 YEARS

of relentless research and innovation, and breakthrough technologies

Employees working in R&D

965

Gross R&D expenses

€302M

Target Net Zero by

2035

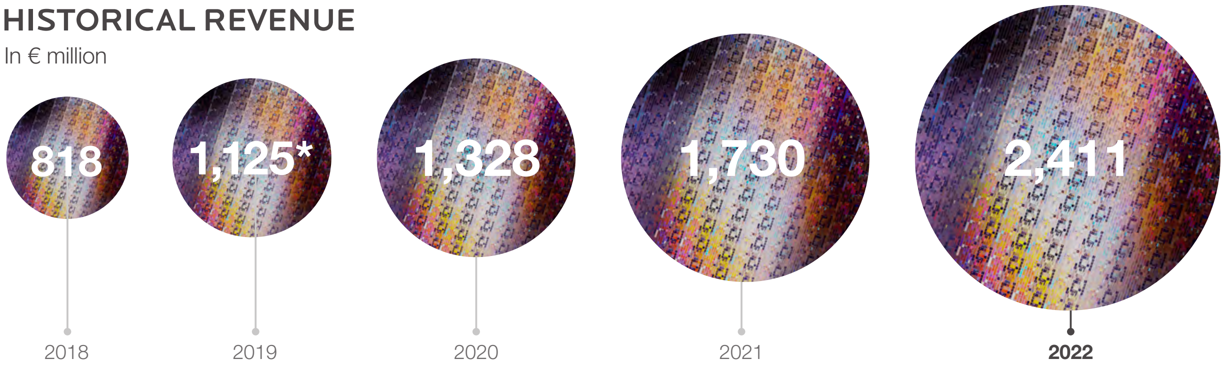
Number of countries present

15

We have suppliers in more than 20 countries

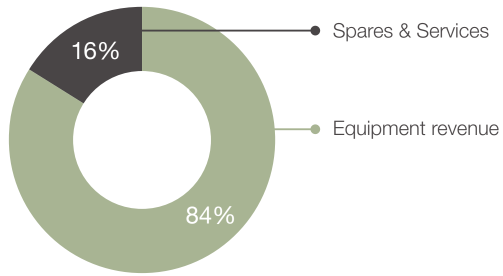
HISTORICAL REVENUE

In € million



OUR FOCUS ON DEPOSITION TOOLS

- A leading mid-50s percentage market share in ALD
- Growing position in silicon Epi
- Selective growth in vertical furnaces and PECVD
- Spares & Services increasingly driven by outcome-based services
- Entering silicon carbide Epi in 2022 with the acquisition of LPE

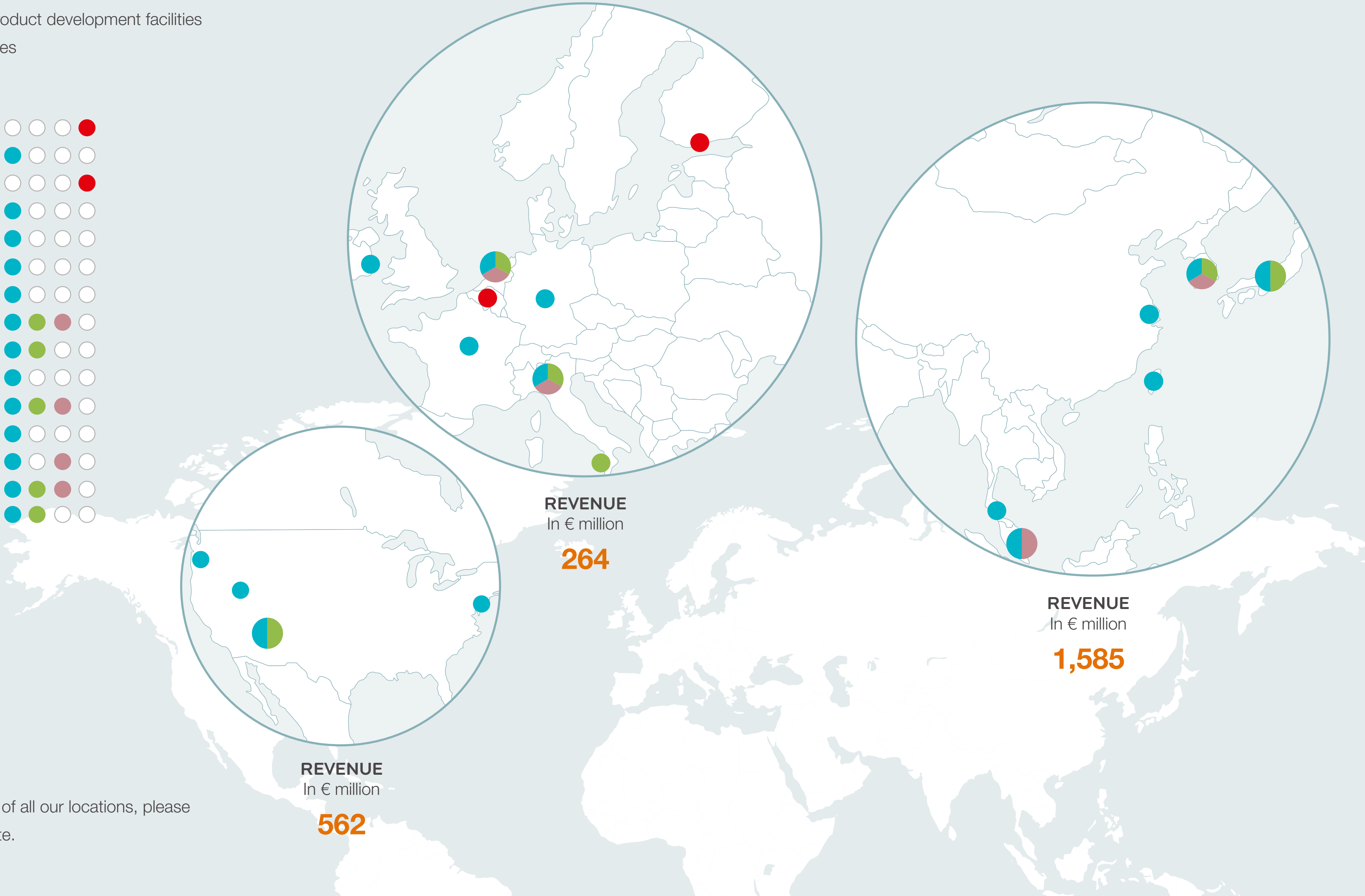


NUMBER OF EMPLOYEES

* Excluding proceeds from patent litigation and arbitration settlement.

OUR GLOBAL FOOTPRINT

Country	Corporate, sales, and service offices	Business unit and product development facilities	Manufacturing facilities	Research facilities
Belgium				●
China	●			
Finland				●
France	●			
Germany	●			
Ireland	●			
Israel	●			
Italy	●	●	●	
Japan	●	●		
Malaysia	●			
The Netherlands	●	●	●	
Taiwan	●			
Singapore	●		●	
South Korea	●	●	●	
United States	●	●		



For a complete overview of all our locations, please visit our corporate website.

4. WHAT WE DO

4.1 OVERVIEW

ASM supplies semiconductor wafer-processing equipment and process solutions, with customers including the companies that make the world's top semiconductor devices. Our equipment is a key technology for the semiconductor integrated-circuit chips needed to make the electronics products that consumers and businesses use everywhere. ASM's leading position is in the logic/foundry segment, although sales in memory are rising. We also have important positions in the analog/power, sensors and wafers segments.

Our focus in the wafer fab equipment market is on the deposition of thin films. We design, make, sell, and service our deposition tools to supply our customers with the advanced technologies they use in their wafer fabrication plants, known as fabs. At their fabs globally, we also provide maintenance service, spare parts, and process support.

Our deposition tools are crucial for the industry to advance its technology roadmap. We are a major player in the atomic layer deposition (ALD) and epitaxy (Epi) segments, and have a more niche role in vertical furnace and PECVD. In 2022, we added a new product line – silicon carbide (SiC) epitaxy equipment.

ALD

ASM is a leader in ALD. It is our largest product line, accounting for more than half our equipment revenue in 2022. ALD is the most advanced deposition method in the market, making it possible to create ultra-thin films of exceptional material quality, uniformity, and conformality. ALD is among the fastest-growing segments in the wafer fab equipment market, and ASM has the broadest portfolio of ALD products and applications.

EPI

Our second-largest product line is Epi, the process of depositing highly controlled silicon-based crystalline films. It is one of the fastest-growing segments in the deposition market. The number of Epi steps is increasing as logic/foundry customers move to smaller nodes, and mobile applications and electric vehicles need more powerful devices.

SILICON CARBIDE EPITAXY

Our newest product line is SiC epitaxy. This came about through ASM's acquisition in Q4 2022 of LPE, the Italy-based maker of epitaxial reactors for SiC and silicon. The SiC epitaxy equipment market is expanding fast due to the growing electrification of the automotive industry, with vehicle power electronics transitioning from silicon to SiC-based materials. SiC devices allow electric vehicles to have greater driving range and faster charging times. Our SiC tools use an epitaxy process to deposit the SiC materials, either on bare substrates or as part of the transistor device fabrication process.

PECVD AND VERTICAL FURNACES

The relatively large size of the PECVD and vertical furnace segments makes these markets attractive to ASM. In recent years, we have seen solid increases in the total revenue of these two combined product lines.

SERVICE AND SPARE PARTS

Technical service and spare parts are important product offerings for our business. For speedy availability, our global service teams are based close to our customers at regional and local service centers. We are expanding our offering with new outcome-based services.

4.2 ENGAGING OUR CUSTOMERS CLOSELY AND EARLY

ASM is committed to giving customers the best products and services, helping them achieve their device and process technology goals. We work with them closely and early in each development cycle to make sure our products meet their roadmap requirements, with service teams on hand at global fabs providing ongoing equipment and process support. We focus on value creation for our customers, continuously improving our products to support their technology roadmaps, increase productivity, lower operating costs per wafer, and enable next generation chips.

A key goal of our customers is to build faster, cheaper, and increasingly more powerful semiconductors with reduced power consumption for each new technology node. We work with them closely to make this happen, forging mutually beneficial partnerships to help develop the next-generation technologies. Through our intensive R&D programs and customer co-development, we continuously improve and extend the capability of our products and processes to meet these advanced technology roadmaps. Critical to our success is close and early collaboration with leading customers and suppliers, global research institutions, such as imec, and key universities. The result is value creation for our customers.

Brian Birmingham
Senior VP Global Sales

"ASM'S INNOVATIVE TECHNOLOGY AND WORLD-CLASS FIELD ORGANIZATION – FOCUSED ON VALUE ENGINEERING AND FASTER CYCLES OF LEARNING – IS DELIVERING DIFFERENTIATED SOLUTIONS THAT ENABLE OUR CUSTOMERS' ASPIRATIONS."

Continuously developing and maintaining strong relationships underpins mutual progress, and ASM engages with our customers throughout our organization. Our account teams are close to our customers' fabs for day-to-day interaction in sales, product and process support, spare parts, etc. Our product development and technical product-support groups, meanwhile, engage with customers on issues in manufacturing, product-improvement projects, joint development programs, and discussions about requirements for next-generation technology roadmaps.

Periodic customer and ASM executive meetings serve to strengthen our business relationships and share commitments.

ASM is focusing on strengthening our quality organization and processes to support our product performance, customers' goals in fab operations, and efficiencies. In 2022, we made further investments, expanding our Quality team and its capabilities.

We serve society by helping our customers produce chips for the advanced electronics that deliver improvements and opportunities across many aspects of our lives. While doing so, we work at the edge of what is technologically possible, creating an attractive professional and learning environment for our employees, and generating long-term value for all our stakeholders.

We engage with – and are responsive and committed to addressing – the broad range of our customers' sustainability expectations, including detailed inquiries and periodic audits. To expand our contribution and impact, we collaborate with our customers on sustainability topics wherever possible.

CUSTOMER RECOGNITION

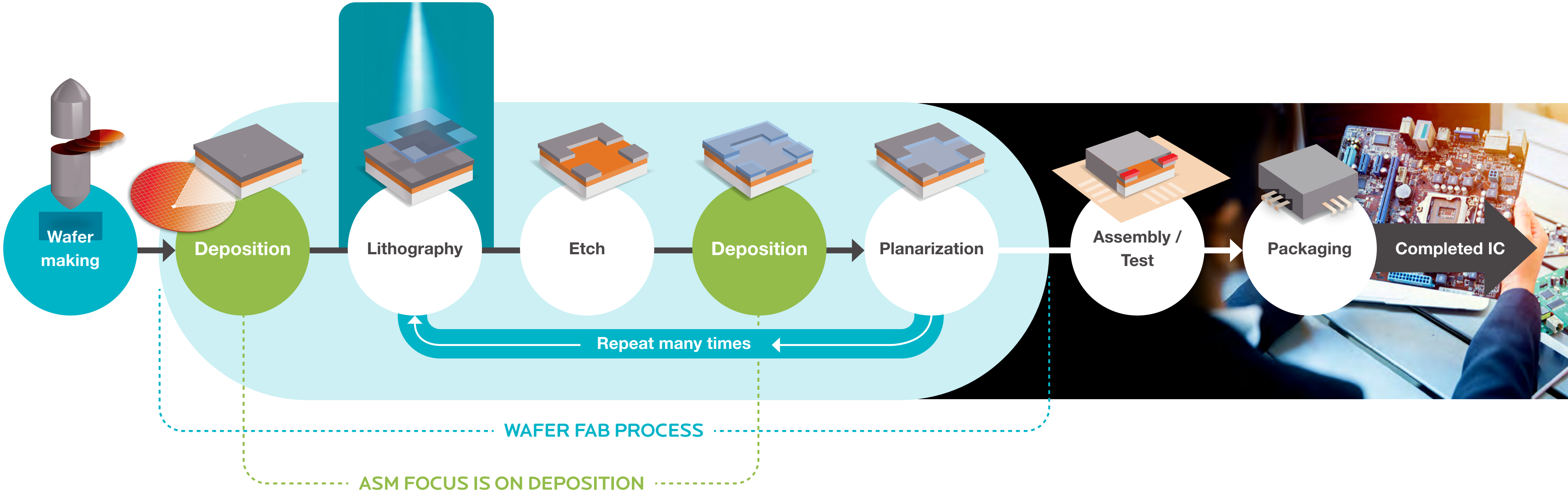
In 2022, several key customers recognized ASM for equipment performance and support:

- A key customer in Taiwan presented us with several 'Excellent Supplier' awards for product performance and improvements to ALD systems.
- A large customer in South Korea honored us with awards for 'Best Collaboration in 2022', relating to ALD and Epi process development, and continuous support overall during the year.
- In April, Intel presented ASM with its 'Valued Supplier Award' in the Intel EPIC Supplier Program. This recognizes supplier partners that represent Intel's standard of excellence.
- A leading memory customer in Taiwan rewarded our service team with its 'Top Supplier Award in Safety' for annual safety performance – the third year in a row that ASM has received this award. This underlines how we value safety, and focus on improving it, both in our teams and in working with customers.

4.3 BASICS OF SEMICONDUCTOR MANUFACTURING

Making semiconductor chips at our customers' fabs is complex and costly. The fabs house a large set of wafer-processing equipment, which performs a series of process steps on round silicon wafers, typically 300mm in diameter. The equipment operates in cleanrooms, where the air is filtered to prevent small particles from causing contamination that could affect the circuitry on the chips.

Semiconductor manufacturing involves a wide range of technical disciplines, including physics, electronics, chemistry, plasma generation, gas-flow dynamics, optics, and metrology. Hundreds or even up to more than a thousand chips are processed at the same time on each wafer, depending on the type of device.



There are many steps to fabricating a semiconductor chip, involving various types of wafer-processing equipment. These include:

- Deposition of thin-film layers on the starting wafer
- Photolithography to create patterns
- Etching to remove material
- Deposition of thin-film layers
- Planarization, cleaning and thermal treatments

ASM's systems are designed for deposition processes where thin films, or layers, of various materials are grown or deposited onto the wafer. Many different thin-film layers are deposited to complete the full sequence of process steps to make a chip. After testing the individual circuits to make sure they are performing correctly, the individual chips on the wafer are separated and packaged in a protective housing. Ultimately, they will become part of a set of semiconductor chips on circuit boards within an electronic product.

4.4 OUR POSITIONING IN THE MARKET

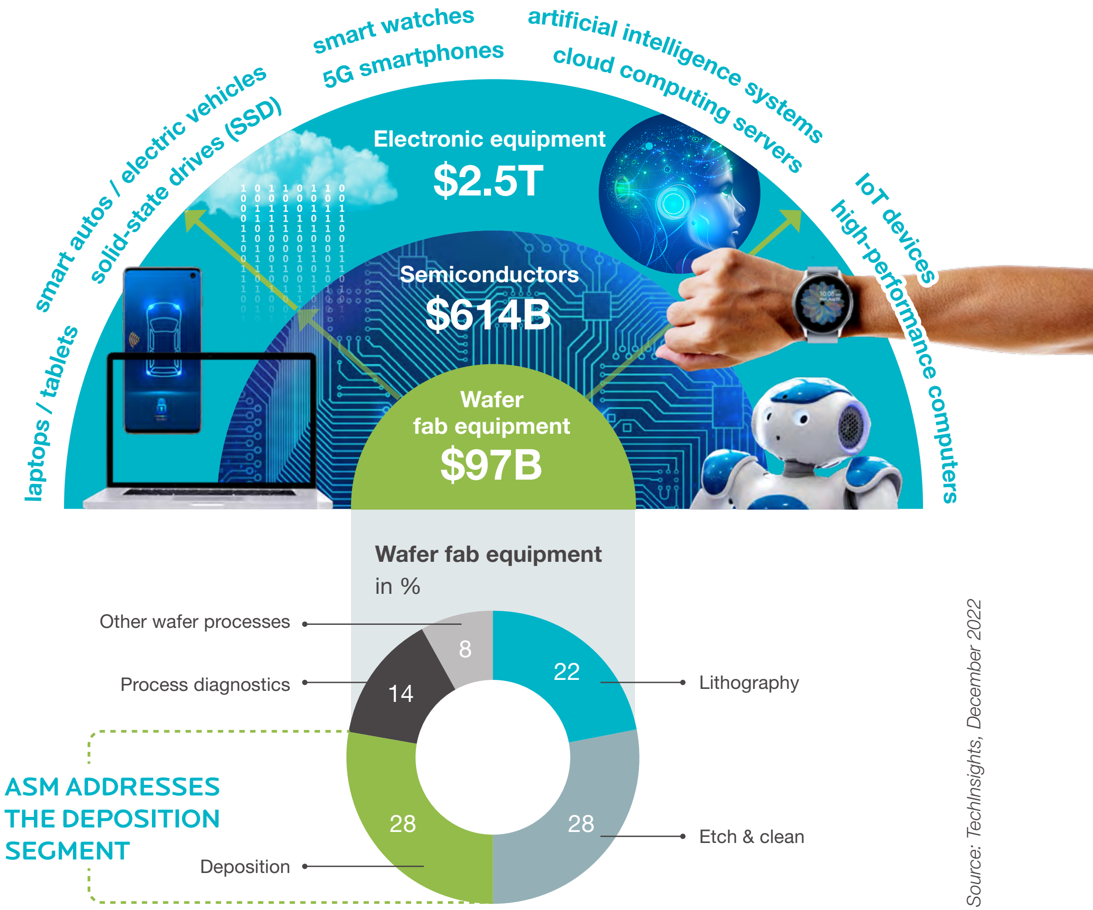
Digital transformation trends are fueling significant growth in the roughly US$600 billion semiconductor-device market. As global economies become increasingly digitized, advanced semiconductors are key to creating this more connected world. New end-market products and applications are being developed, including edge and cloud computing, big-data analysis, artificial intelligence (AI), 5G smartphones, autonomous and electric vehicles, Internet of Things (IoT) for smart connected devices, and many more. Analysts are expecting the total semiconductor market to be worth >$1 trillion in the early 2030s.

Demand for wafer fab equipment (WFE) links to the growth in the semiconductor device market. Increasing complexity in the most advanced semiconductor devices, meanwhile, intensifies that demand. As a result, we see that each new technology node needs further investment in process equipment. In 2022, WFE grew about 9%, following roughly 40% growth in 2021, to reach about US$97 billion (TechInsights, December 2022). WFE growth this year was mostly driven by strength in the logic and foundry segments, while spending for memory fabs declined. The WFE market began slowing by the end of 2022, impacted by global economic weakness, rising interest rates, inflationary pressures, lingering supply-chain issues, trade conflicts, and other challenges. Because of the solid trends in the semiconductor market, the structural long-term growth outlook for WFE remains positive.

The major segments in WFE include lithography, etch & clean, deposition, and process diagnostics. Our focus is on deposition equipment, comprising just over 25% of WFE, in which we address ALD, Epi, PECVD and vertical furnaces. Within deposition, ALD and Epi are the fast-growing market segments. The single-wafer ALD market is expected to grow from ~US$1.5 billion in 2020 to around US$3.1-$3.7 billion in 2025[1]. The Epi market is expected to grow from ~US$0.8 billion in 2020 to about ~US$1.5-US$1.8 billion in 2025[2]. Based on these estimates, the ALD and Epi markets are expected to outgrow the total WFE market.

ASM supplies equipment to the leading semiconductor manufacturers in the logic/foundry and memory (DRAM and NAND) segments of the WFE market. Other smaller but important market segments we supply equipment to include analog/power devices and wafer manufacturing. Analog/power semiconductors are used in a wide range of electronic systems for mobile products, vehicles, telecommunications, and other applications. Wafer manufacturing is for the processing of bare silicon wafers before they are delivered to semiconductor fabs. As the market for leading-edge

Semiconductor value chain



Source: TechInsights, December 2022

"ASM IS FOCUSED ON ALD AND EPI, FAST-GROWING SEGMENTS WHICH ARE EXPECTED TO OUTGROW WFE"

solutions continues to grow, we remain focused on supporting our customers, leveraging ASM's strong track record of innovation in materials, hardware, and process technologies. We enable their roadmaps, which are focused on accelerating technology, improving manufacturing efficiencies, optimizing costs, and sustainability.

1, 2 ASM estimates, ASM Investor Day September 2021

4.5 OUR PRODUCT TECHNOLOGIES

Our products include wafer-processing systems for ALD, Epi, PECVD and vertical furnaces. Now, by acquiring LPE, we also have SiC epitaxy tools. We continuously drive innovation of our products and services to address our customers' technology needs, and the industry's focus on reducing costs and improving its environmental footprint. Our development programs aim to increase throughput, make our equipment more reliable, improve yield in our customers' manufacturing line, reduce energy and resource intensity, and cost of ownership. Our customers benefit from lower operating costs, as many of our products use the same parts and consumables, while a common control architecture improves ease of use.

Our single-wafer tools are designed for use on a common platform architecture. The XP platform is a high-productivity, common 300mm single-wafer platform that can be configured with up to four process modules. The XP platform enables high-volume multi-chamber parallel processing or the integration of sequential process steps on one platform. Our XP8 platform follows the basic architectural standards of the XP. But it offers even higher productivity with up to 16 chambers integrated on a single-wafer platform with a relatively small footprint. The XP8 platform can be configured with four dual-chamber modules (DCM), enabling up to eight integrated chambers, or with four quad chamber modules (QCM) for up to 16 integrated chambers on the same platform.

ALD

ASM is the leader in the fast-growing single-wafer ALD market – with a market share of around mid-50s percentage (source: ASM estimates, Investor Day 2021). Using ALD technology, we can scale devices to smaller dimensions while reducing the power consumption of transistors. This helps the industry follow Moore's Law, and create smaller, more powerful semiconductors. ALD allows us to deposit thin films, atom by atom, on silicon wafers. This means we can deliver atomic-scale thickness control, high-quality deposition film properties, and large area uniformity. Such precision allows us to use materials that could not previously be considered, and develop 3D structures vital to the future of electronics. 3D technology provides several benefits, including saving space while delivering chips with higher performance that consume less power.

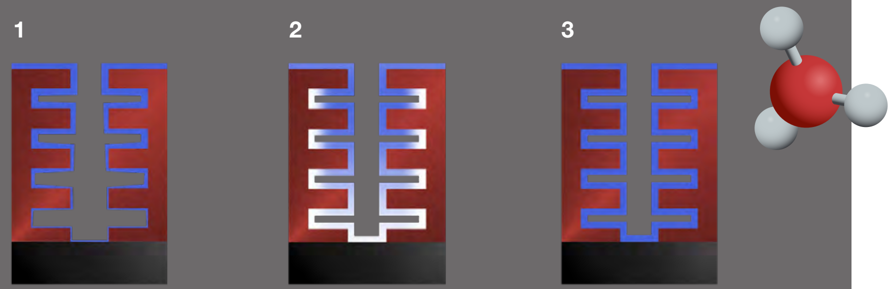
Many new applications are emerging where ALD is the technology of choice. Indeed, in some cases it is the only solution able to meet the challenging technology requirements. For example, ALD high-k gates are now in production for high-performance DRAM devices. We are seeing customers wanting more ALD applications for each new technology node, driving high growth in the ALD equipment market. New applications include high-k metal gates for gate-all-around (GAA) transistors, high aspect ratio gap-fill, underlayers for EUV lithography, metals, selective ALD, and others.

ADVANTAGES OF ALD

ALD is the only deposition technology capable of meeting the coverage and film property requirements for complex 3D structures such as the 3D-NAND example shown here. Compared to CVD methods, ALD has unmatched capability to conformally cover 3D structures with complex materials, with near-perfect chemical composition and electrical properties control.

The graphic of the **CVD A (1)** case shows that the deposited film (blue) does not fully cover the lower portions of the structure. With some process adjustments for the **CVD B (2)** case, coverage is achieved, but the film properties and chemical composition are poor (white areas) in the bottom area.

The **ALD (3)** graphic shows fully conformal coverage – and due to ASM's ALD technology methods, high quality and uniform film properties are achieved in all areas of the structure.



CVD A
Step coverage not OK

CVD B
Step coverage OK, but properties not OK

ALD
Step coverage, composition and properties all OK

ASM has the broadest portfolio of ALD products with innovative ALD reactor designs. Our strength in chemistries and applications using new materials means our customers can meet advanced node technology challenges. We offer systems capable of thermal ALD and plasma ALD. In PEALD, plasma is used to provide the reaction energy for the process, enabling us to use lower temperatures for low-thermal budget applications. This technology was originally introduced in DRAM and planar NAND flash manufacturing for spacer-defined double patterning (SDDP).

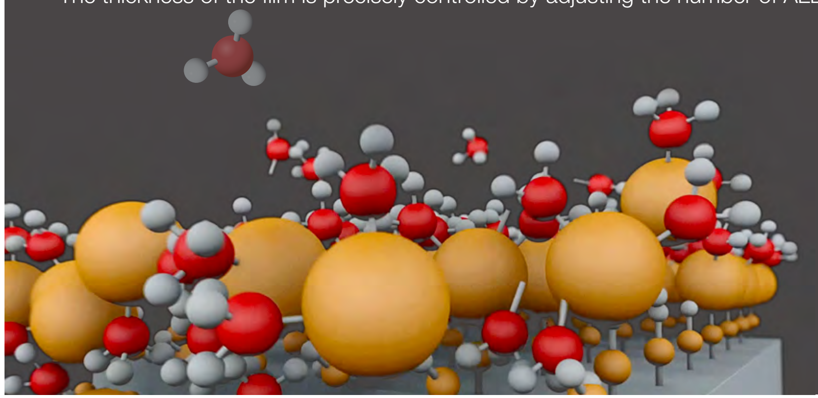
ACQUISITION OF RENO SUB-SYSTEMS

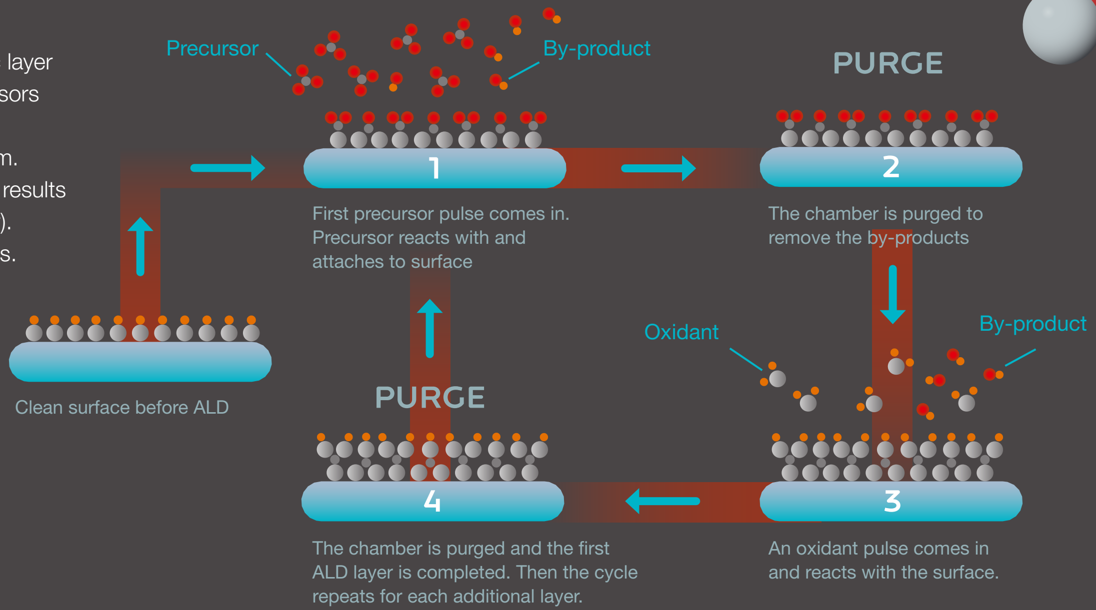
In 2022, ASM acquired Reno Sub-Systems Inc., a supplier of high-performance RF matching networks and RF generators. RF power is used to generate gaseous plasma in various semiconductor manufacturing processes. Today's complex devices require precise control over the RF power delivered to the plasma reaction chamber, especially when depositing material on atomic scale. Reno's EVC (Electronically Variable Capacitor) technology provides sub-millisecond control over RF power delivery, improving throughput and quality of the deposited film. EVC technology, embedded in ASM's deposition equipment, is an enabler for next generation devices.

On our XP platform, we offer Pulsar and EmerALD single-chamber ALD process modules for high-k dielectric and metal gate films respectively. The Synergis ALD tool uses the XP8 platform with DCM modules, and leverages the core technologies from our Pulsar and EmerALD ALD products for high-productivity thermal ALD applications. Synergis is available for a range of films, including high-k metal oxides, metal nitrides, and metals.

ALD CYCLE

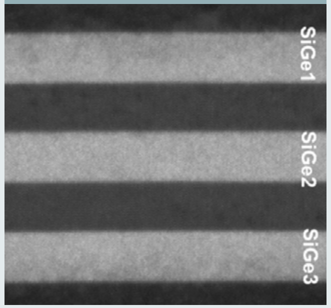
ALD is a surface-controlled layer-by-layer process that deposits thin films one atomic layer at a time. Layers are formed during ALD reaction cycles by alternately pulsing precursors and oxidants, and purging out by-products with inert gas in between each pulse.
The repetition of the ALD cycles results in a layer-by-layer growth of the deposited film. Because the ALD process is self-limiting, due to the principle of surface saturation, it results in films with a uniform thickness, even over varied surface topographies (conformality).
The thickness of the film is precisely controlled by adjusting the number of ALD cycles.





Also on the XP8 common platform architecture, we offer PEALD processes for a wide range of applications. The Eagle XP8 uses DCM module configurations for high-productivity silicon oxides, metal oxides, and nitrides. Our XP8 QCM tool offers PEALD processing on quad chamber modules for very high productivity. A wide range of silicon oxide and silicon nitride process applications are available with the QCM tool. Our XP8 QCM tool excels in the 3D-NAND high aspect ratio dielectric gap-fill application. This is where silicon oxide films are deposited void-free in deep trenches that are up to 100 times deeper than their width. In 2022, we introduced TENZA ALD, an innovative process technology that provides great film quality, conformal coverage through the full trench, and the highest productivity in its class.

GAA



Multi-layer stack of nanosheets

Intrepid ES epitaxy

MULTI-LAYER EPI NANOSHEETS FOR GAA

Epitaxy (Epi) is a special CVD process for depositing a new crystalline layer, such as silicon or silicon germanium, on top of an atomically clean crystalline surface. Epitaxy improves the electrical characteristics of the wafer surface in a highly controlled manner, making it suitable for complex microprocessors and memory devices.

For advanced gate-all-around (GAA) applications, Epi is required to create the transistor channel using a multi-layer stack of silicon (Si) and silicon germanium (SiGe) nanosheets. Precise control of material purity, layer thickness and smooth interface transition between the epitaxial layers are critical for device performance.

With our Intrepid ES epitaxy system, we have a number of innovations in our process chemistry and chamber design to enable the right performance and cost for advanced Epi applications.

EPITAXY (EPI)

Epi is used for depositing precisely controlled crystalline silicon-based layers, a critical process technology for creating advanced transistors and memories. ASM has the number two share in the Epi equipment market, and we saw solid growth in our 2022 Epi revenues. We gained an additional key customer win in 2021 for advanced node transistor applications. Also, one of our strengths in Epi is in the growing analog/power segment.

Our most advanced Epi tool is the Intrepid ES for transistor applications, using our XP platform to configure up to four Intrepid reactors on the same tool. Temperature control is extremely important in Epi reactors. We have developed new methods of temperature control in our Intrepid ES Epi tool that enable improved film performance and repeatability in volume production. Intrepid's closed-loop reactor temperature control brings enhanced stability in production. VERACE-CL is Intrepid's new multi-point pyrometer-based temperature-measurement system that further improves temperature control performance.

For enhanced Epi film performance, we offer the Previum process module, a pre-deposition wafer surface clean technology, integrated with Intrepid epitaxy process modules. The surface clean process is used prior to the epitaxy deposition to create a pristine silicon surface for defect-free epitaxy film deposition. This is critical for achieving the most advanced node transistor-performance requirements.

For silicon-based analog/power devices and wafer-manufacturing applications, we offer our Intrepid ESA tool for 300mm silicon-based epitaxy. The Intrepid reactor architecture allows for thick Epi deposition in a single pass, a significant productivity benefit for our power and wafer customers. For 200mm epitaxy applications, still relatively significant in the analog/power market, we offer the Epsilon 2000 tool.

SILICON CARBIDE (SIC) EPITAXY

SiC is ASM's newest product line, following our acquisition of LPE. The SiC epitaxy equipment market is growing fast due to the growing electrification of the automotive industry. SiC devices provide greater battery life and a longer range for EVs. Because of its wide band gap, SiC is highly efficient at high voltages, offering higher power efficiency, increased power density resulting in reduced component weight and size, and faster battery-charging times.

With Italian-based LPE, ASM now has a solid position in the SiC epitaxy market, and we plan to further strengthen the SiC product offerings by drawing on our global engineering, quality, supply-chain, and customer-support capabilities. Our SiC tools use an epitaxy process to deposit the SiC materials on either bare substrates or as part of the transistor device fabrication process. The ASM SiC tool portfolio includes the PE106A and PE108, single-wafer epitaxy tools for 150mm and 200mm respectively. For higher productivity, we also offer the PE208 dual chamber 200mm tool. The transition to 200mm SiC is a major technology inflection, which positions single wafer reactors like ASM's particularly well since thickness and material uniformity control is more challenging at 200mm.

LPE PE106 SILICON CARBIDE EPITAXY

Single-wafer epitaxial reactor tool for depositing silicon carbide layers on bare substrates and for power device transistors.

PECVD AND VERTICAL FURNACES

ASM is also active in the vertical furnace and plasma-enhanced CVD (PECVD) market segments. While these are each large segments, we are focused on niche portions of the market.

Vertical furnaces use a batch configuration. This means a large number of wafers are processed at the same time for productivity and cost savings. We design our furnace tools with dual-batch reactors for even more productivity. A wide range of process applications are available on our furnace tools, including LPCVD, oxidation, diffusion and cure.

Our furnace tools include the new SONORA vertical furnace launched in 2022 for 300mm logic/foundry and memory applications, as well as 300mm analog/power. SONORA deliveries have begun to multiple customers globally, among them leaders in advanced logic, and power device manufacturing. We also offer the A400 DUO vertical furnace for 200mm and smaller wafers, targeting analog/power, RF, and MEMS applications. The A400 DUO has achieved significant wins in the China market.

In PECVD, our key position is on low-k for advanced logic interconnects. PECVD processes are offered on our high-productivity XP8 platform. Our Dragon XP8 PECVD tool addresses a broad range of dielectric films for various low-temperature deposition applications, such as interconnect layers, passivation layers, and etch stop layers.

SPARES & SERVICES

All of ASM's technologies mentioned above come in the form of sophisticated and complex systems that ship to our worldwide customers. These are installed at their fabs, along with other similar systems used in series to create microchips.

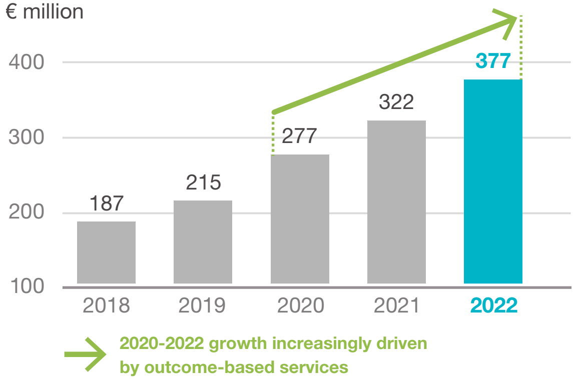
Of course, our service capabilities and performance are a key factor in our customer's equipment selection process. When customers choose ASM systems it is also based on how ASM's systems have performed on a very limited scale – within our demo labs or during a single system evaluation at the customer site. Once they choose ASM to ramp into production, the customer trusts that our system will meet their needs and enable their success. Failing a customer during a production ramp would cause significant problems for them.

This is where ASM's Global Services & Spares group (GSS) comes in. We work to make sure our systems are installed properly in the customer fab, are started up to make sure they perform as they should, and continue to run in production 24/7 for 20+ years, across tens to hundreds of such tools in the customer fabs, no matter where they are in the world.

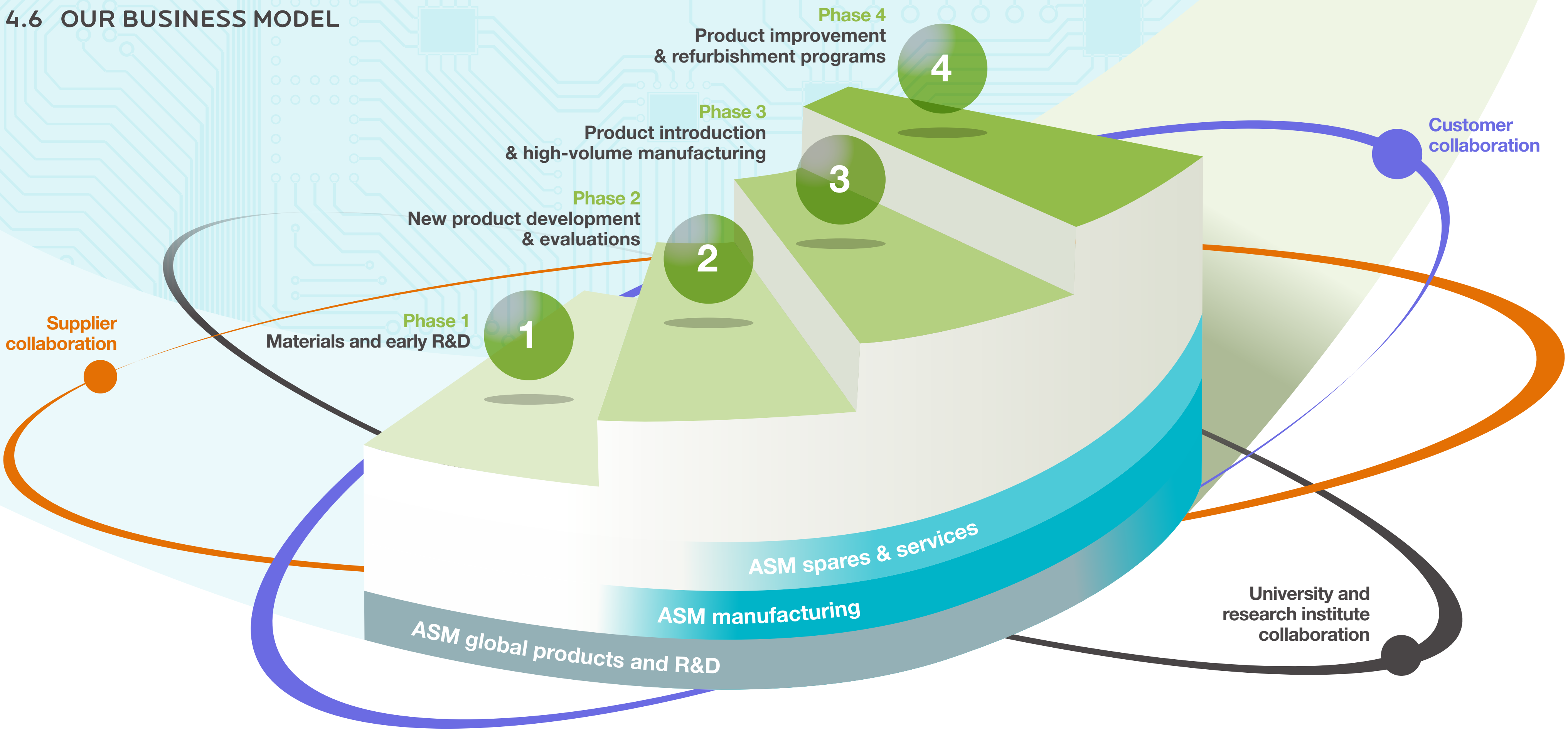
In the past few years, GSS has grown its support beyond making sure trained maintenance staff and spare parts are available, and systems are running. Today, GSS provides what we call outcome-based services. Its aim is to draw out ever-greater performance from our installed base of systems, through engineering-based improvements to the parts and procedures we use. This can deliver improvements such as fewer defects, longer parts and system life, better film uniformities, more process repeatability, and, ultimately, lower operating costs for our customers.

Spares & Services revenue growth

€ million



4.6 OUR BUSINESS MODEL



Phase 1: ASM's business model emphasizes early phase R&D, collaborations, and wide-ranging customer engagement. At our R&D labs in Helsinki, Finland, we focus on early stage R&D for developing new materials and new precursor chemistries. A critical component is close and early collaboration with global research institutions, such as imec, key universities, suppliers and leading customers.

Phase 2: These engagements are particularly beneficial during the new product development phase, when each of our product lines designs and implements new systems and processes to meet upcoming customer roadmap requirements. When new products are ready, ASM often places evaluation tools at key customer sites to demonstrate critical performance factors and to optimize the equipment and process technology.

Phase 3: When evaluations and product enhancements are completed, and ASM has been selected as the production tool of record (PTOR) supplier, new products are ready to be shipped to customers for high-volume manufacturing (HVM). At this point our manufacturing site is ready for volume manufacturing of the new products. While our customer support teams are already engaged at the evaluation phase, the on-site service, spare parts management and process support activities ramp up substantially for HVM.

Phase 4: Over time in production, our products are involved in CIP, or continuous improvement program activity, a focused effort to further optimize the product performance based on the learnings and results in the customer fab environment. Furthermore, from a longer term and sustainability and circularity perspective, we look to extend the product's life cycle with a team that works on refurbishment and upgrade solutions for our installed base. We actively work with customers to implement improvements so existing products can continue operating even as technical requirements become more challenging.

STRATEGY AND VALUE CREATION

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5. STRATEGY

We are an innovation leader in the semiconductor industry. This is the result of our focus on key issues and challenges within the industry, enabling us to make a difference to and create value for our customers, employees, investors, and other company stakeholders, while we continue to bring our breakthrough technologies into volume manufacturing.

CORE VALUES

Our values are We Care, We Innovate, We Deliver.
These values are central to all we do at ASM. They provide every employee with guidance in their daily activities. The values are a cornerstone of the ASM culture.

PURPOSE

Our purpose is to improve people's lives through advancing technologies that unlock new potential.
ASM is a leader in innovation for the semiconductor industry. With our technology, we help move the industry roadmap forward, driving innovation in the electronics market and improving people's lives.

MISSION

Our mission is to enable our customers' success by creating leading-edge semiconductor process products, services, and new materials.
Our deposition technology helps our customers address their device and process-development challenges. By partnering with leading chipmakers to develop new materials, processes, and technologies that support their roadmaps, we drive innovation in semiconductor technology. This helps create new, improved semiconductor devices. We have a deep understanding of the important requirements of the next generations of device roadmaps. This enables us to develop value-added service solutions to the industry's critical issues.

STRATEGY

Our strategy is Growth through Innovation.
Innovation is at the core of what we do at ASM. With our global, networked R&D model, we can collaborate closely and early with our customers, industry partners, and universities. Over the past 20 years, we have accumulated a vast amount of know-how in ALD materials and chemistries. Coupled with decades of experience in developing reactors and processes, ASM has a legacy of innovation of more than half a century.

5.1 CORE VALUES

In 2021, we took an essential step in defining who we are at ASM, and what we stand for, by launching our core values – We Care, We Innovate, We Deliver. In 2022, we continued to take steps to further embed these core values throughout the organization, top-down and bottom-up.

WE CARE

Together we care for our people, society, and our planet.

Together we act with integrity, compassion, and respect, at all times.

Together we are inclusive, inspired by others, and always growing.

WE INNOVATE

Together we lead our industry and work towards a common goal.

Together we think creatively, with truly open minds.

Together we challenge the norms and embrace diversity of thought.

WE DELIVER

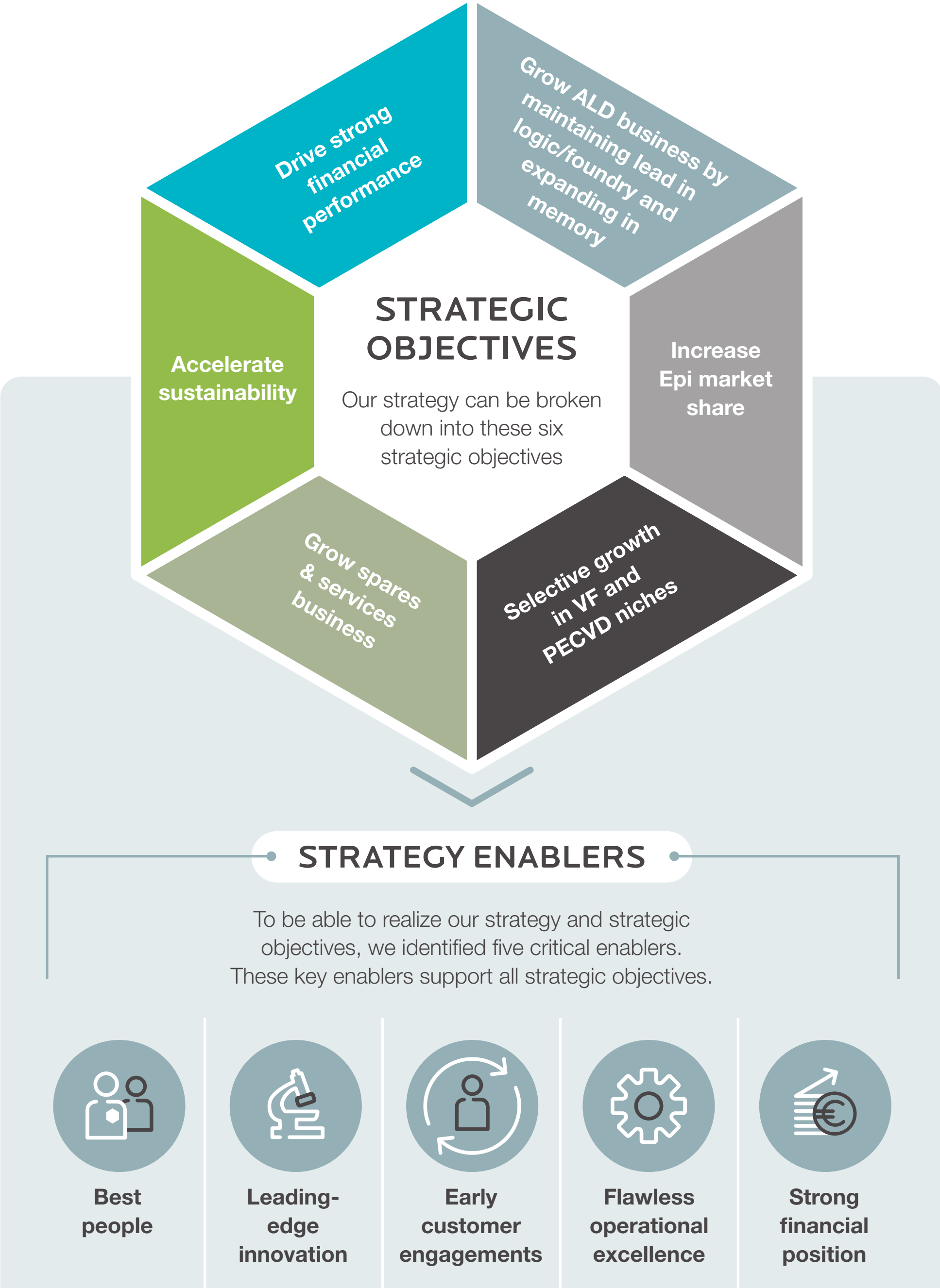
Together we perform at our best and deliver on our promises.

Together we ensure satisfaction and exceed expectations.

Together we take ownership and are accountable for our actions.

5.2 EXTERNAL TRENDS AND CHALLENGES

- **The digitalization of society is accelerating** Technology is increasingly shaping how we live and work – and much of this technology is created with advanced semiconductors. As society becomes more automated and connected, we're relying on a broad range of electronic devices to control our homes, offices, vehicles, and communications. Our connected world is leading to a growing demand for massive amounts of data. This needs ever-greater computer-processing power and storage, capable of analyzing and acting on the data quickly and effectively. The processing power of semiconductor chips must constantly increase to make this possible. ASM's process equipment technology is key to making this happen.
- **Rising complexity of chip technologies** The continuation of Moore's Law, which states that the number of transistors on a chip doubles every two years, is becoming increasingly difficult. The equipment costs for these advanced nodes are rising, which will place greater pressure on equipment manufacturers to create innovative solutions. At the same time, increasing complexity and smaller chip technology means more ALD and Epi steps. Being at the forefront of technology development is critical to continuing success.
- **Attracting and retaining talented people** We need the right people to grow and strengthen our organization, but there is increasing competition for highly skilled talent everywhere we operate. Without this talent, we will not be able to realize our strategy.
- **Environmental footprint** The semiconductor industry provides critical and enabling technology that contributes to society and is vital to progress in the world's sustainability imperatives. However, the industry's environmental footprint is significant and gaining more attention. Our customers place a high priority on their environmental performance and operational economics associated with their fabs. It is key to their decisions when choosing manufacturing equipment. The industry's environmental footprint, and ASM's role in it, is also a priority of our other stakeholders. Additionally, the EU Taxonomy, and the Corporate Sustainability Reporting Directive (CSRD) approved by the EU Council on November 28, 2022, bring further attention to this matter. We continue strengthening our team and global innovation and collaboration network, to improve the energy and resource efficiency of our products, and in turn, improve the environmental footprint of the industry.
- **Geopolitical risk and shift in global supply** In the past, the success of the semiconductor industry was strongly linked to the success of all parties along the value chain. Innovations by equipment suppliers supported state-of-the-art solutions developed by chip manufacturers. This led to new opportunities for customers to take advantage of these advanced chips. Geopolitical developments, such as trade restrictions, put this model at risk. Increasing awareness around the importance of a domestic semiconductor industry is leading to shifts in the industry's global footprint. We carefully review any impact such developments may have for us, while taking advantage of new opportunities they may offer.
- **Scarce resources** The increased global demand for semiconductors is fueling the need for more scarce resources. Our obligation to responsibly source resources will drive us to continue our innovations around the development of new chemistries, the design and manufacture of our equipment, and our value-added services that can increase circularity.



5.3 KEY ELEMENTS AND ENABLERS OF OUR STRATEGY

Our strategy is based on the following six strategic objectives:

GROW ALD BUSINESS BY MAINTAINING LEADERSHIP IN LOGIC/FOUNDRY AND EXPANDING IN MEMORY

Our ALD business is a key priority. We expect that ALD will continue to grow as a core technology as our customers transition to the next nodes. We also expect the ALD market to be the fastest-growing segment in the deposition market in coming years. We are focused on maintaining our leading position in the logic/foundry segment, and increasing our market share in memory. Supported by a strong increase in our R&D engagements in DRAM and 3D-NAND applications for the next nodes, we aim to meaningfully increase the contribution of our memory business over time. We estimate that the single-wafer ALD market will grow to US$3.1-3.7 billion in 2025. Our goal is to have a market share larger than 55% in 2025.

INCREASE EPI MARKET SHARE

Epitaxy silicon has become a second growth engine in our product portfolio. Our Intrepid product has enabled us to make successful inroads in the advanced CMOS part of the Epi market, while increasing our presence in the analog/power market. In R&D, we are working with multiple customers on new Epi applications for the next nodes, which should further grow our market share. We estimate the Epi silicon market will increase from US$0.8 billion in 2020 to US$1.5-1.8 billion in 2025. We aim to have a market share of more than 30% by that time.

With the acquisition of LPE in 2022, we have entered the silicon carbide (SiC) epitaxy market, which complements our epitaxy silicon offerings. Silicon carbide devices are experiencing strong growth driven by the rapidly expanding market for electric vehicles. The global auto industry is investing significantly in chips made from silicon carbide. SiC devices offer higher power efficiency at high voltages, resulting in reduced component weight and size, as well as faster battery charging times. Consequently, we forecast demand for SiC epitaxy equipment to grow at a CAGR in excess of 25% from 2021 to 2025.

SELECTIVE GROWTH IN VF AND PECVD NICHES

In vertical furnaces (VF) and PECVD, we want to develop our niche positions through targeted growth opportunities. Vertical furnace applications for the analog/power market is an example of a niche position we have selectively been investing in.

GROW SPARES & SERVICES BUSINESS

We are growing our services and spares business faster by focusing on our differentiated outcome-based services. The Spares & Services group is expanding our engineering and surface-technology expertise and facilities. This will deliver a much better installed-base performance for our customers with a measurable impact on their profitability. These outcome-based services deliver a clear, quantifiable result at a much lower cost than the value brought to them.

ASM Spares & Services is focused on:

- Working with customers to understand their issues and opportunities in our systems
- Finding high-value / yield solutions
- Using design and engineering, along with strong supplier support, to lower operational costs for our customers, while a higher share of the customer wallet is put toward ASM's outcome-based services.

Our focus on new outcome-based services has allowed us to grow our spares and services revenue at a higher rate than in the past, and at one that is higher than the growth rate of our installed base.

ACCELERATE SUSTAINABILITY

Our focus is to deliver long-term sustainable value creation for all our stakeholders and make a positive impact in the world. We aspire to be a sustainability leader in our industry, toward which these examples are indicative:

- Our Net Zero by 2035 target (1.5°C, all scopes), which is among the most ambitious in our industry
- Our principal role in forming the Semiconductor Climate Consortium, joining as a founding member, and in January 2023, ASM was elected as Chair of the SCC's Governing Council
- Key customers consistently recognizing and awarding ASM as an industry safety leader
- Improvement in key ESG ratings that reflect our underlying progress

We will continue to address key sustainability and ESG topics and opportunities that are in line with our strategy and informed by our stakeholder priorities.

DRIVE STRONG FINANCIAL PERFORMANCE

Healthy profitability will allow us to continue investing in growth. To this end, we have drawn up our profitability targets for the period 2021-2025. We strive to achieve gross margins between 46% and 50%, and an operating margin of 26% to 31%, generating strong free cash flow.

OUR FIVE STRATEGIC ENABLERS

To be able to realize our strategy and strategic objectives, we identified five critical enablers. All our activities are focused around these elements:

BEST PEOPLE

Our people are at the heart of our company's success. We strive to create a safe, inclusive, inspiring, and motivating workplace where our employees are able to use their talents, excel, and develop their potential as we work together to deliver the cutting-edge technologies of tomorrow. As our workforce rapidly expands, we are focusing on strengthening ASM. This means developing our talent pool with more long-term career progression and training. It also means strengthening and unifying our ASM culture. Our core values – We Care, We Innovate, We Deliver – help us grow employee engagement, and shape an even more diverse and inclusive culture. This will support us in attracting, retaining, and developing the talent we need to support us as we grow.

LEADING-EDGE INNOVATION

The core part of our overall growth strategy is continuous innovation – this provides ASM with a leading technological competitive advantage. With R&D centers in seven countries, we have helped shape today's leading-edge semiconductor products by driving innovation through our collaborative R&D models. We have successfully delivered advanced new materials, products, and processes to our customers. Our R&D spending is focused on developing new materials and process solutions that enable additional applications. Continuous product improvements in performance, reliability, and cost of ownership is key. We are also focused on improving the energy and resource efficiency of our products. In addition, we are making capital investments in lab space and equipment to further expand our development capabilities in next-generation technologies. As well as our internal R&D efforts, we are growing and deepening our strategic cooperation with key customers, suppliers, chemical manufacturers, and research institutes.

EARLY CUSTOMER ENGAGEMENTS

We have strong customer relationships with the leading semiconductor manufacturers, working closely together in the early stages of their device roadmaps. As we have expanded and deepened our R&D engagements with chipmakers, we have developed our understanding of the key requirements of the next generation of device roadmaps. This is enabling us to develop value-added solutions to the industry's critical technology issues.

FLAWLESS OPERATIONAL EXCELLENCE

While technology leadership remains crucial, we see operational excellence as essential to further strengthen our future position. We aim to provide our customers with dependable, leading-edge products and services at a consistent performance level, while providing the best total cost of ownership. We continuously focus on making our organization even more effective and efficient. Following our strong growth in recent years, we need to strengthen our organization and business processes in specific areas. For example, we are stepping up our capabilities in engineering, product lifecycle management (PLM), and quality. We aim to strengthen our new product introduction processes to provide our customers with additional on-site support, as the pace of technological change continues to accelerate.

STRONG FINANCIAL POSITION

We strive to maintain a strong balance sheet that allows us to continue investing in R&D and in the growth of our company. To this end, our target is to increase the minimum amount of cash on our balance sheet from €300 million to €600 million in the period until 2025 (as announced at our Investor Day in September 2021). At the end of 2022, we had €419 million in cash and cash equivalents. ASM generated a healthy free cash flow of €381 million excluding acquisitions. We intend to continue paying a sustainable dividend, and use excess cash for the benefit of our shareholders through share buybacks.

6. OUR SUSTAINABILITY APPROACH

We have a fundamental responsibility to our stakeholders, and to the sustainability of our world. As such, sustainability is part of ASM's strategy.

Our principal source of positive impact to society and the environment is through the innovation and technology we deliver to the industry, and which is the core of our sustainability focus. We aspire to be a sustainability leader in our industry and beyond. We aim to actively seek and be responsive to our stakeholder's priorities. We align our strategy and stakeholder priorities, set ambitious goals informed by leading bodies and standards, strive for innovative solutions, collaborate to achieve positive impact beyond our scale, and measure and share our progress and challenges transparently.

Our efforts to accelerate sustainability are deeply interwoven into our long-term value creation for our stakeholders.

Our sustainability focus areas and priorities are informed by meaningful engagement with our stakeholders through our materiality assessment and ongoing stakeholder engagement, by in-house ESG expertise, and through the RBA Code of Conduct, the UN Global Compact, the UN Sustainable Development Goals, as well as other leading frameworks and bodies, and ultimately aligned with ASM's strategy.

Responsible Business Alliance
Advancing Sustainability Globally

The RBA is the world's largest industry coalition dedicated to corporate social responsibility in global supply chains. Our membership commitment and active engagement in the RBA and its related initiatives are core to our sustainability approach and efforts. ASM adopted the RBA Code of Conduct (CoC) in 2013, extended the RBA CoC to our Supply Chain in 2014, joined the RBA officially in 2020, and was promoted to Full Member in 2022.

United Nations Global Compact

ASM joined the UN Global Compact in 2022, further reinforcing our commitment to responsible and sustainable business conduct.

We continue to align our policies and actions with leading bodies, standards, and emerging legislation and expectations, striving to remain at the forefront of sustainability requirements and expectations.

ASM supports the following United Nations Sustainable Development Goals (UN SDGs):

For additional information on our stakeholder engagement and materiality analysis, and our support of the RBA, the UN Global Compact, and the UN SDGs, see chapter '25 Other sustainability information'.

ASM's sustainability focus areas are Innovation, People, Planet, Responsible supply chain, and Sustainability governance.
Further information on each can be found in their respective sections of this report.

INNOVATION

- **Product sustainability and eco-design**
  Improving the energy and resource efficiency of our products
- **Product safety**
  Improving the safety of our products and our customers operations

PEOPLE

- **Safety**
  Making a positive impact on the safety of our industry
- **Our team**
  Unleashing everyone's potential at ASM
- **Community, industry, society impact**
  Positively impacting our communities, industry, and the world around us

PLANET

- **Net Zero**
  Achieving our Net Zero by 2035 target
- **Climate adaptation**
  Addressing climate change risks and opportunities

RESPONSIBLE SUPPLY CHAIN

- **Safety**
  Ensuring safety throughout our supply chain
- **Net Zero**
  Collaborating to address our shared carbon footprint
- **Product sustainability**
  Improving ASM product sustainability
- **Human rights**
  Ensuring the ethical treatment of people throughout our supply chain

SUSTAINABILITY GOVERNANCE

- **Cybersecurity and IP protection**
  Ensuring robust cybersecurity and IP protection
- **Disclosures**
  Providing transparency, integrity, and assurance

Our efforts are led by a Sustainability Leadership Council, comprised of those responsible for our sustainability focus areas and key related functions. The Council is chaired by the Corporate Vice President of Sustainability, and reports to the Management Board.

Our stakeholders place a high priority on the transparency and integrity of our disclosures, and their trust is of paramount importance. A considerable portion of our Annual Report contains non-financial and sustainability/ESG-related information. As such, continuing from our 2021 report, key non-financial aspects of this report receive limited assurance. The EU Corporate Sustainability Reporting Directive (CSRD) is recognized as a significant increase in requirements and expectations for EU listed companies. ASM aims to complete its fit/gap assessment of the CSRD and define its implementation roadmap within the first half of 2023. With the European Commission's approval of the CSRD in November 2022, limited assurance of non-financial information will become a requirement beginning in 2024.

2022 sustainability highlights include:

- Improving our gender diversity for female participation from 15% to 17% in 2022, and on track toward our 20% by 2025 target
- Our principal role in the formation of, as a Founding Member of the Semiconductor Climate Consortium (SCC), and in January 2023, ASM was elected to chair the SCC's Governing Council
- Remaining on track to our target of 100% renewable electricity for our operations by 2024
- Submitting our Net Zero by 2035 measurements and targets to the Science Based Targets initiative (SBTi) for their subsequent validation in the course of 2023.

In 2022, ASM's results improved across multiple ESG ratings. These rating results are captured in the infographic below. For additional information on the rating or how to interpret the results, see section '25 Other sustainability information' in this Annual Report.

ESG ratings and indices	2022 result	2021 result
AEX ESG AEX ESG by EURONEXT	2022 inaugural index	–
Corporate Knights Global 100	Rank 33	–
CDP Climate Change / Water Security CDP DRIVING SUSTAINABLE ECONOMIES	B / B =	B / B
S&P Global CSA Sustainability Yearbook Member S&P Global ESG Score 2022 Industry Mover	69 and Yearbook member ↑	58
Sustainalytics MORNINGSTAR SUSTAINALYTICS	Risk rating 13.1 ↑	Risk rating 15.3
MSCI ESG MSCI	AA ↑	A
ISS ESG Score ISS ESG	E:4 S:4 G:1 ↑	E:4 S:5 G:1
FTSE Russel FTSE4Good	4.0 ↑	3.6

7. LONG-TERM VALUE CREATION

We are committed to long-term sustainable value. We create value for all our stakeholders as we grow our business and develop leading-edge technologies, while accelerating our focus on sustainability.

7.1 HOW WE CREATE VALUE FOR OUR STAKEHOLDERS

Our purpose is to improve people's lives through advancing technologies that unlock new potential. We serve society by helping our customers produce chips for the advanced electronics that deliver improvements and opportunities across many aspects of our lives. Our innovations and leading-edge technologies, such as our ALD products, enable our customers and our industry to develop faster and more power-efficient semiconductors.

Accelerating sustainability is one of the pillars of our strategy. ASM's focus areas are Innovation, People, Planet, Responsible supply chain, and Governance. In Planet, as an example, we have prioritized focus on climate response, water security, and circularity. After announcing our Net Zero by 2035 ambition in 2021, we took an important next step by sizing our Scope 3 GHG emissions and submitting our measurements and targets to the Science Based Targets initiative (SBTi) for validation. We aim to collaborate with stakeholders across our value chain with the ambition to bring faster and more meaningful change to the environmental challenges facing the world today.

Innovation is in our DNA. We work at the edge of what is technologically possible, creating an attractive professional and learning environment for our employees. As we aspire to be an employer of choice for existing and future talents, we are constantly focused on improving our employee experience. Our 2022 biannual employee engagement survey revealed a 5% increase in the engagement score. On diversity and inclusion, we are focused on increasing the female participation rate, with a target of 20% female workforce by 2025, up from 15% in 2021. In 2022, we made a first step by increasing our female workforce to 17%. In safety, our vision is ZERO HARM!, where we foster a safety leadership culture regardless of role. This means we strive to prevent all incidents and injuries, regardless of severity or impact. We prioritize and focus on prevention, meaning we aim to remove all exposure to harm.

Our mission is to enable our customers' success. We focus on value creation for our customers, by continuously improving our products to support their technology roadmaps, to lower cost of ownership, and enable next-generation chips. Critical to our success is close and early collaboration with our customers, to make sure our products meet their requirements, with service teams for ongoing equipment and process support. To expand our contribution and impact, we collaborate with our customers on sustainability topics wherever possible. As an example, through innovation we aim to further improve the energy and resource efficiency of our products.

Our suppliers are key partners. As we grow our business, the opportunities for our suppliers increase. ASM continues to expand its global supply chain to support the need for technology, capacity, flexibility, and sustainability. Together with our suppliers, we can create positive impact for our stakeholders, the planet, and society overall – well beyond our individual scale. We strive to further build on a sustainable, responsible supply chain, with a focus on areas such as worker safety, environmental footprint, human rights, and supplier diversity.

We create value for our shareholders as we focus on long-term profitable growth. Leveraging our advanced technologies, our positions in fast-growing markets such as ALD, we aim to deliver revenue growth of on average 16%-21% in 2021-2025, with healthy operating margins of 26%-31%. We aim to maintain a strong financial position. Our key capital allocation priority is to invest in the growth of our business. We are committed to our sustainable dividend policy and to return excess cash to our shareholders in the form of share buybacks. Investors, like all our stakeholders, are increasingly focusing on ESG-related targets and performance.

OUR VALUE CREATION MODEL

RESOURCE INPUTS

FINANCIAL
- Strong financial position
- €419 million cash position, no debt

MANUFACTURING & SUPPLY CHAIN
- More than €1.2 billion in direct materials spend
- Fitting out second manufacturing floor in our Singapore facility
- Suppliers in more than 20 countries

INNOVATION
- Gross R&D spending of €302 million
- More than two decades of know-how in ALD materials
- Eight R&D centers globally

PEOPLE
- 4,258 talented and skilled employees
- 59 different nationalities
- 1,450 new hires

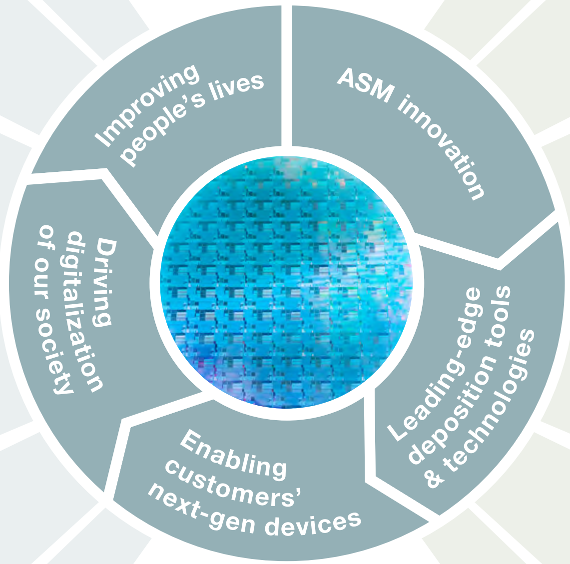
COLLABORATION
- Partnerships with universities/imec
- Strategic relationships with key customers

NATURAL
- 60,519 MWh, 75.6% electricity from renewable sources
- 149k cubic meters water used

CORE VALUES
We Care, We Innovate, We Deliver

PURPOSE
Improve people's lives through advancing technologies that unlock new potential

MISSION
Enable our customers' success by creating leading-edge semiconductor process products, services, and new materials



STRATEGIC OBJECTIVES
- Maintain leadership in ALD market
- Grow share in Epi market
- Selective growth in PECVD & vertical furnace niches
- Grow Spares & Services through outcome-based offering
- Drive continued strong financial performance
- Accelerate sustainability in key focus areas: Innovation, People, Planet, Responsible supply chain, Governance

VALUE OUTPUTS / IMPACT

FINANCIAL
- 39% increase in revenue
- €381 million free cash flow excluding acquisitions
- 29% increase in operating result

Impact:
- Driving long-term value for all stakeholders

MANUFACTURING & SUPPLY CHAIN
- Delivering on customer requirements with record shipments in 2022 despite supply-chain constraints

Impact:
- Creating growth opportunities for our suppliers and encouraging them to follow best practices in sustainability
- Continued investment in state-of-the-art infrastructure

INNOVATION
- Strong pipeline of new applications for 2nm and beyond
- 2,619 patents in force
- Introduction of SONORA vertical furnace and TENZA ALD gap-fill

Impact:
- Our advanced deposition technologies enable next-gen semiconductors, driving the digitalization of our society

PEOPLE
- Total injury rate 0.55
- 10.2% voluntary attrition rate
- Increased female workforce from 15% to 17%
- 5% increase in engagement score

Impact:
- Creating an inspiring, diverse, and safe workplace where our people can excel, pursue a career, and develop themselves

COLLABORATION
- Renewed partnerships with imec and University of Helsinki
- Several new JDPs* for next technology nodes

Impact:
- By working together with customers and partners we contribute to continued innovation in our industry

NATURAL
- Transitioned most key sites to electricity from renewable sources in 2021
- 109% increase in packaging materials reuse

Impact:
- Target Net Zero emissions by 2035
- Reducing our environmental footprint

Numbers refer to 2022 unless indicated otherwise.

* Joint development programs

ASM's enterprise value creation and reporting models are informed by the Value Reporting Foundation's integrated reporting framework and SASB Semiconductor Accounting Standard.

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8. FINANCIAL PERFORMANCE

ASM delivered a very solid performance yet again in 2022, our sixth year of double-digit growth. Our operating result grew by 29%, even as we stepped up our investments in R&D and strengthened the organization.

€2,411M
Revenue

47.4%
Gross margin

€632M
Operating result

€381M
Free cash flow ex. acquisitions

8.1 PERFORMANCE REVIEW

Demand for our leading-edge products continued to be strong in 2022. Our new bookings increased by 44% to €3,153 million, reaching a new record level. New bookings grew by strong double-digit growth in all our product lines. The book-to-bill ratio, as measured by new orders divided by revenue, was 1.3 in 2022, in line with 2021. Equipment bookings continued to be driven by ALD, while we also achieved particularly strong growth in Epi bookings. Equipment bookings were led by foundry, followed by logic, and then memory. Bookings also increased strongly in the combined segments of power, analog, and wafer manufacturers.

Bookings were particularly strong in the first half of the year, reaching a record-high of €942 million in the second quarter, to some extent due to early ordering in view of the supply-chain constraints. In the third quarter, our order intake dropped. This included the negative impact of new export regulations issued by the US government on October 7, 2022, which led us to conservatively derisk our backlog by removing all potentially impacted orders. Following extensive clarifications and subsequent internal reviews, we rebooked part of these orders again in the fourth quarter. Orders in the fourth quarter increased to around €830 million, also driven by stronger-than-expected demand in the power, analog and wafer-maker segments, and extraordinarily high orders for LPE.

We finished the year with a backlog of €1,669 million, up sharply from €811 million at the end of 2021. This included a consolidation effect of €107 million for acquisitions, mainly related to LPE.

The following table shows the level of new orders and the backlog for 2021 and 2022:

	Year ended December 31,		
(€ million)	2021	2022	% Change
Backlog at the beginning of the year	**323.6**	**811.3**	**151%**
Additions through business combinations	—	**106.8**	n/a
New orders	2,195.7	**3,152.5**	44%
Revenue	(1,729.9)	**(2,410.9)**	39%
FX-effect	21.9	**9.5**	
Backlog at the end of the year	**811.3**	**1,669.2**	**106%**
Book-to-bill ratio (new orders divided by revenue)	**1.3**	**1.3**	

The backlog includes orders for which purchase orders or letters of intent have been accepted, typically for up to one year. Historically, orders have been subject to cancellation or rescheduling by customers. In addition, orders have been subject to price negotiations and changes in specifications as a result of changes in customers' requirements. Due to possible customer changes in delivery schedules and requirements, and to cancellations of orders, our backlog at any particular time does not necessarily indicate actual revenue for any subsequent period.

The following table shows the operating performance for 2022 compared to 2021:

(€ million)	2021	2022	Change
New orders	2,195.7	**3,152.5**	44%
Backlog	811.3	**1,669.2**	106%
Book-to-bill	1.3	**1.3**	
Revenue	1,729.9	**2,410.9**	39%
Gross profit	828.1	**1,142.9**	38%
Gross profit margin %	47.9%	**47.4%**	
Other income	4.1	**—**	(100)%
Selling, general and administrative expenses	(189.5)	**(276.6)**	46%
Research and development expenses	(151.2)	**(233.9)**	55%
Operating result	491.5	**632.4**	29%
Operating margin %	28.4%	**26.2%**	
Normalized operating result (excluding amortization of the purchase price allocation of Reno and LPE)	491.5	**641.2**	30%
Normalized operating margin %	28.4%	**26.6%**	
Net finance income (expense)	(2.0)	**(1.9)**	0.1
Foreign currency exchange gain (loss)	33.5	**25.0**	(8.5)
Income taxes	(102.6)	**(115.9)**	(13.3)
Net earnings before share in income of investments in associates	420.3	**539.7**	119.4
Share in income of investments in associates	74.4	**64.8**	(9.6)
Impairment of investments in associates, net	—	**(215.4)**	(215.4)
Net earnings	494.7	**389.1**	(105.6)
Normalized net earnings [1)]	506.9	**627.0**	120.1
Net earnings per share, diluted	€10.11	**€7.93**	€(2.18)
Normalized net earnings per share, diluted [1)]	€10.36	**€12.77**	€2.41

1 Excluding amortization of fair value adjustments from purchase price allocations (net of tax), change in fair value of the contingent consideration ("LPE earn-out") and impairment of ASMPT.

Revenue

The revenue cycle from production to shipment for our equipment generally takes several months. On average, acceptance is obtained four months after shipment. The revenue cycle is longer for equipment installed at the customer's site for evaluation prior to sale. The typical trial period is six months to two years after installation.

Our revenue is concentrated in Asia, the United States, and Europe. The following table shows the geographic distribution of our revenue for 2021 and 2022:

	Year ended December 31,			
(€ million)	2021		2022	
United States	454.1	26.2%	**561.8**	**23.3%**
Europe	172.4	10.0%	**264.3**	**11.0%**
Asia	1,103.3	63.8%	**1,584.8**	**65.7%**
Total	**1,729.9**	**100.0%**	**2,410.9**	**100.0%**

A substantial portion of our revenue is earned by equipping new or upgraded fabrication plants where device manufacturers are installing new fabrication lines. As a result, our revenue in this segment tends to be uneven across customers and financial periods. Revenue from our 10 largest customers accounted for 78.9% and 77.8% of revenue in 2021 and 2022, respectively. The three largest customers accounted for around 57.6% of revenue in 2022 (2021: 59.4%). In 2022, we had two customers (2021: three customers) who contributed more than 10% of total revenue.

	Year ended December 31,		
(€ million)	2021	2022	% Change
Equipment revenue	1,408.1	**2,033.7**	44%
Spares & service revenue	321.8	**377.2**	17%
Total	**1,729.9**	**2,410.9**	**39%**

Total revenue grew by 39% year-on-year and by 33% at constant currencies. Equipment revenue accounted for 84% of total revenue. Equipment revenue grew by 44% in 2022, and by 38% at constant currencies. In terms of customer segments, equipment revenue was led in 2022 by foundry, followed by logic, and then memory. We booked strong double-digit revenue growth in all product lines. In 2022, our largest product line continued to be ALD, driven by strong demand in both the logic/foundry and memory market.

Epi, our second-largest product line, was our fastest-growing product line. Momentum continued to be strong in the advanced CMOS part of the market, and we also recorded significant growth in the power, analog and wafer manufacturer segments, also driven by our Intrepid ESA tool that we introduced in 2021.

Spares & Services revenue increased by 17% (16% in 2021), and by 11% at constant currencies. Growth is increasingly driven by strong momentum in our outcome-based services, with again multiple new contracts booked in 2022. Spares & Services represented 16% of total revenue in 2022, down from 19% in 2021, as the solid increase in Spares & Services was outpaced by even stronger growth in equipment revenue.

Gross profit margin

Total gross profit developed as follows:

	Year ended December 31,				
	Gross profit		Gross profit margin		Increase (decrease) percentage points
(€ million)	2021	2022	2021	2022	
Gross profit margin	828.1	**1,142.9**	47.9%	**47.4%**	(0.5)

The gross margin decreased from 47.9% in 2021 to 47.4% in 2022. As a reminder, the gross margin in 2021 was positively impacted by a relatively strong application mix in the first six months of the year. Currency changes led to an increase of 4% in gross profit compared to 2021.

Selling, general and administrative (SG&A) expenses

Total selling, general and administrative expenses developed as follows:

	Year ended December 31,		
(€ million)	2021	2022	% Change
Selling, general and administrative expenses	189.5	**276.6**	46%

Selling, general and administrative (SG&A) expenses increased by 46% in 2022 year-on-year. Throughout 2022 we continued to invest in the strengthening of our organizational structure, expanding our headcount in areas such as customer support, IT, HR. The number of total people increased 29% year-on-year. The increase in SG&A expenses is also partly explained by higher wage inflation and variable compensation, as well as increase in travel costs.

As a percentage of revenue, SG&A expenses in 2022 were 11%, in line with 2021. The impact of currency changes on SG&A expenses resulted in an increase of 6% year-on-year.

Research and development (R&D) expenses

Gross R&D expenses, increased by 46% in 2022, compared to the previous year. The increase in R&D expenses was driven by increased headcount (up 49% in 2022) and employee-related expenses. The increase in expenses is driven by a substantial increase in the number of R&D projects and engagements with customers for new products and applications in the next technology nodes. Net R&D expenses increased 55% in 2022. The higher increase of net R&D expenses is caused by proportionally lower capitalization, and higher amortization of capitalized development expenses compared to 2021. As a percentage of revenue, net R&D was around 10% up from approximately 9% in 2021. Currency changes resulted in a 4% increase in R&D expenses year-on-year.

Total research and development expenses developed as follows:

	Year ended December 31,		
(€ million)	2021	2022	% Change
Gross research and development expenses	206.0	**301.6**	46%
Capitalization of development expenses	(82.0)	**(102.6)**	25%
Amortization of capitalized development expenses	25.2	**34.9**	38%
Impairment of capitalized development expenses	2.0	**—**	(100)%
Net research and development expenses	**151.2**	**233.9**	**55%**

We continue to invest strongly in R&D. As part of our R&D activities, we are engaged in various development programs with customers and research institutes. These allow us to develop products that meet customer requirements, and to gain access to new technology and expertise. The costs relating to prototypes and experimental models, which we may subsequently sell to customers, are charged to the cost of sales.

Operating result

The operating result developed as follows:

(€ million)	Year ended December 31, 2021	2022	% Change
Operating result	**491.5**	**632.4**	**29%**
Operating margin %	28.4%	**26.2%**	
Excluding:			
Amortization intangible assets (resulting from the acquisitions of Reno and LPE)	—	**(8.7)**	100%
Normalized operating result	**491.5**	**641.2**	**30%**
Normalized operating margin %	28.4%	**26.6%**	

Operating profit increased by 29% to €632 million, from €491 million in 2021, resulting in an operating profit margin of 26.2% (2021: 28.4%). The decrease in the operating margin was explained by the slightly lower gross margin and the increase in operating expenses. The impact of currency changes on operating result shows an increase of 4% year-on-year.

Financing costs

Financing costs are mainly related to translation results. Financing costs in 2022 included translation gains of €25 million, compared to translation gains of €34 million in 2021. The translation results are mainly related to movements in the US dollar in the respective periods. A substantial part of our cash position is denominated in US dollars.

Share in income of investments in associates

Share in income of investments in associates, which reflects our shareholding in ASMPT, decreased to €78 million from €87 million in 2021. This result exclude the amortization of intangible assets related to ASMPT and impairment. At the end of 2022, our stake in ASMPT amounted to 24.95% (2021: 24.96%). Net cash of our 24.95%-owned associate was €513 million on December 31, 2022. The cash resources and borrowing capacity of ASMPT are not available to ASM. For further information on ASMPT, please visit www.asmpacific.com.

Although two directors of ASM are non-executive directors of ASMPT, ASMPT is under no obligation to declare dividends to shareholders or enter into transactions that are beneficial to us. As a shareholder, we can participate in the shareholders' approval of the payment of dividends, but cannot compel their payment or size. Cash dividends received from ASMPT during 2021 and 2022 were €36 million and €49 million, respectively.

Impairment (reversal) of investments in associates

ASM impaired its investment in associates (ASMPT) as disclosed in the third quarter 2022 results press release to account for the reduced market valuation of the stake in ASMPT. The impairment charge of €321 million is party recovered (€106 million) in the fourth quarter as a result of an increase in the recoverable amount (share price).The net impairment of investments in associates in the full year of 2022 amounts to a non-cash charge of €215 million.

This impairment (reversal) is in line with our accounting policy under which, at each reporting date, we will determine if there is any objective evidence for impairment. If the fair value of an investment is less than its carrying amount, the company determines whether the decline in value is significant or prolonged. The impairment charge will be subsequently reversed only to the extent that the recoverable amount of the investment increases.

Income tax

The income tax expense of €116 million (2021: €103 million) reflects an effective tax rate of 22.9% (2021: 17.2%). The effective tax rate, excluding the impairment on, and net income of our investment in ASMPT, for full year 2022 is 17.7% (2021: 19.6%). For further information on tax, see Note 22 to the consolidated financial statements.

Net earnings

Net earnings developed as follows:

(€ million)	Year ended December 31, 2021	2022	Change
Net earnings	**494.7**	**389.1**	**(105.6)**
Excluding:			
Amortization intangible assets (resulting from the acquisitions of Reno and LPE)	—	**(8.7)**	(8.7)
Income taxes (realization temporary differences)	—	**2.3**	2.3
Finance expense [1]	—	**(2.6)**	(2.6)
Amortization intangible assets (resulting from the sale of the 12% stake of ASMPT)	(12.2)	**(13.6)**	(1.4)
Impairment of investments in associates, net	—	**(215.4)**	(215.4)
Normalized net earnings	**506.9**	**627.0**	**120.2**

1 Finance expenses include the change in fair value of the contingent consideration ("LPE earn-out").

Non-current assets

Property, plant, and equipment increased by 21% year-on-year as a result of investments in our facilities such as in Phoenix, the US, and Tama, Japan, and the outfitting of the second floor in our manufacturing facility in Singapore.

As far as the increase in goodwill is concerned, €288 million of the €307 million increase is attributable to the acquisition of LPE, for which a total consideration of €545 million was transferred. For Reno Sub-Systems, ASM paid an amount of €41 million, of which €18 million was allocated to goodwill.

Other intangible assets increased by €371 million year-on-year mainly due to:

- Purchased technology acquired through the acquisition of Reno and LPE including amortization for €208 million;
- Other intangibles for €88 million, as a result of the identified intangibles as part of the acquisitions, and include customer relationships, order backlog, and trade name; and
- Capitalized development for €73 million, due to our continued investment in R&D.

(€ million)	December 31, 2021	December 31, 2022
Property, plant and equipment	257.0	**312.1**
Evaluation tools at customers	63.7	**68.7**
Goodwill	11.3	**318.5**
Investments in associates	848.8	**686.3**
Other intangible assets	274.8	**646.1**
of which:		
Development costs	267.7	**340.4**
Software	7.1	**10.2**
Purchased technology	—	**207.7**
Other intangibles	—	**87.8**

Working capital

Working capital increased from €316 million to €497 million. This was mainly driven by a substantial increase in inventories from €212 million at the end of 2021 to €538 million at the end of 2022. To increase our flexibility given the challenging supply-chain conditions, we increased our buffer inventories of critical parts and materials. Supply-chain constraints also resulted in higher inventories with tools waiting for missing parts.

Our accounts receivable position increased from €447 million to €581 million, reflecting the higher revenue level. The number of outstanding days of working capital, measured against quarterly revenue, increased from 58 days as at December 31, 2021 to 62 days as at December 31, 2022.

The working capital developed as follows:

(€ million)	December 31, 2021	December 31, 2022
Inventories	211.8	**538.4**
Accounts receivable	446.7	**580.8**
Other current assets	51.0	**114.5**
Accounts payable	(175.4)	**(243.5)**
Provision for warranty	(27.2)	**(34.2)**
Accrued expenses and other payables	(190.6)	**(458.9)**
Working capital	**316.4**	**497.1**

Liquidity

(€ million)	December 31, 2021	December 31, 2022
Cash	491.5	**419.3**

We were debt-free as of December 31, 2022 (and 2021). Our principal sources of liquidity consisted of €419 million in cash and cash equivalents, and €150 million in undrawn bank lines. The company has a new revolving credit facility (RCF) since the end of May 2022 with improved terms and conditions compared to the previous one. The new facility has a tenor of five years with an option to extend up to two years. The facility amount is €150 million and it has an accordion option to increase the amount by €100 million. The facility also includes a financial covenant on the consolidated total net debt/total Shareholders' equity ratio. This financial covenant is measured twice a year, on June 30 and December 31. We were compliant with this financial covenant on both measurement periods.

In 2023, ASM converted its revolving credit facility into a sustainability-linked RCF aligned with the Sustainability-Linked Loan Principles by the Loan Market Association. Under the terms of the facility, the interest rate is linked to the achievement of long-term sustainability goals targeting gender diversity, net zero, and value chain packaging reuse which are in line with ASM's sustainability strategic focus. Achievement of these targets will impact the interest rate as the lenders will apply a discount on the existing margin or add a penalty to the existing margin depending on the sustainability achievement against the target. The original terms and conditions of the RCF remain in place.

For the most part, our cash and cash equivalents are not guaranteed by any governmental agency. We place our cash and cash equivalents with high-quality financial institutions to limit our credit risk exposure.

Our liquidity is affected by many factors. Some of these relate to our ongoing operations, such as the need to invest in R&D projects and expansion. Others are related to the semiconductor and semiconductor-equipment industries – for instance supply chain constraints and the phase of the industry cycle – and the economies of the countries where we operate. Although our cash requirements fluctuate based on the timing and extent of these factors, we believe that cash generated by operations – together with the liquidity provided by our existing cash resources and our financing arrangements – will be sufficient to fund working capital, capital expenditures, and other ongoing business requirements for at least the next 12 months.

See notes 11, 16, and 17 to the consolidated financial statements for more information on our funding, treasury policies, and long-term debt.

CASH FLOW

The following table shows the condensed cash flow statement:

(€ million)	2021	2022
Net earnings from operations	494.7	**389.1**
Operating cash flows before changes in working capital [1]	448.2	**701.0**
Net cash from operating activities	380.6	**541.5**
Net cash used in investing activities	(114.4)	**(474.9)**
Cash flows from operating activities after investing activities [1]	266.2	**66.6**
Net cash used in financing activities	(240.3)	**(132.6)**
Foreign currency translation effect on cash and cash equivalents	30.3	**(6.2)**
Net increase (decrease) in cash and cash equivalents	**56.3**	**(72.2)**

1 Non-IFRS financial performance measure. Please see '21. Non-IFRS performance measures'.

We generated cash from operating activities of €541 million (2021: €381 million). We used €475 million cash in investing activities (2021: €114 million) and used €133 million in financing activities (2021: €240 million). Free cash flow excluding acquisitions amounted to €381 million (€266 million in 2021). Including acquisitions, free cash flow amounted to €67 million.

CapEx increased from €72 million in 2021 to €101 million in 2022, with a meaningful part spent on expanding and upgrading our R&D lab facilities and fitting out the second manufacturing floor of our facility in Singapore. This was in line with our earlier indication that CapEx in 2022 would be towards the higher end of the target range of €60-100 million.

FINANCIAL RISK FACTORS

We are exposed to market risks (including foreign exchange-rate risk), credit risk, liquidity risk, and equity price risk. We may use forward exchange contracts to hedge foreign-exchange risk. We do not enter into financial instrument transactions for trading or speculative purposes. See Note 17 to the consolidated financial statements for financial risk factors.

8.2 CAPITAL ALLOCATION POLICY

The four priorities in our capital allocation policy are:

1. Investing in growth;
2. Maintaining a strong balance sheet;
3. Paying a sustainable dividend; and
4. Redistributing cash to shareholders through share buybacks.

Our first priority is investing in the growth of our business, both organically – spending on CapEx and R&D – and also scanning the market for potential M&A opportunities. In 2022, we increased gross R&D spending by 46%, reflecting our strong pipeline of opportunities such as in next-generation GAA technologies. We spent €101 million on CapEx, including the expansion of our manufacturing and R&D facilities. We did two acquisitions in 2022, Reno and LPE. We financed the acquisition of Reno entirely out of our cash reserve (approximately €40 million in cash), and the acquisition of LPE with a combination of €283 million in cash, 631,154 ASM shares, and a conditional earn-out of maximum €100 million.

Second, it remains key for us to maintain a strong balance sheet. At the Investor Day in September 2021, we communicated that we intended to gradually increase our cash towards a target of €600 million, up from a cash target of €300 million in previous years, reflecting the increased size of our company.

Third, we remain committed to paying a sustainable dividend. With the publication of our Q4 2022 results on February 28, 2023, we announced a proposed dividend of €2.50 per share to be paid over 2022.

Finally, our policy regarding excess cash is unchanged: we continue to return excess cash to our shareholders in the form of share buybacks. Although not yet started, we still intend to execute in 2023 the buyback program of €100 million that we announced in February 2022.

PRIORITY 1

INVEST TO SUPPORT FUTURE GROWTH

- **R&D**
- **CapEx**
- **M&A**

PRIORITY 2

MAINTAIN A STRONG BALANCE SHEET

- **Increase targeted minimum cash position towards €600 million in coming years**

PRIORITY 3

SUSTAINABLE DIVIDEND PAYMENTS

PRIORITY 4

RETURN OF EXCESS CASH TO SHAREHOLDERS THROUGH SHARE BUYBACKS

CFO MESSAGE

In 2022, ASM delivered solid financial results yet again, with a 29% increase in operating profits. We also stepped up our spending to prepare ASM for the next growth phase. Our acquisition of Reno and LPE were among our highlights of the year. We believe we are on track to achieve our 2025 Growth through Innovation targets.

"OUR TOP PRIORITY IN OUR CAPITAL ALLOCATION IS INVESTMENT IN THE PROFITABLE GROWTH OF OUR COMPANY IN A SUSTAINABLE MANNER."

Paul Verhagen
Member of the Management Board and Chief Financial Officer

OUR SIXTH CONSECUTIVE YEAR OF DOUBLE-DIGIT GROWTH

ASM's revenue increased by 33% at constant currencies to a new record-high of €2.4 billion, our sixth consecutive year of double-digit growth. Also at constant currencies, equipment sales increased by 38%, for the largest part driven by strong growth in our ALD and Epi product lines. Spares & Services sales continued its own solid growth again – 11% at constant currencies, including an increasing contribution from new outcome-based services.

Coming off strong growth of 25% in 2021, the semiconductor market increased a further 5% in 2022. The WFE market increased by a high single-digit percentage in 2022 (2021: approximately +40%). In the course of 2022, the economic outlook became more uncertain, given the war in Ukraine and sharp increases in inflation and interest rates. This resulted in weakening conditions in several parts of the semiconductor end markets, especially in PCs and smartphones. The memory segment was particularly affected by the end-market slowdown, which also led to a softening in our memory business in the second half of 2022. Our total exposure to memory is, however, still relatively limited at 19% of total equipment sales in 2022. The trend in the other segments – logic/foundry, as well as the power, analog and wafer-manufacturers segments – continued to be healthy throughout the year.

Despite the slowdown in the semiconductor end-market, we increased our revenue by 21% at constant currencies, from the first half to the second half of 2022. This increase was supported by a gradual easing of supply-chain constraints. As a result, we were able to convert more of our backlog, which had strongly increased in the first half due to strong customer demand and supply-chain constraints. We ended the year on a strong note, with record-high revenue of €725 million in Q4, exceeding our earlier guidance. This was driven by further improvement in the supply situation, and also reflected solid execution by our ASM team in close collaboration with suppliers and customers.

ACQUISITIONS OF RENO AND LPE

The acquisitions of Reno Sub-Systems and LPE were important highlights for us in 2022. Reno will contribute to further improvement of our plasma products. In 2022, considering its smaller size, the impact on financial results was limited. With the takeover of LPE we have entered the silicon carbide epitaxy market, which is expected to grow by a CAGR of more than 25% in the coming years, driven by demand for electric vehicles. We paid for this acquisition with a combination of €283 million in cash and around 631,000 ASM shares (representing 1.3% of ASM's total share count, and mostly consisting of 580,000 treasury shares). In addition, we will pay earn-outs of up to €100 million, depending on certain performance metrics over a two-year period. The earn-outs will be exclusively paid in cash. LPE is growing strongly, and is expected to generate revenue of more than €130 million in 2023, up from more than €100 million previously expected. Profitability of LPE is well in line with ASM's own financial-target model. This is excluding integration-related costs and amortization of PPA, which was €8 million in Q4 2022 and is expected to be €46 million in 2023 (Reno and LPE combined). In addition, the earn-out will accrue under financial expenses for an annual amount of €10 million in 2023.

IMPACT OF EXPORT CONTROLS

In the second half of 2022, our bookings and revenue were negatively impacted by new export controls announced by the US government in October. With our Q3 results, we announced that we conservatively debooked all potentially impacted orders, which contributed to a decrease in overall bookings in Q3 compared to the record high in Q2. Following further examination, we announced at the end of November that we expected these export controls to negatively impact 15% to 25% of our sales in the Chinese market. In Q4, we again rebooked part of the orders that we had debooked in Q3.

MANAGING THE GROSS MARGIN WITHIN THE TARGETED RANGE

Gross margin decreased slightly from 47.9% to 47.4% in 2022, which was mainly mix related. Cost inflation went up considerably, but we were able to manage it well last year. In 2022, particularly in the first half of the year, we succeeded in reducing, on average, the relative cost of goods of our tools. In the second half of the year, we gradually experienced an increase in cost of goods. For 2023, we project cost of goods to continue to increase. We have responded by continuing commercial price negotiations, and have increased focus on cost-reduction value engineering initiatives. In addition, we are passing on part of the higher costs in the pricing of our own products, also reflecting the higher value we create for our customers through, for instance, continuous improvement programs (CIP). This continues to be an important focus for us in 2023 to manage our gross margins. We remain committed to the targeted gross margin range of 46% to 50% (excluding PPA expense) for the period 2021-2025 that we communicated at our Investor Day. As always, in the shorter term from quarter to quarter, application mix is the main factor explaining the variations in the gross margin. In 2022, the quarterly gross margin fluctuated within a range of 46.4% (in Q4, and 46.9% excluding PPA expense) and 48.1% (in Q3).

INCREASING R&D AND SG&A IN 2022

SG&A expenses increased by 46% in 2022. For the most part, this increase reflected strong growth in people (up 29% in 2022), with higher headcount in several areas, such as customer field support, IT, and supply chain. The increase was in part also explained by more competitive compensation benefits, both fixed and variable, and an increase in staff-related expense, such as travel. We also stepped up investments to grow in a sustainable manner, and we managed to get 75.6% of our total electricity consumption from renewable energy. Sustainability is one of the key elements of our strategy, and it is good to see that our increased focus in this area is being increasingly recognized. One example is the inclusion of ASM in the AEX ESG index last year. The increase in SG&A in 2022 also reflected our earlier decision to invest in strengthening the organization, and prepare for expected higher activity levels in coming years. Towards the end of the year, we completed most of these investments, and SG&A in Q4 stabilized quarter-to-quarter on a comparable basis, excluding LPE. For 2023, we expect the rate of the increase in SG&A to moderate significantly (excluding PPA expense), and to limit the overall increase in costs at a time of increasing economic uncertainty.

We increased net R&D expenses by 55%. An important reason was the 49% increase in headcount, more competitive benefits, both fixed and variable, and, more generally, a strong increase in the number of R&D projects. Net R&D grew somewhat faster than gross R&D (+46%), due to moderate growth in capitalization of development expenses (+25%). Net R&D grew slightly faster than revenue, and increased as a percentage of revenue from 9% in 2021 to 10%. This is in line with the projections we made at our Investor Day in 2021 to bring R&D to a range of a high single-digit to a low double-digit percentage of sales. R&D is our lifeline. In 2023, we project a further double-digit increase in net R&D expenses. This reflects a strongly increasing number of customer R&D engagements, and expanding opportunities for new applications in the next technology nodes, such as the inflection to the new gate-all-around (GAA) devices in logic/foundry.

Operating profit increased by 29% to €632 million. The operating margin decreased from 28% to 26% in 2022, due to the slight decrease in gross margin, and the increase in operating expenses. On a normalized basis, share in income of investments in associates, which reflect our 25% stake in ASMPT, decreased by 9%. In the third quarter of 2022, we also recognized a non-cash impairment charge of €321 million to account for the reduced market valuation of the stake in ASMPT. This impairment was partly reversed in the fourth quarter, leading to a net impairment charge of €215 million in full year 2022. Excluding the share in income of investments in associates and excluding the impairment of the ASMPT value, the effective tax rate amounted to 17.7% in 2022 (2021: 19.6%). Normalized net earnings increased by 24% to €627 million.

HEALTHY INCREASE IN FREE CASH FLOW, CONTINUED STRONG FINANCIAL POSITION

Excluding €314 million in cash spent on acquisitions, we generated free cash flow of €381 million, up 43% from €266 million in 2021. The improvement was driven by improved underlying profitability, and in spite of an increased cash outflow for working capital and higher CapEx. Working capital increased from €316 million to €497 million. This was mainly driven by a substantial increase in inventories. To have more flexibility amid supply-chain conditions, we increased our buffer inventories of critical parts and materials. Supply-chain constraints also resulted in more of our tools waiting for missing parts before we could complete and ship them to customers. The increase in inventories was partly offset by an increase in short-term liabilities.

In 2022, our CapEx increased from €79 million to €101 million. This is in line with our earlier indication that CapEx would be towards the higher end of the target range, as some spending was carried over from 2021. It is also due to increased spending on the further expansion and upgrading of our R&D labs.

ASM's financial position remained very strong, with €419 million at the end of 2022, and no debt. Cash decreased compared to €492 million at the end of 2021, explained by the cash spent on acquisitions and €122 million paid in dividends during 2022. At Investor Day in 2021, we said we would gradually increase our targeted cash position to €600 million.

INVESTING IN THE SUSTAINABLE GROWTH OF OUR COMPANY

Our top priority in our capital allocation is investment in the sustainable growth of our company. That means spending on R&D, but also on CapEx, and on M&A if attractive opportunities arise as they did last year with Reno and LPE. For 2023, we are planning for CapEx of €150-200 million. This is significantly above the mid-term target of €60-100 million annually, and is explained by the further expansion of our innovation and manufacturing infrastructure that we are planning in the next few years. We completed the second manufacturing floor of our Singapore facility, which has substantially increased our flexibility in the near term. To support growth beyond our mid-term guidance, we require increased manufacturing and lab R&D capacity, and need to start preparing for this now. In February 2023, we announced our plan for an investment of around US$100 million, in the period up to 2025, to significantly increase our R&D and manufacturing facility in Korea. We are also exploring options to expand our activities in Phoenix, Arizona, and in Europe.

We remain committed to our sustainable dividend policy. With the publication of Q4 2022 results on February 28, 2023, we announced a proposed dividend of €2.50 per share for approval by the AGM on May 15, 2023. The €100 million share buyback for 2022-2023 that we announced in February 2022 was not started last year, due to the cash we spent on acquisitions in 2022. We plan to execute this buyback program in 2023.

ON TRACK FOR OUR GROWTH THROUGH INNOVATION TARGETS

Underlined by our solid performance in 2022, we believe we are on track for our Growth through Innovation targets that we launched at our Investor Day in 2021. One of these targets is to grow revenue to a level of €2.8-3.4 billion by 2025, implying a CAGR of 16%-21% in the period 2020-2025. Important drivers to achieve this include continued growth in our ALD product line, and expansion and share gains in the Epi market. These targets exclude the acquisition of LPE. We are planning to have our next Investor Day in September 2023.

As we enter 2023, there is increasing uncertainty about the macroeconomy, and this is expected to impact the semiconductor market. WFE spending is forecasted to drop by a mid-to-high teens percentage in 2023. We feel confident about ASM's positioning, however, on the back of our record-high order backlog, our strong share in the leading-edge logic/foundry market, our newly introduced products and applications, and supported by a very strong balance sheet. We expect that the investments we are planning for, combined with the strengths of our customer engagements, our talented people, and our innovation, will position ASM for continued healthy growth.

March 2, 2023

Paul Verhagen
Member of the Management Board and Chief Financial Officer

9. INNOVATION

Our R&D network is well suited to initiate and coordinate collaborations globally. In 2022, we significantly increased gross R&D spending by 46%, as we continued to execute on our roadmaps and opportunities in the next technology nodes. We grew the number of R&D employees from 649 to 965.

2,619	€302M	965	8
Patents in force	Gross R&D	R&D headcount	R&D centers

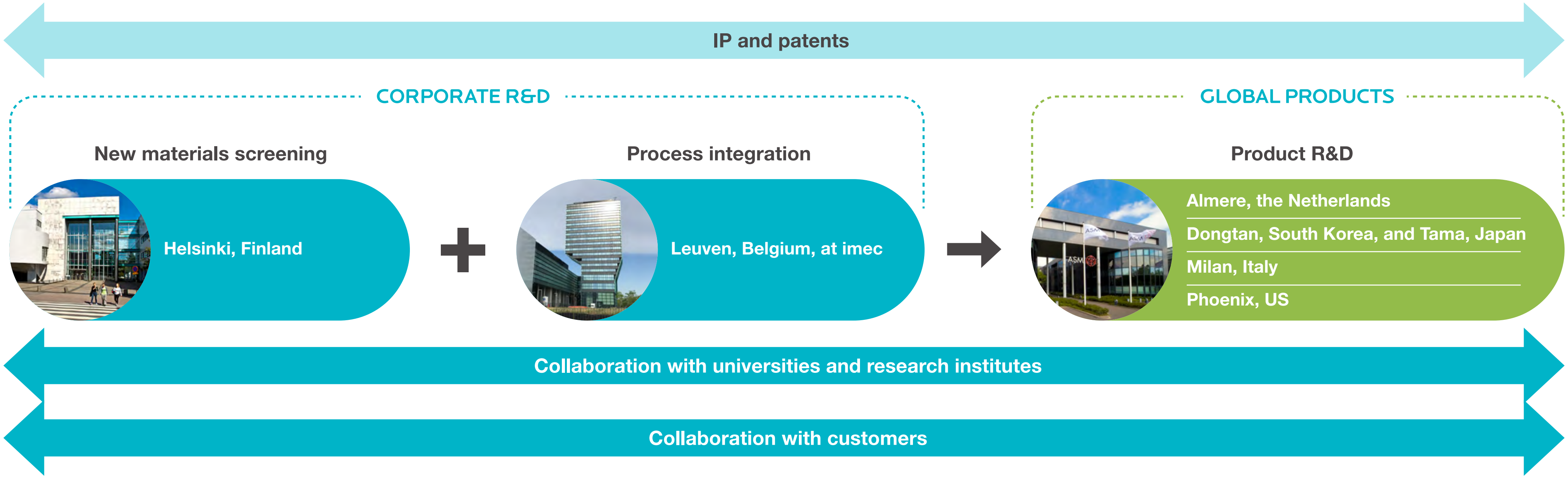
9.1 ASM R&D STRATEGY AND MODEL

ASM has a globally decentralized R&D and engineering organization, with a corporate R&D group. Resources are located mainly in Helsinki, Finland, and Leuven, Belgium, with additional resources at our product-development sites in the Netherlands (Almere), the US (Phoenix), Japan (Tama), and South Korea (Dongtan). We manage our R&D effort centrally from our headquarters in the Netherlands.

The corporate R&D group addresses common needs for advanced process and materials development. It also looks at process integration work for the advanced nodes that are four to eight years away from initial semiconductor production at our customers. R&D work at our Helsinki location focuses on synthesis and screening of precursor chemistries required for developing new ALD materials. At Leuven, the focus is on application development through integration and device characterization of these new materials in structural and electrical test structures – making use of the imec infrastructure.

Our product-development sites each focus on a subset of products and technology. With the acquisition of LPE, we expanded our R&D footprint with a presence in Italy, focused on silicon carbide epitaxy.

We embed IP managers at each of these locations to make sure we actively capture and protect innovation that enables our technical leadership.



9.2 CORPORATE RESEARCH

GLOBAL RESEARCH AND ACHIEVEMENTS

In 2022, we significantly increased our capital investment related to R&D activities, and grew the number of R&D employees from 649 to 965, to accommodate the growing pipeline of new opportunities. These investments included demo, R&D, and metrology tools. We also have an expansion plan for our Helsinki R&D facilities, to increase our capability in materials development. To this end, we signed an agreement to lease cleanroom space for four years – starting in April 2023 – in an existing cleanroom facility, to bring in our latest ALD tools.

Our global R&D network is well suited to initiate and coordinate collaborations globally, and manage them centrally. Accordingly, as an integral part of our roadmap-driven R&D efforts, we have expanded our external R&D engagements with new collaborators.

In 2022, we signed a new strategic partnership – renewed for the fourth time – with the Interuniversity Microelectronics Center (imec) in Leuven, Belgium, the world-leading R&D institute in our industry. The partnership, which extends through 2025, significantly expands on the scope of our previous agreement, roughly doubling R&D spend over the next four years. As well as existing areas of collaboration, the new agreement includes taking part in a heterogeneous integration program at imec. The scope includes many of our state-of-the-art 300mm products, as well as work involving disruptive inflections in our industry that may materialize beyond 2026. The imec collaboration gives us the opportunity to investigate, both jointly and independently, the integration of individual process steps and new materials in electrically active devices. We have partnered with imec since 1990, with significant on-site representation since 1994.

In February 2022, we signed a new five-year agreement with the University of Helsinki to form and fund the Atomic Layer Deposition Center of Excellence (ALD CoE). This is a significant expansion of the nearly two-decade collaboration with the university that first started in 2004. The ALD CoE will focus on research around ALD necessary for future semiconductor technologies. The ultimate aim is the design of new precursors, processes, and materials that will have great scientific and technical impact. We are co-located with the university, allowing for a close collaboration on creating new ALD chemistries and developing new materials deposited by ALD. The intended timeline to bring most of these targeted innovations into production is towards the end of our horizon of 2028, and beyond.

Vamsi Paruchuri
VP of Technology & Corporate R&D

"THE CORPORATE R&D TEAM CONSISTENTLY STRIVES TO MAINTAIN ASM AS AN INNOVATION LEADER. THEY EMBODY OUR VALUE 'WE INNOVATE'."

ASM joined the Semiconductor Research Corporation (SRC) program on Nanomanufacturing Processes starting in 2022. Through this membership, ASM gains access to and actively participates in forward-looking pre-competitive semiconductor research at leading universities around the world. Also, this membership creates direct access to graduate students as new hires who are highly qualified in ALD and other relevant areas of expertise. In 2022, we continued our joint development programs with IBM in their SUNY Albany research center, focusing on the Epi and ALD materials needed to enable future gate-all-around (GAA) device nodes.

Through our network, we collaborate with universities in several countries on a bilateral basis, including, among others, academic institutions in the Netherlands, Belgium, Finland, the United States, Canada, Japan, and South Korea.

We contribute to several process and equipment-development projects at the major Dutch technical universities through the Dutch NWO[1] funding organization in the domain TTW[2] (covering applied and engineering sciences). In Belgium, we take part in the industrial users group for several projects supported by the Flemish funding organization VLAIO[3].

We applied for membership of the European Industrial Alliance for Processors and Semiconductor Technologies. Its two main objectives are to reinforce the European electronics design ecosystem, and establish the necessary manufacturing capacity along a twin track towards 16nm to 10nm, and below 5nm to 2nm, and beyond. We are discussing partnerships in projects related to the Important Project of Common European Interest (IPCEI) on Microelectronics and Communications Technology.

We take part in select publicly funded programs to research and develop 'More than Moore' technologies. This is a strongly growing market of various types of analog chips not driven by

1 De Nederlandse Organisatie voor Wetenschappelijk Onderzoek ("Dutch Organization for Scientific Research")
2 Domein Toegepaste en Technische Wetenschappen ("Domain for Technical and Applied Sciences")
3 Vlaams Agentschap Innoveren & Ondernemen ("Flemish Agency for Innovation and Entrepreneurship")

the same Moore's Law technology scaling inflections of mainstream logic and memory chips. We are also a member of the Association for European NanoElectronics Activities (AENEAS), and take part in roadmap activities.

We occasionally cooperate with other semiconductor capital equipment suppliers in complementary fields. Our aim is to learn more about how our own deposition processes perform, in cooperation with other processes, either in bilateral or consortia projects.

We continuously engage in formal joint-development programs (JDPs) with customers for 300mm applications of our products. We also actively evaluate our most advanced technologies with selected customers. The scope of these JDPs span many nodes – from the current node in production to N+2 and beyond nodes in logic, foundry, DRAM and 3D-NAND technologies. For the logic/foundry technologies, there is a significant increase in our engagements related to GAA devices as they get closer to HVM readiness.

9.3 PRODUCT DEVELOPMENT

GLOBAL PRODUCTS AND DEVELOPMENT

Our global product-development sites are centers of excellence for a subset of products and technology. The Phoenix location focuses on products for thermal ALD and Epi; Almere, the Netherlands, for vertical furnaces; Dongtan, South Korea, for PEALD; and Tama, Japan, for PECVD and PEALD, in collaboration with Dongtan. Through the acquisition of LPE in Q4 2022, we now also have R&D and product-development facilities focusing on silicon carbide epitaxy in Italy (Milan and Catania). While our advanced R&D sites focus on future technology needs, our key product units work with customers on the products and technology currently in volume manufacturing or to be used in manufacturing in less than six years' time. The global platform engineering group addresses the need for common platforms and software for the various products in our product portfolio, and across different key-product units. This helps us drive the standardization of hardware and software throughout the organization.

We continuously drive innovation of our products and services to address the technology needs of our customers, and the industry's focus on reducing costs and improving environmental footprint. Our development programs aim to increase throughput, equipment reliability, and yield in our customers' manufacturing line, as well as lower the energy and resource intensity, and cost of ownership. Our customers benefit through reduced operating costs, as many of our products use the same parts and consumables, while a common control architecture improves ease of use.

The South Korean facility is one of our product R&D centers.

To support our strong increases in the ALD and Epi growth markets, we invested further in modernizing the equipment base in our Phoenix R&D facility. This includes investments in more of the advanced metrology tools we use in our labs. We also expanded our Tama, Japan, R&D facility, and are planning to grow our Dongtan, Korea, R&D footprint.

IMPROVING COST OF OWNERSHIP AND TECHNICAL PERFORMANCE

Innovation in products and platform technology is one of ASM's most important strengths, bringing continued improvements in technical performance and cost of ownership. In the following section, we highlight a few examples of the many innovations we introduced in our ALD and Epi products in 2022.

ALD

We optimize our ALD products and have introduced specific innovations for different applications. For example, for metal oxides, we have developed a new reactor with the flexibility to deposit five, six, or even seven elements. This is important because new materials are driving Moore's Law. This ability to mix and match different precursors allows us to develop new materials that are unknown to humanity right now. This has been an important factor in developing new ALD applications, such as for use in GAA.

For all metal ALD applications, we have further developed and optimized a surface clean (SC) technology. This technology has been integrated on the same platform with the metal ALD reactors, so as not to break vacuum. SC reactors remove any impurities or moisture from the wafer surface prior to metal ALD deposition.

In memory devices, ALD has seen an increase in use for gap-fill applications. We are able to gap-fill high aspect ratio (>100:1) structures with our innovative TENZA ALD technology. Our ALD technology has been selected for use in several applications in 3D-NAND.

The majority of the ALD films are deposited on the XP8 platform in a dual-chamber module (DCM) or quad-chamber module (QCM) architecture, to improve productivity and reduce the cost of ownership.

Our ALD product portfolio expanded considerably in 2022, with a significant range of new applications. However, we kept the key advantages of our core reactor-design consistent, such as a small reactor volume. This allows for very fast cycling times and an ALD reactor design that provides excellent uniformity and homogeneity. We are able to purge the precursor very fast. This is important for gap-fill applications where it is challenging to purge out the precursor from the deep structures.

EPI

The reaction chamber design of our Epi tools includes several key innovations, important to providing optimal value to our customers as they transition to the next-generation device structures. One important example of an innovation we introduced in 2022 is VERACE-CL. In Italian, VERACE means ‘accurate’, while CL is closed loop. VERACE-CL is the industry’s first across-wafer direct temperature measurement and control system, which enables unmatched wafer-in-wafer and wafer-to-wafer uniformity. VERACE-CL is the only technique that can measure the actual wafer temperature. All previous techniques measure the susceptor temperature, on which the wafer sits and make a correlation to the wafer temperature. The ability to actually measure and control the wafer temperature makes for accurate matching. This allows thickness control one monolayer at a time, bringing important advantages such as in GAA nanosheet applications.

NEW PRODUCTS AND APPLICATIONS IN 2022

In 2022, ASM introduced new products, system upgrades, and many new applications. Most new process applications are customer specific, typically outcomes from our collaborative joint-development programs.

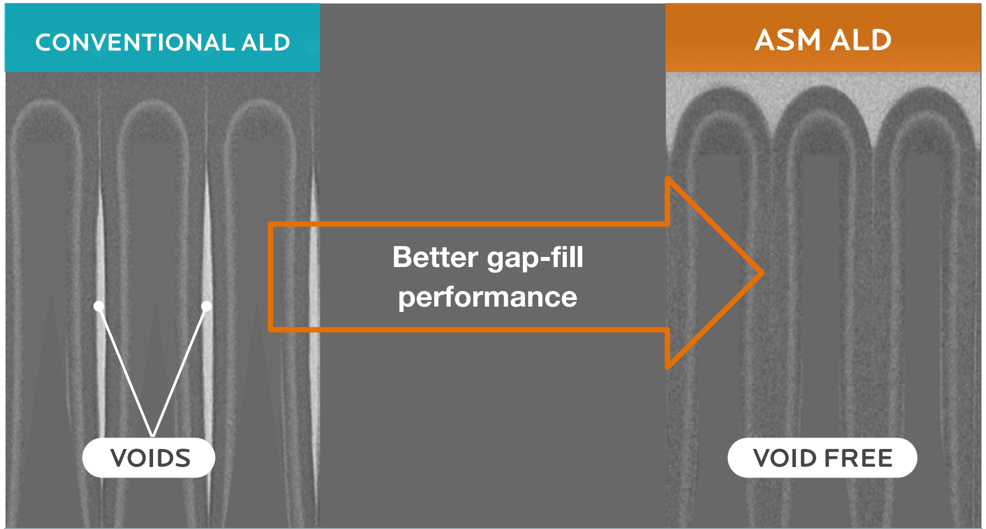
Compared to the A412, the SONORA achieves 30% higher productivity and a 50% lower cycle time. The SONORA has been designed for productivity, reliability, and serviceability with advanced process controls. It was able to achieve 98% availability in HVM environment.

A SONORA tool in one of our training rooms.

We launched our new SONORA vertical furnace at Semicon West 2022 for 300mm logic, foundry and memory applications, as well as for 300mm analog/power applications. SONORA is fully compatible with the original A412 furnace, so existing process recipes are easily transferred, accelerating system qualification and ramp-up.

Also at Semicon West, we introduced TENZA ALD, an innovative process technology that provides excellent film quality, conformal coverage through the full trench, and the highest productivity in its class. TENZA ALD enables a variety of silicon oxide applications for gap-fill, and liners for a range of structures in advanced transistors, memory devices, and interconnects.

Other recent new products include the Intrepid ESA 300mm epitaxy tool, introduced in 2021 for analog/power devices, and for epitaxial silicon wafers. Based on our Intrepid ES tool, the Intrepid ESA has innovative technologies and features that provide unmatched in-film performance and reactor availability, including for relatively thick Epi layers in power applications. The Intrepid ESA has been well received in the market, and we delivered more than 100 reactors.



GAP-FILL SIO / SIN

Gap-fill is a deposition process used to fill a previously etched space with a material such as silicon oxide. Filling material in high aspect ratio, deep trench structures is very challenging. The left side image of a conventional ALD process shows poor quality gap-fill because of incomplete filling where voids (white areas) remain in the trenches. The right side image shows ASM's TENZA ALD gap-fill technology, where silicon oxide films are deposited void-free in the deep trenches.

In late 2019, we launched the new A400 DUO vertical furnace tool addressing 200mm applications for power, analog, RF and MEMS devices. The A400 DUO has been very successful with, in total, more than 150 reactors shipped.

INNOVATION IN SPARES & SERVICES

The technology-development team in Spares & Services has grown significantly in the past few years. Innovations are multiplying worldwide, many more are being developed, and patents are being filed. The focus of these innovations is on the parts making up our systems. We are developing these based on the key issues customers encounter as they use our systems in different ways and over long periods. We focus on how we innovate to overcome these issues, on making the system perform better on wafer (lower defects, better uniformity, etc.), and more consistently over longer periods of uninterrupted use at lower costs. Primary focuses are on evolving the internal chamber part surfaces to make them more robust for our evolving uses, enabling the refurbishment and reuse of parts rather than replacing them, and making parts last longer. This results in lower costs and more product outs for our customers.

For services support, we make sure lessons do not need to be learned twice. We do this through a 'Knowledge Net' that captures, stores, and retrieves the information that allows our support to be as efficient as possible and resolve issues faster. And as part of Knowledge Net, we are developing AI / machine learning-based data capture and learning so we may understand how to make our tools operate most effectively to levels that were previously unobtainable. The effects of these efforts are outcomes to our customers delivering lower costs, higher device yields, and more output per system footprint in their fabs.

Our complete kit management (CKM) is one example of our new outcome-based service products developed in recent years – a service that aims to make the maintenance process faster, more efficient, and cost effective, through, among others, smart planning and proactive maintenance. Previously, system maintenance meant significant downtime – regularly, given the many different parts – which added to its operations costs. With CKM, we can combine the repair, replacement, and preventive maintenance of several different parts, resulting in a significant reduction in the time it takes for a system to be taken down for maintenance until it is back up and running. It also means more time between maintenance. It works in much the same way as pit stops do in F1 racing, where downtime is everything. Like pit stops that keep cars in the race through necessary maintenance stops, CKM aims to keep ASM's systems on site at our customers running with the highest possible uptime. CKM also puts significant focus on reducing the carbon footprint of our maintenance through repairing, refurbishing, and cleaning used parts for reuse, rather than replacing with new parts. Uptake of CKM is on the rise for these reasons. In 2022, we booked new multi-year contracts again.

At ASM, we recognize the benefits of a circular economy and the importance of eco-design for addressing systemic issues like climate change, biodiversity loss, and pollution. Our innovation in spares and services strives to contribute to this need, working toward ensuring the materials throughout our machines are used in an optimal way.

9.4 INNOVATION AND SUSTAINABILITY

RESEARCH SUSTAINABILITY

Guided by our road-mapping process, led globally by the Office of the CTO, and the associated controls, we prioritize our work towards the most likely technologies needed for future technology nodes. Additionally, we use vertical collaboration to achieve more efficiency in R&D and effective down-selection of options. These two processes, prioritization and vertical collaboration, result in fewer materials and wafers being wasted in experiments.

Executing part of our new chemistry developments and initial selection in a lab on coupons in R&D systems, rather than on full wafers in 300mm manufacturing systems, minimizes the number of experimental trials needed to conclude a development. This reduces energy and chemicals consumption, as well as silicon wafer usage.

In our selection process for chemistries, during our initial pathfinding, we investigate many different precursors and chemistries. A sustainability review of these chemistries is now an integral part of our selection process. Although ASM uses only a relatively small amount of these chemicals internally in its R&D process, their use down the value chain by customers can be very large. These initial chemistry choices are therefore important in minimizing the environmental footprint of our equipment in operation at our customers.

We rigorously improved our R&D processes using an effective tollgate (or phase gate) process, and various pipeline controls. This improves the effectiveness and efficiency of our R&D process, decreasing waste in chemicals, materials, and test wafers in the range of 25 to 50%.

We use proprietary techniques in data science in planning and conducting our R&D. This serves to optimize the efficiency and effectiveness of product and process development, and knowledge transfer. This in turn has proved to significantly reduce energy and resource consumption. With advanced models of process and hardware behaviors, we are better able to identify and robustly validate further improvement opportunities. Such advanced techniques are necessary in working at atomic scale, to balance deposition performance with energy and resource consumption.

In April of 2022, we joined the imec Sustainable Semiconductor Technologies and Systems (SSTS) research program, which is aimed at reducing the semiconductor industry's carbon footprint, and is consistent with our long-standing strategic partnership with imec. The imec SSTS program is strategic to our industry, and its charter is aligned with and supportive of our strategy and our Net Zero by 2035 target. Our ambition in all our sustainability efforts is to engage and collaborate with key partners, like imec, to make a positive impact in the world beyond our individual scale.

ENABLING MORE POWER-EFFICIENT CHIPS

Some of the materials and processes we work on with our customers enable more energy-efficient chips, with transistors and memory elements that consume less power per operation, and interconnect with lower power losses. In 2021, 2.1-2.4% of the world's energy[1] was already used for processing (1%) and communicating (1.1-1.4%) data across the internet, and in data centers. This energy use roughly doubles every three years, growing much faster than overall global energy use. New materials and process technologies developed by ASM help to reduce the power consumption in advanced semiconductor devices, while increasing their performance. For example, ALD gate dielectrics and new work function (WF) metals enabled reductions in gate leakage current by 1000x. ALD, due to its near-perfect conformality, also enabled the transition of device architectures from planar to 3D FinFET structures. FinFETs have a lower power consumption per operation than planar FETs.

Going forward, ALD and Epi processes will play a crucial role in the next device architecture migration from FinFET to GAA nanosheet transistors. Compared to FinFET, the GAA will consume less power per operation. The migration of DRAM periphery to high-k dielectric and metal gate significantly reduces its dynamic and static power consumption, just like it did for logic devices. Also, we expect that the new materials for memory that ASM is currently researching – such as phase-change materials and ferroelectric materials – will play a significant role in future energy-efficient memory devices, and energy-efficient AI architectures.

1 www.iea.org/reports/data-centres-and-data-transmission-networks

PRODUCT SUSTAINABILITY AND ECO-DESIGN

Customer use of our products through their productive life represents the most significant portion of our greenhouse gas footprint (reported as Scope 3 Category 11 emissions). As such, progress here is vital in achieving our Net Zero by 2035 target. The main factors are process chemistries and supporting gases, and electricity consumption. As such, improving the energy and resource efficiency of our products, and speeding up customer adoption of renewable energy is paramount. To this end, we have included improvement in energy and resource efficiency in our plans for our Net Zero by 2035 target.

We design leading ASM products with a fundamental, innovation-driven, and intrinsic technology advantage in energy and resource efficiency, through which we drive continuous improvement. For example, optimizing chamber size and thermal efficiency, extending time between chamber maintenance, maximizing system throughput, and other aspects, creates a performance advantage. As a result, these products are already meeting our customer's highest energy-efficiency rating. We believe ASM can continue to innovate and improve tool energy and resource efficiency.

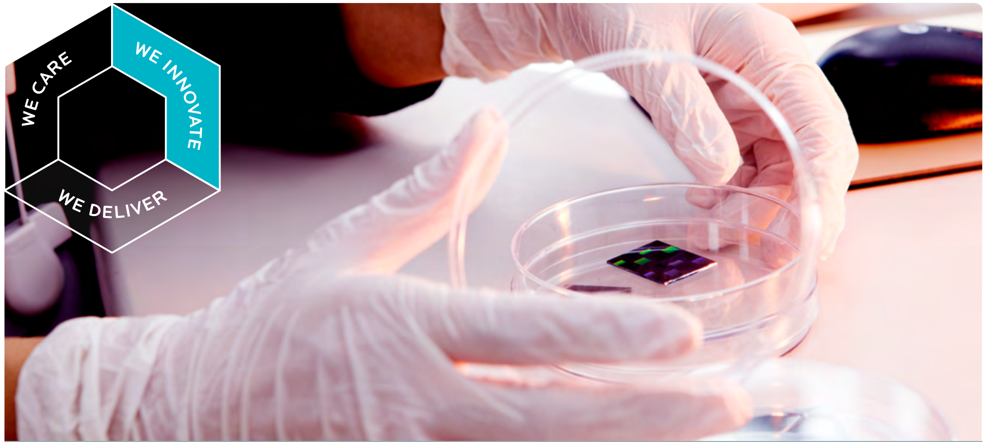
In 2022, ASM increased its focus on eco-design in reducing the energy used and resources consumed across our product portfolio. Working closely with our customers, ASM has improved the wafer productivity of our tools. This not only reduces the energy consumption per process step per wafer, in terms of direct consumption of energy and gases, but also in terms of cost per square area per wafer and per cleanroom footprint. As an example, we improved the robotics and wafer handling of our leading XP8 ALD systems to increase wafer throughput by 15-20%. This increased the overall productivity of the system without compromising film quality. These innovations will be extended to HVM in 2023. In another case, we developed an improved load lock module for our atmospheric epitaxy systems, Intrepid ESA, used by customers in the power electronics space. This allows them to not only improve overall throughput but also be able to run smaller batches, increasing their overall factory productivity. This innovation will be extended to HVM in 2023.

In addition to productivity improvements, we have enhanced our methods for tracking, collecting, and analyzing the energy and resource consumption of our products using SEMI S23 guidelines and measurement protocols. This further improves our science and data-driven approach to reducing our consumption footprint. We have also increased the selection of green-certified components, initiated more collaborations with OEM suppliers, and continue to broaden our innovation network.

In line with our ambition to further accelerate sustainability, we have identified directions that will enable additional gains for new products. These include:

- Further innovation in wafer throughput;
- Compact chamber and system design to minimize cleanroom footprint;
- Advanced energy-saving states and implementing intelligent handshake with such equipment;
- Increasing innovation in and selection of high-efficiency components;
- Facilitating selection of greener supporting equipment by our customers;
- Further optimization of electricity, water, and gas flows to lower consumption without compromising film performance; and
- Circular product shipping container materials.

We believe these directions will enable us to meet or exceed industry targets in the near and longer term.



FROM IDEA TO PROOF-OF-CONCEPT

Vincent Vandalon – Senior Process Engineer

At ASM's research and development, our goal is to develop novel solutions for our customers' future needs. The creative and the varied nature of the work is a key driver for me and what attracted me to ASM. So, our new INNOVATE platform – ASM's digital application to share challenges – quickly caught my interest.

One of the challenges was to come up with a solution to measure the solid precursors remaining in a solid source. In-place level sensing is already an industry standard for liquid precursors, but solids pose additional challenges like high operating temperature.

At the moment, the only option is to weigh the vessel – causing significant tool-down time, and so making it a high-value problem. I thought about this challenge during my daily runs, and came up with several material properties that could be exploited.

After talking to colleagues and some back-of-the-envelope calculations, one solution looked very promising. So, I built a prototype from some old parts, and it turned out to already exceed the specifications! I got the opportunity to present the ideas to several stakeholders and it was received enthusiastically, resulting in a patent for ASM. For me, personally, it was very exciting to be challenged in a different way and see an idea taking off.

PRODUCT LIFECYCLE MANAGEMENT

Product stewardship and product lifecycle (PLC) management are the foundation of our product-development efforts. This involves in-depth understanding of our markets and the challenges our customers face, as well as the expectations of other stakeholders for responsible product-lifecycle management. Effectively translating these inputs into product development-program requirements helps us address our customers' challenges, enable their roadmaps, and meet stakeholder expectations.

We examine the environmental impact of our products along their entire lifecycle, from ideation to end-of-life, looking for further eco-design opportunities to increase efficiency, circularity, and overall sustainability. Ultimately, this approach allows us to develop products more efficiently as well. It results in products that are more efficient and productive, with the aim of extending useful life and lowering lifecycle environmental impact.

Our product lifecycle process follows the well-established construct of phase-gate product development, guided by several key inputs:

a. Our collective industry knowledge/experience and subject-matter experts;
b. Industry/customer requirements and frameworks (such as customer-purchase specifications and business requirements); and
c. Industry regulations, standards, and guidelines.

We document the product development-program requirements from these inputs in market requirement specifications (MRS), which become the objectives we need to meet throughout the development process. The MRS are updated periodically to capture changes in market conditions, regulations and standards, and related requirements. Governance is provided through key technical and program execution (e.g. architecture, design, and validation reviews), and lifecycle phase exit meetings through the stages of the program.

ASM maintains a global[1] ISO9001:2015 registration, relating to the scope 'design, sell, make, install, and customer support of front-end semiconductor processing equipment', which was recertified on August 1, 2022. The next recertification audit is in April 2025.

1 Global registration includes 100% of key sites in its scope

9.5 INDUSTRY TECHNOLOGY ROADMAP

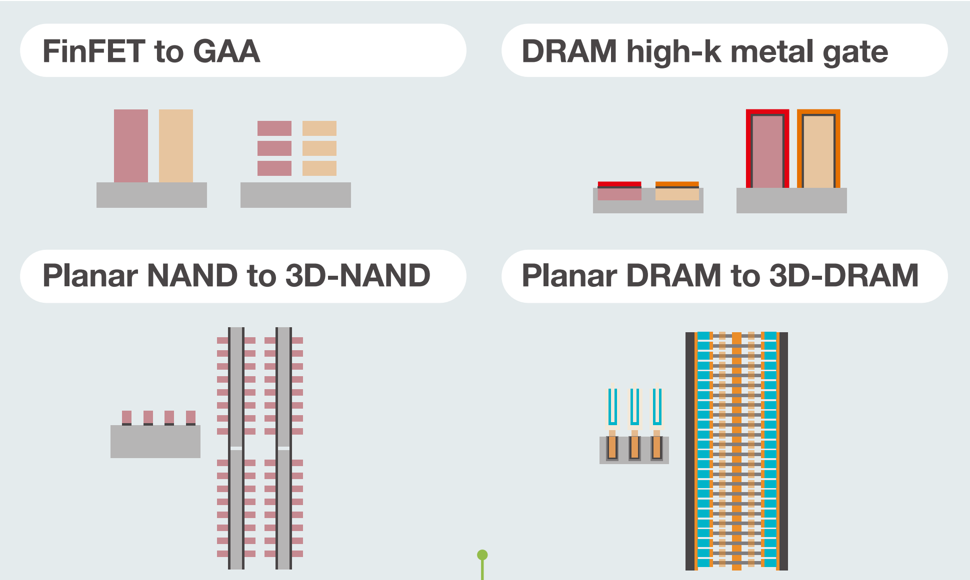
At ASM, we believe that as long as there is growing demand for semiconductors, Moore's Law – or at least a generalized version of it – will continue. Scaling of the smallest dimension through lithography is no longer enough to increase density and decrease cost-per-function. Increasingly, scaling is complemented with a move to the vertical dimension '3D'. A first example of this was the transition from 2D-NAND to 3D-NAND non-volatile memory with, currently, more than 128 transistors aligned vertically along a single vertical channel.

A second example of 3D is the GAA transistor, poised to take over in a few years, following five or more generations of FinFET. This stacks up to four channels on top of each other, significantly multiplying the current a particular transistor can carry. Simultaneously, this improves the control over that current. Third, chips are now stacked vertically in a package to reduce the package size and shorten the connection lengths between the chips. For example, a high-bandwidth DRAM device integrates a logic chip, formerly 'the periphery' in a single chip, with multiple vertically stacked memory arrays in a single package. And fourth, the difficulties in scaling the cost and size of a DRAM is expected to lead to a transition to stack transistors vertically in a 3D-DRAM beyond 2026.

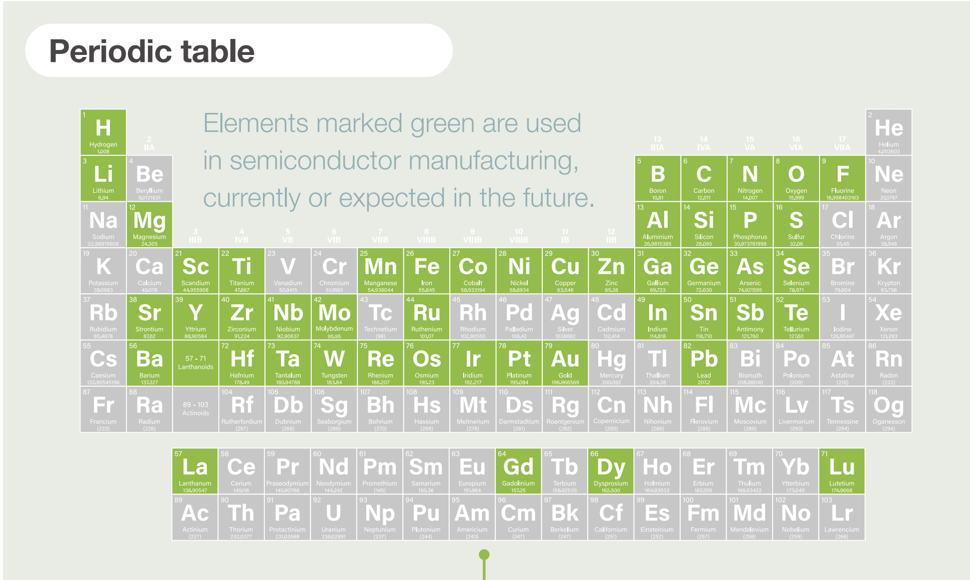
3D AND NEW MATERIALS

Next-generation semiconductors increasingly require:

3D structures



New materials



3D AND NEW MATERIALS INCREASINGLY REQUIRED FOR NEXT-GENERATION SEMICONDUCTORS

ALD

Due to its ability to create substantially uniform and high-quality layers of complex materials over 3D structures ('conformality') at relatively low temperature, the share of ALD (including PEALD) in the deposition market is expected to grow substantially with this trend towards 3D. On the one hand, existing technologies like LPCVD are being replaced by single-wafer ALD. On the other hand, new ALD processes will enable further changes in device architecture that will not be possible with other deposition technologies. New materials, such as better conductors and insulators, for example, will be needed to maintain adequate electrical performance. Materials need to be deposited in narrow, deep gaps, without any holes or seams. More and more of these critical process steps are expected to migrate towards ALD and PEALD.

EPI

The GAA transistors will rely on an epitaxial superlattice of as many as eight to 10 silicon and silicon-germanium layers. For 3D-DRAM, this superlattice is expected to be even taller – starting with around 64 layers. This is expected to scale quickly to even more layers. The new GAA transistors will also need new epitaxial contact layers, selectively grown bottom up with high doping. In addition, power electronics for, among others, EVs, will need thick epitaxial layers.

Overall, we believe ALD and Epi are the most important growth markets – at least in the next five years. Accordingly, we have focused most of our R&D spend on these technologies.

INTERVIEW WITH THE CTO

Hichem M'Saad was appointed as ASM's new Chief Technology Officer and a member of the Management Board in May 2022. In the interview below, Hichem shares some insights into technology trends in our industry, such as how new materials and 3D structures will drive increasing ALD adoption, the transition to gate-all-around in logic/foundry, and new applications in memory. He also comments on the contribution of product development to ASM's Net Zero by 2035 ambition.

Some would argue that Moore's Law has come to an end. What's your view?

We're confident Moore's Law is continuing, and we expect it to continue for at least the next decade – and likely longer than that. This will be driven by device and transistor innovations, enabled by new materials and full use of the third dimension (3D). We believe, too, that more functions per chip area can, and will be, integrated in the coming decade, and that we'll need continuous innovation in semiconductor technologies to make this happen – not only in core logic and memory, but also in heterogeneous integration and advanced packaging.

In the past decade, device structures have been moving from 2D to 3D. For example, NAND has gone from 2D-NAND to 3D-NAND. DRAM today is still 2D-DRAM, but developments are on the way to develop 3D-DRAM. In logic, FinFET is moving to gate-all-around. Beyond GAA, CFET will take over as the new logic device structure. What's common among all these technologies is that we're going vertically.

How essential do you think ALD is in future nodes?

ALD becomes increasingly essential in future nodes, driven by the trend for thinner films, new materials, and vertical scaling. Because the ALD process is self-limiting, the film is deposited one monolayer at a time. By repeating the process, as many more layers as desired can be built up. Since such precision in layer thickness is impossible to achieve with other techniques – such as chemical vapor deposition – ALD is the only option available when the required layer thickness drops below a critical lower limit. Right now, we're seeing many of the CVD layers transitioning to ALD. ALD is the new CVD.

As mentioned, innovation in new materials is driving Moore's Law. And ALD is playing a significant role in developing new materials that are still unknown to us today. In fact, the self-limiting nature of the ALD process allows for the unprecedented development of new materials with a precise and repeatable composition. Only ALD is uniquely qualified to deposit these materials with the precise composition and thickness-control necessary for advanced semiconductor devices.

Hichem M'Saad
Member of the Management Board and Chief Technology Officer

"OUR FOCUS HAS ALWAYS BEEN ON INNOVATION AND EARLY CUSTOMER ENGAGEMENT."

As more device structures evolve into 3D, requirements for conformal layers with homogeneous film composition and excellent electrical and mechanical properties tend to favor ALD, due to its unique control and exceptional step coverage.

Going forward, how do you see ASM and customers collaborating?

Our focus has always been on innovation and early customer engagement. Due to our market-share wins in the past few technology nodes for ALD and Epi, we've gained experience over several device generations in supporting tools in high-volume manufacturing. This experience includes a stronger focus on customer satisfaction. As a next step in our development as a close partner to our customers for new technology pathfinding, we recently made infrastructure investments by expanding the advanced metrology capability in our demo labs. This prepares us for even closer collaboration with our customers going forward.

"ALD ADOPTION IS STILL IN ITS EARLY INNINGS – ALD IS THE NEW CVD"

ASM has acquired LPE, the Italian manufacturer of epitaxy systems for silicon carbide (SiC). ASM has been active in silicon epitaxy for decades. What synergies exist between ASM's silicon Epi experience and silicon carbide epitaxy?

LPE's SiC reactor is enabling; it's very similar to ASM's cross-flow Intrepid ES reactor for silicon epitaxy, which has proven to be very successful in HVM. LPE's reactor provides SiC epitaxial films with lowest defects, which is a key material property for SiC power devices to function optimally.

In terms of synergies, ASM will use its experience in manufacturing and servicing silicon epitaxy tools in HVM to strengthen that same capability for our SiC products and technology. ASM will also apply its experience in developing high-productivity tools for the silicon semiconductor market to make highly productive SiC products.

Customers are moving from FinFET to gate-all-around transistor architectures. What does this mean for ASM's ALD opportunities?

In FinFET, ALD is used to homogeneously cover the fin structure on three sides with gate dielectric and metal. Moving to the GAA transistor structure, the gate dielectric and metals now need to completely envelope the channel on four sides, making the configuration truly 3D in a very tight space. ALD is the only deposition technique that still works there.

At the same time, due to requirements for increasing multiple switching voltages within devices, the amount of different applied combinations of dielectric materials and metals around the gate tends to increase. This directly drives additional deposition steps of films that remain in the device, as well as additional sacrificial deposition steps to shield areas where you want other variations of dielectric and metal combinations. All these deposition steps around the GAA structure have to be ALD. So, overall, the transition from FinFET to GAA represents more ALD opportunities.

ASM is aiming to strengthen its position in the memory sector. What are the new applications and inflections ASM is targeting?

In the past year, we've seen healthy revenue growth in the memory segment, which is being driven by ALD dielectric high aspect ratio gap-fills that require specific technologies. In 2022, we released the production-proven TENZA ALD for ultra-high aspect ratio (>100:1) gap-fill. Further in memory, we continue to be well positioned in the segment of patterning films, with new opportunities where continued scaling and the introduction of EUV drives new requirements.

And, of course, our strength in ALD high-k gate dielectrics used in logic transistors has enabled us to become a leader in this segment in memory as well, with DRAM manufacturers moving to use high-k gate dielectrics in access transistors for high-performance DRAM products.

ASM announced its target for Net Zero emissions by 2035. Can you, as CTO, tell us what this means for new product development?

It will mean requirements up-front for sustainability as part of design specifications, such as those for chemical consumption and energy usage, as well as driving suppliers to meet specific sustainability targets.

For existing products, it means, for example, executing projects like the reduction of system heat-losses, via new insulating materials. Another example is the improvement of the RF plasma efficiency of the plasma reactor, resulting in lower parasitic plasma and reduced energy losses.

An attractive aspect of the acquisition of Reno Sub-Systems has been the faster rate at which the electronically variable capacitor matching network matches the RF power, consequently leading to lower power losses.

You've been responsible for Global Products at ASM since 2015, before becoming CTO. What are some important achievements in this period?

The important achievements have been the various product launches: in 2017, the Intrepid ES epitaxy tool for advanced-node CMOS logic and memory; in 2018, Synergis, the high-productivity ALD tool utilizing ASM's production-proven XP8 platform – for advanced-node logic and memory high-volume production applications; in 2019, the A400 DUO vertical furnace system with dual reactor chambers for 200mm wafers; in 2021, the Intrepid ESA epitaxy tool for power and analog devices, and for epitaxial silicon wafers. And in 2022, the SONORA vertical furnace system with dual reactor chambers for 300mm wafers.

The string of product introductions and their positive reception by the market are testament to our commitment to serve our customers with leading-edge innovative and competitive offerings.

"OUR TALENTED R&D PEOPLE ARE THE INNOVATION ENGINE OF ASM"

As CTO, you're responsible for the technical product portfolio, future technologies, and innovation. How do you view the integration of research and product development at ASM in coming years?

Our talented R&D people are ASM's innovation engine, and we aim to strengthen the cooperation between our employees in R&D and our products organization. The clear strategic intent is to speed up our rate of innovation, along with the development and productization of those innovations. We'd like our R&D people to have more exposure to our latest products, and leverage those products for the R&D of new materials and process technologies. The aim is to introduce these as high-volume manufacturing solutions for our customers as efficiently and speedily as possible.

March 2, 2023

Hichem M'Saad
Member of the Management Board and Chief Technology Officer

10. PEOPLE

'Best people' is one of ASM's five strategic enablers, highlighting just how important our people are to us. Our company aspires to be the employer of choice for existing and future talents. We empower our people by helping them to develop, thrive and grow – unlocking their potential to be the best they can be while driving the success of our business and customers.

4,258
Employees

17%
Female employees

0.55
Total injury rate

5%
Increase in engagement score

10.1 PEOPLE ARE OUR BIGGEST ASSET

For ASM and its workforce to be successful in the long term, we focus our people initiatives and roadmap on becoming a home for talent in the semiconductor industry.

To make this happen, our People strategy focuses on five key areas:
1. Attracting and retaining talent
2. Culture and engagement
3. Leadership and development
4. Diversity & Inclusion
5. Employee experience

WORKFORCE	2018	2019	2020	2021	2022
Employees	2,181	2,337	2,583	3,312	**4,258**
Employees including temp	2,327	2,444	2,689	3,462	**4,397**
% temporary workers	6.3%	4.4%	3.9%	4.3%	**3.3%**
Number of workers under Collective Bargaining	260	278	328	254	**408**
% workers under Collective Bargaining	9.1%	10.8%	11.7%	7.7%	**9.6%**
Nationalities	29	29	40	47	**59**
Male	85%	85%	85%	85%	**83%**
Female	15%	15%	15%	15%	**17%**
Voluntary attrition rate	9.9%	8.7%	8.3%	11.1%	**10.2%**

ATTRACTING AND RETAINING TALENT

While building our employer brand, ASM's total workforce grew from 3,312 to 4,258 people at the end of 2022. This is an increase of 29%, which is approximately similar to the growth in 2021. This number includes 139 temporary staff and around 100 people joining through the acquisitions of Reno and LPE. Voluntary attrition decreased slightly to 10.2%. We hired more than 1,450 new colleagues during the year – a new hiring record for ASM in a globally tight labor market.

These are some of our initiatives key to driving this growth:
- To attract talent, drive applications and boost awareness, we improved our recruitment marketing. For example, we expanded our career-fair footprint, and upgraded our marketing and media for further global activation.
- We focused on employer branding and employee storytelling across social media (e.g. LinkedIn, Glassdoor, WeChat, Facebook, Instagram)
- We continued investing in early-talent programs. This included developing a global graduate pilot program launched in the US at the end of 2022. Its focus is on fast-tracking graduates' technical careers with business rotations and leadership development.
- We fostered strong partnership with industry associations. For example, we took part in the SEMI SEA 2022 conference in Malaysia and offered scholarship to students via Korea Semiconductor Industry Association. For additional information on how we give back, see section '10.3 Community' of this chapter.

For hiring and gender diversity, we made progress in 2022, with 19% female new hires. This is a significant increase, coming from 2021 with 14% of female new hires. We attribute this to the success of various partnerships and programs, such as those with the Society of Women Engineers and the diversity recruiting and retention platform PowerToFly.

Attracting and retaining talented people continues to be a priority, as we focus on growing and strengthening our organization to support ASM's Growth through Innovation strategy.

To ensure the company's continued success, and support our position as an attractive home for existing and future talent, we assessed our total rewards strategy in 2021. This diagnostic review focused mainly on global benchmarking and compensation programs. In 2022, the resulting recommendations led to progressive changes to our approach to compensation practices and policies. For further improvements, we conducted another benchmarking exercise in 2022, and reviewed employee benefits programs globally. These findings will drive further action planning around rewards in 2023.

These activities will make sure ASM keeps offering competitive pay, while helping to safeguard our people and their role in supporting the company.

Q&A with our Executive Committee members at the Thought Leadership Meeting in December 2022 in Arizona, US.

CULTURE AND ENGAGEMENT

Strengthening our company culture makes us able to engage with and develop our people, drive collaboration, add value for our customers, and set us apart from the competition. In 2022, we continued our journey to define our culture and build on the foundation of our core values – We Care, We Innovate, We Deliver.

To help shape and embed our company culture, our leaders are key as role models and ambassadors. In 2022, we had two face-to-face meetings with our Thought Leadership Team, discussing how our leaders can be more active in developing a workplace that fosters Accountability, Collaboration and Empowerment (ACE). To help set new standards, we identified high-performing teams and looked at how to share best practices across ASM.

In 2022, we held our biannual employee engagement survey. Highlights include a continued high participation rate of 89% and a 5% increase in the engagement score – for ASM overall, and across business units, service units and regions. All the survey items have increased ratings. Survey items that show the biggest improvement are recognition, manager feedback, and development reviews.

We continue to work on engagement action-planning with our managers and teams, prioritizing Accountability, Collaboration, and Empowerment (ACE).

LEADERSHIP AND DEVELOPMENT

To nurture our people and develop ASM as a home for top talent, we must develop their careers, supporting them to learn, grow and thrive. In managing our talent, we focus on our people's strengths as well as their potential, tailoring our support where necessary. This means everyone has an opportunity to enhance their skills and develop their career.

In 2022, we kicked off a pilot on our talent marketplace, aimed at helping ASM's people take ownership of their own career paths. This new platform, powered by AI, helps people identify possible career paths, learning opportunities, and internal job applications. In 2023, we will evaluate and extend this pilot.

Also, we continued to use the e-learning platform HMM (Harvard Manage Mentor) to connect with our people. Every month, we hosted the HMM café, with topics including project management

Sukanya Datta
Senior Process Engineer

"TECHNOLOGY IS MOVING FAST. IT'S NEVER TOO LATE TO ADAPT AND DISCOVER NEW THINGS. NEVER STOP LEARNING AND DON'T BE AFRAID TO ASK QUESTIONS!"

and transparent communications. While continuing to foster a learning environment, we appreciate the increase in active learners (from 650 in 2021 to 1,352 in 2022), and time spent on learning (+154%).

We have identified specific positions critical to our continued success. These form a central part in our succession planning, a process that maps our internal talent against these positions. It means ASM has continuity in key positions, and helps us strengthen our internal talent pipeline.

While strengthening our talent and leadership pipeline for critical roles, we successfully ran our 'Elevate Program'. This focuses on a global group of high-potential employees, empowering and preparing them to be future leaders. It is built around action-learning projects: this is about finding solutions to ASM-specific business challenges, while at the same time shaping the development of our future leaders.

With our managers playing a key role in living our culture each day, and driving engagement and development, we continue to strengthen the manager capability. To this end, we have already launched our BOOST program – designed for new managers – in Europe, Korea and Singapore. First-time managers transitioning from individual contributor to people manager often struggle to adapt to their new role. BOOST aims to flip the mindset of new managers to be geared towards managing people rather than managing tasks, and helps managers become effective leaders. We will continue to expand this program to other regions.

DIVERSITY & INCLUSION (D&I)

At ASM, we believe that diversity starts with our culture and core values: We care, We innovate, We deliver. Our award-winning employee value proposition – 'Power of an Open Mind' – reflects our ambition to grow employee engagement, develop our existing team members, and shape a diverse

Michelle Sympson

Senior Global IP Paralegal and Head of IP Administration

"DIVERSITY AND INCLUSION GIVES ASM THE OPPORTUNITY TO WORK WITH A WIDE RANGE OF GREAT PEOPLE FROM AROUND THE WORLD."

CELEBRATING ASM'S CULTURAL DIVERSITY

Ryan Liebengood – Corporate Director IP & Licensing, learns about ASM's different cultures through children's books he collects for his son on business trips.

"A picture is worth a thousand words – and the pictures in the books I collect are a great way to explore different cultures with my family."

Alongside the travel and the new places I get to see in my job, the IP team's diversity gives me a unique chance to spend time learning from colleagues in Belgium, Finland, Japan, Korea, the Netherlands, and Singapore. We regularly talk about ASM being a global company – with close to 60 nationalities in 15 countries. Even our R&D is spread across three continents. And IP is no exception, with people in six countries supporting IP creation, preparation, protection, and monetization.

Over the years, my book collection has expanded, reflecting the diversity within ASM's global R&D and manufacturing teams. These books are a reminder of how unique ASM is and how much we all have in common.

and inclusive culture. This makes us effective in engaging our employees, driving collaboration and empowerment, and adding value for our customers while differentiating ourselves from the competition. ASM's diversity focus is made up of gender, specific knowledge, work background, nationality, age, ethnic diversity, (technical) experience, and skills.

In 2022, we saw an increased representation of nationalities. With locations in 15 different countries, we have grown from 47 nationalities in 2021 to 59 nationalities in 2022.

We strive for a continuous increase in female participation in the period 2021-2025. To achieve this goal, we focus on three different groups:

- Supervisory Board and Management Board. In line with ASM's diversity policy, the Supervisory Board strives for a composition of both the Supervisory Board and Management Board representing at least 30% of the seats held by either gender at the same time. (ASM's Diversity policy is published on our website).
- Sub board: relates to all ASM's directors, senior directors, corporate directors, vice presidents, corporate vice presidents, senior vice presidents, and Executive Committee members. The 2022 diversity plan for the Sub board aims at a continued average increase in female participation of 1% per year, in order to reach 20% female participation in the Sub board by 2025.
- All employees: relates to all employees below Management Board level, including Sub board. As shared in our Annual Report 2021, and included in our 2022 diversity plans, we aim at a continued average increase in female participation of 1% per year, in order to reach 20% female participation in the All employees group by 2025.

Gender diversity results in 2022

In 2022, we realized good progress towards our targets for the respective groups:

Supervisory Board and Management Board

For female participation, the Supervisory board progressed from 43% in 2021 to 50% in 2022. The current composition of the Supervisory Board is six members – three female and three male. The current composition of the Management Board is three male members. The AGM on May 16, 2022 appointed Hichem M'Saad as the third Management Board member and Chief Technology Officer. Mr. M'Saad was an internal candidate who has been instrumental in ASM's product innovation, including developing several of our successful innovative products, and customer relationships. He is also known for his deep semiconductor technology knowledge.

Sub board

We are proud to see that the female participation for the Sub board progressed from 14% in 2021 to 17% in 2022. We progressed from 16% female new hires in 2021 to 18% female new hires for the Sub board. Next to this, 13 female colleagues were promoted in 2022, compared to six in 2021.

The Executive Committee – part of the Sub board – was installed in February 2022. All position holders were already in their senior roles, representing a global function, and were promoted into the Executive Committee. Initially, there was a fourth member of the Executive Committee (excluding the Management Board members, who are also part of the Executive Committee). However, he resigned in 2022 and, by the end of 2022, the Executive Committee consisted of three members. For additional information, see chapter '13.7 Composition of the Executive Committee'.

Overview of gender diversity percentage per level

	2021				2022			
Group	Hires (F)	Promotions (F)	Headcount (F)	Headcount (M)	Hires (F)	Promotions (F)	Headcount (F)	Headcount (M)
Executive Committee								3
VP, CVP, Senior VP, Executive VP				22		3	3	27
Director, Senior Director, Corporate Director	7	6	26	135	9	10	37	165
Sub board (% F)			14%				17%	
Managers/Senior managers (**JG** 18-19)	22	13	67	335	24	30	95	411
Senior professionals (**JG** 16-17)	60	25	194	968	101	45	265	1221
Professionals (**JG** 14-15)	70	17	200	923	122	20	286	1174
Para-professionals (**JG** 11-13)	7		17	423	21	1	34	534
All employees (% F)			15%				17%	

F = female employees; **M** = male employees; **JG** = job grade

All employees

For female participation in the All employees group, we progressed from 15% in 2021 to 17% in 2022.

In 2022, we progressed from 14% female hires in 2021 to 19% female hires in 2022. Next to this, 109 female colleagues were promoted in 2022, compared to 61 in 2021.

The ASM diversity plan for all employees aims at 20% female participation by 2025. Already in 2021, we implemented the Employee Resource Group (ERG) as a flagship initiative, which forms the backbone of our D&I plan for all employees. We defined three concrete goals, strongly linked to our ESG ambitions:

- Drive an inclusive culture
- Lead in gender-pay equality
- Foster recruitment and retention of women across ASM

The ERG initiative expanded in 2022 with a strong focus on internal and external communication, as well the activation of ASM's Women Initiative Network (WIN), active in Singapore, the US, Korea and Europe. This is a growing group of around 120 women, who are partnering to drive gender diversity in our workplace.

In September 2022, our colleagues in Korea hosted a WIN event at our ASM office in Dongtan. They shared their suggestions about how ASM can continue to create a comprehensive and diverse workplace for women.

Gender pay ratio

ASM also assesses the difference in gender compensation between our female and male employees. We look at the compensation ratio at management and non-management levels. The analysis compares the median compensation as a function of gender per job grade and per country, excluding the impact of job scope and country-specifics in compensation.

In 2022, we saw an upward shift from 95% to 98% in our female-to-male gender pay ratio. This was calculated using the relative salary position (RSP), comparing female and male employees. ASM is committed to fair pay. We continue to monitor to make sure all employees – male and female – are rewarded fairly and in line with local and global best practices. To this end, a gender-equity review is now a formal part of our annual performance review, and compensation and promotion processes, which also focus on country-specifics.

Median RSP (Female/Male)	2021	2022
Senior management / executives	91%	**100%**
Middle management	91%	**94%**
Non-management	97%	**99%**
Total	**95%**	**98%**

Retention Sub board and all employees

We closely monitor the retention and attrition of our female employees. In 2021 and 2022, for both groups, the attrition of female colleagues is lower compared to male colleagues. In 2022, the female attrition total is well below ASM's total attrition of 12%.

The table below shows the attrition distribution for female colleagues compared to male colleagues for the Sub board and for All employees in 2021 and 2022.

	2021			2022		
Total attrition	F	M	Total	F	M	Total
Sub board	0.0%	8.8%	7.6%	**7.5%**	**10.6%**	**10.1%**
All employees	**11.5%**	**12.6%**	**12.5%**	**9.0%**	**12.6%**	**12.0%**

F = female employees; **M** = male employees

Action plan 2022 Sub board and all employees:

Our 2022 diversity plan included concrete actions supporting our female recruitment inflow as well as strengthening gender diversity within our culture. Among others, we have been focusing on:

- Partnering with PowerToFly, a diversity recruiting and retention platform;
- Partnering with the Society of Women Engineers to connect with early-career candidates and women professionals;
- Gender decoder to eliminate gendered language skews in job descriptions;
- ASM's referral program focusing on Women in Engineering;
- Targeting women-focused universities to drive employer brand engagement, participation in our career events, and applications to our open roles;
- Engagement action planning to drive gender diversity and awareness in our teams;
- Leveraging our social media and internal communication platforms to help drive engagement and increase awareness of ASM's culture;
- Continue to activate and expand the ASM's Women Initiative Network (WIN) to drive gender diversity in our workplace, and
- Launching quarterly 'Women at ASM', featuring global employee stories focused on highlighting their STEM roles, leadership, and how they drive impact through innovation in their ASM roles.

EMPLOYEE EXPERIENCE

As our people are the main ambassadors to drive customer experience, promote our brand, and live our aspiration to be an employer of choice in our industry, we feel it is very important to drive employee experience across the full lifecycle from hire to retire.

In 2022, we onboarded more than 1,500 new people (including joining through the acquisitions of Reno and LPE), and implemented our 'moments that matter' new-hire journey for the first 180 days. And even before they start, new hires can learn about ASM and our products in an interactive online game. This is followed by various events to help new hires get up to speed and connected to their team in the first six months of their employment.

For new managers, there is a tailored onboarding journey. An extensive manager toolkit is available to support them, as well a portfolio of training they can use with their teams. This will help them deal with team dynamics, and drive process excellence in their teams.

We continue to make sure our people have the right information and support. With our new mobile platforms, we are able to deliver a better employee experience.

GLOBAL EMPLOYMENT STANDARDS AND HUMAN RIGHTS

ASM is committed to uphold fundamental human rights and respect those rights in conducting our activities throughout the world. We also take responsibility for international employment standards across our supply chain. Our Global Employment Standards (GES) summarize our policy and standards regarding human rights throughout our global operations. They are written with everyone in our value chain in mind. The GES reflect the principles laid out by the United Nations in the Guiding Principles on Business and Human Rights, and support the RBA Code of Conduct labor standards framework, including the following:

- Prohibit the use of forced or involuntary labor, including fees of any type to secure employment;
- Prohibit the employment of child labor; ASM policy specifically does not allow anyone under the age of 18 to be employed at the company;
- Prohibit corporal punishment, threats of violence, or other forms of physical or verbal coercion or harassment. We believe everyone deserves to work in an environment free of any threats to their human rights;
- Respect the legal rights of its employees to join or to refrain from joining worker organizations, including labor organizations or trade unions;
- Create a work environment free of discrimination or harassment based on race, color, religion, gender, gender identity or expression, sexual orientation, national origin, disability, age or veteran status, and
- Comply with all applicable wage and hour laws, regulations and collective labor agreements, including those relating to minimum wages, overtime hours, piece rates, nonexempt or exemption classification and other elements of compensation, and provide legally mandated benefits.

In 2022, we had no reports or evidence of any human-rights violations or abuses within our global hiring or employment practices.

The full text of our Global Employment Standards is published on our website. For additional information on Human Rights in our supply chain, see chapter '12.4 Global Operations and Sustainability'.

LIVING WAGE AND WORKING HOURS

Our people are paid above the local minimum wage, and we are committed to paying at least a living wage.

We care about the living conditions of our workforce. To this end, we actively engage with outside organizations to benchmark best practices in line with the Anker methodology – a robust approach to measuring living wages and incomes. We also make use of the WageIndicator Foundation definition and data, which is dedicated to labor-market transparency.

The scope of the living-wage assessment we conducted in 2022 included all countries where we have employees or contractors. As with the assessment in 2021, we concluded that all ASM employees are paid a minimum living wage. In our analysis, we also took into account the increase in living costs due to inflation. in 2023, we expect to re-evaluate the cost of living again. Our wage commitments align with our 'We Care' value and 'employer of choice' ambitions. For additional information about Living Wage in our supply chain, see chapter '12.4 Global Operations and Sustainability'.

Following the RBA guidelines, our general practice is a workweek of no more than 60 hours, including overtime, with at least one day off per seven days. We actively monitor the working hours and working days of our direct people, to make sure overtime is within limits and time-off is ensured.

10.2 SAFETY LEADERSHIP

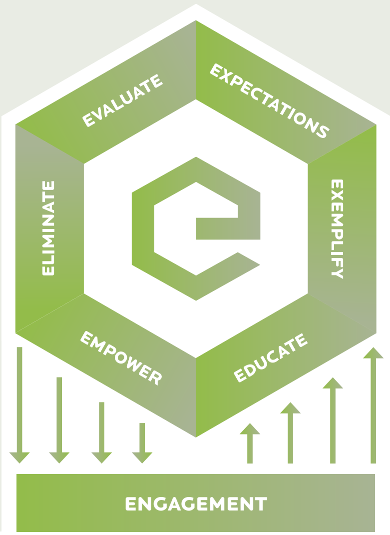
We are passionate about making sure our products and people everywhere in our value chain are safe. Our vision is ZERO HARM! – this means we strive to prevent all incidents and injuries, regardless of severity. We prioritize and focus on prevention, meaning we aim to remove all exposure to harm. Our ambition is to lead in safety, within and outside ASM, collaborating with and influencing others to improve the safety of our industry. Our product safety is key to ASM's innovation process, realized through the design, development, manufacturing, delivery, and ongoing use and support of our products. We extend our innovation power to product safety technology, with the aim of advancing the safety our industry.

SAFETY CULTURE

We believe everyone should be responsible for safety. Setting this expectation and empowering everyone across the company as a safety leader, regardless of role, is fundamental to our approach.

Management aims to embed safety in all we do, while every employee is expected to be a safety leader in every moment. We always search for opportunities to improve, and take responsibility where we see potential risks or any breach. Anyone can call Stop Work! to address any situation if it seems unsafe for themselves or anyone else. They can also contribute to improving safety at any moment by reporting good-catch observations to identify and recognize positive examples or behaviors, or to address potentially unsafe situations, procedures, or practices. Our 6Es of Safety Leadership are the foundations of our safety culture, and instill the philosophy that everyone is a safety leader. Our intense focus on collaboration beyond our own scale has inspired us to add a 7th E – Engagement. This will be a key focus for 2023 and beyond to advance the safety of our industry. Our EHS and Product Safety leaders work as one team, defining our overall safety strategy and relentlessly pursuing continuous improvement in our policies, capabilities, processes, programs, systems, and results.

'Be Safe' Safety Leadership framework



EXPECTATIONS
Set the foundation for our safety culture

EMPOWER
Everyone is a leader for safety

EXEMPLIFY
Lead by example, in words and actions

ELIMINATE
Prevention always comes first; eliminate hazards up front

EDUCATE
Know for yourself; require timely completion of safety training

EVALUATE
Your and your organization's safety leadership

ENGAGEMENT
Whether inside or outside ASM, engage and collaborate for safety

QUARTERLY SAFETY LEADERSHIP RECOGNITION

We honor and celebrate our safety leaders each quarter through our global Safety Leadership Award. Employees can nominate peers for notable contributions in safety, scaled for their role, positive attributes, and leadership.

QUARTERLY SAFETY AWARD WINNERS

Q1

Service Manager – For her ongoing service in safety leadership and commitment to everyone's safety

Q2

Facilities Engineer – For his work identifying a key product safety risk

Q3

Developer – For her work in developing the Product Safety Risk database/management system 'OASIS'

Q4

Ireland Service Team – For recognition of safety risk and leadership in design and implementation of a solution

LIFETIME SAFETY-LEADERSHIP AWARD

In 2022, we started an ambitious project to further modernize our safety and environmental incident-reporting and data system. We migrated from an ASM-developed system that has been fundamental to capturing safety reporting and building a culture of ZERO HARM! for over a decade. We honored the IT architect responsible for this system with a Lifetime Safety Leadership Achievement Award for his foundational and enduring contributions to our safety culture.

Lifetime Achievement Award - Brad Gettings - For his role in creating and maintaining our SIR system and most recently its migration to a modern platform we call SHIELD

Key areas of progress in 2022 include:

- **OASIS system** – Launched in early 2022, we manage product-safety risk assessments, validations, and ongoing product safety development with a proprietary and industry-leading product-safety risk-management system we call OASIS.
- **SHIELD system** – We deployed the first applications in our new SHIELD system. This is a new, digital platform for Environmental, Health & Safety (EHS) applications based on industry-leading architecture. The first applications to be used are the Safety Reporting, Assessment, Investigation, and Action Planning systems. These will help us better understand and improve our safety performance, particularly with predictive capabilities. We have a three-year roadmap to develop SHIELD and integrate it with other key control and workflow processes. OASIS and SHIELD together form a powerful safety management, learning, and continuous-improvement system – from optimizing design for safety, through capturing and applying learning to improve product designs, safety programs and results. They are a key engine to support our vision of ZERO HARM!

- **Safety Leadership Collaboration (SLC)** – We share safety data and learnings in a transparent way, and collaborate with key customers and partners to improve shared safety. We have taken steps to further grow SLCs, making significant progress with an additional key customer in 2022. With our customers and partners we are achieving positive outcomes, and work together to continue to increase the value of these SLCs.
- **Risk reduction** – Our R&D labs, manufacturing areas, and global-service environments represent our highest safety risk. We structurally improve safety in each of these areas by defining and carrying out multi-dimensional annual plans. These plans focus on the unique aspects of each risk area, identifying and directly addressing key risks, developing the safety-leadership culture of the teams, and delivering other improvements. These efforts have led to structurally fewer risks and incidents year-on-year.
- **Industry engagement** – With a view to collaborating and engaging around health and safety, we maintain a board seat in SESHA, a multi-industry association focusing on advancing health, safety, sustainability, and environmental knowledge and processes. We continue to be a Diamond sponsor of their activities. For the 45th annual SESHA symposium in April 2023, ASM is due to deliver five key topic presentations to our industry, our most ever. We actively engage with and contribute to SEMI (the global electronic-products industry association) working groups that drive standards and knowledge-sharing for the industry.
- **Safety by design** – Each year, we review new regulations, advancements in standards, and the lessons we have learned. We update our training materials accordingly, customizing them with specific product-line examples for respective design teams. ASM's product-safety training classes address the latest technology, lessons learned, and changes to compliance regulation and standards. In 2022, to both support the significant growth of our business and product development teams – including updated and refresher training for those previously trained – we grew the number of ASM employees trained by >6X. This serves to further embed safety by design in ASM's DNA.
- **Innovation** – As a safety leader in our industry, and drawing on our innovation heritage, we also see significant opportunity for innovations that meaningfully reduce safety risk and improve safety-related fab economics. In 2022, we advanced the development and validation of industry-leading technology. A key example of this is an innovative system that reduces purge gas and exhaust volume. It lowers energy and resource use as well as capital and operating costs, while maintaining equipment and operational safety. As another example, our work in industrial hygiene (IH) continues to provide IH data-backed maintenance activities that are markedly safer and faster. This allows our customers to get back to production more safely, and as quickly as possible.

KEY RESULTS

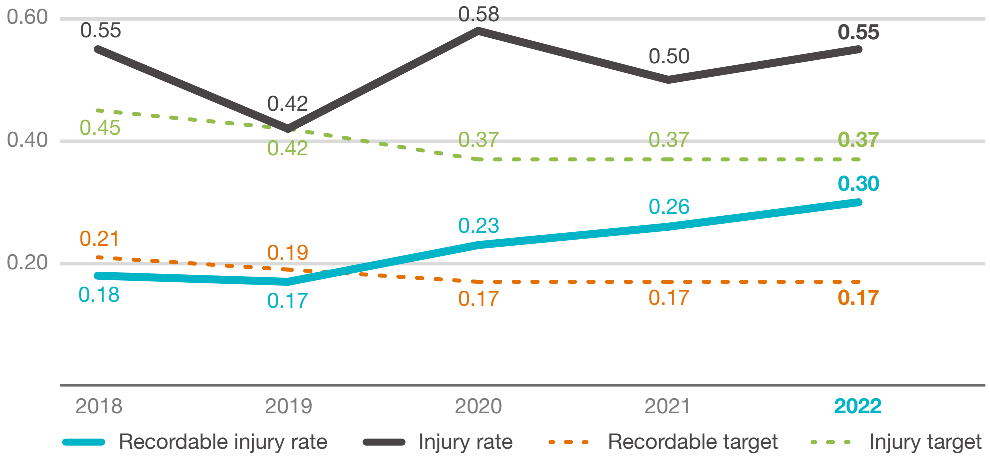
We measure our success not in the number of serious injuries, or the number of days away from work, but in the total injury rate. This includes all injuries requiring first aid or more. Our vision is ZERO HARM!, and we will only reach that vision when our injury rate reaches and is sustained at zero – regardless of severity. We use a robust peer-review system for assurance purposes in classifying our injury incidents. This strengthens our global EHS teamwork in reviewing the facts of all injury cases, and strengthens our governance process in safety results.

In 2022, our total injury rate was 0.55 cases per 100 employees and our recordable injury rate was 0.30, both slightly increased from the prior year. The number of cases for our Service organization fell, while lab and manufacturing increased. There is correlation observed to changes in the work environment in the labs, which drives us to evaluate our management of change processes. The manufacturing cases are predominantly minor hand and finger injuries, and we have a task force evaluating structural preventive actions that can be taken. There were no fatalities, either employee or contractor, within any ASM operations or sites in 2022.

LOOKING FORWARD

We continue to aspire to lead our industry in both programs and results. We continuously nurture a safety culture and system to support this, and our EHS and Product Safety teams strive to embody the mantra that we are 'Amazing Together' in our teamwork to achieve our Zero Harm! vision.

Global injury and recordable rates
(Case rate per 100 employees)



10.3 COMMUNITY, INDUSTRY, AND SOCIETY IMPACT

We engage, collaborate, and innovate to create a positive impact beyond our scale in the communities where we do business, across our industry, and in society overall.

Engaging with and contributing to communities is an opportunity to make a positive difference. Our employees expect this and it motivates them, as they can contribute to a broader cause. Whether as individuals or in teams, our people around the world show commitment by volunteering. These activities also play a significant role in attracting and retaining employees, as well as team-building.

GIVING BACK TO OUR COMMUNITIES

ASM colleagues at our Phoenix location are rolling up their sleeves more and more to help the local community. For instance, over the summer, as part of the Grace Lutheran Church's 'Heat Respite' campaign in the Phoenix community, volunteers got together to support those without food and shelter. The campaign, started in 2005, aims to help Phoenix's vulnerable population cope with the city's multiple heat waves. The program provides hydration stations, refuge locations, and food for those in need.

ASM SINGAPORE SUPPORTS THOSE IN NEED

ASM colleagues at our Singapore location gave back while going green in Q4 2022. Volunteers supported patients undergoing end-of-life care at Tan Tock Seng Hospital, making bouquets from flowers that had been discarded prematurely. Focusing on the three Rs of sustainability – repurpose, reuse, and reduce – they gave the flowers a second life while bringing joy to patients. The project took place in collaboration with the RE/FRESH team, a social-impact organization founded in 2016. Over the years, the NGO has repurposed more than 3,500 bouquets, partnering with five hospice organizations in Singapore.

This initiative was part of ASM Singapore's #ShowWeCare initiative, founded in November 2021, which sets out to organize further programs and activities demonstrating our company values to our people, society, and planet.

Earlier in 2022, as part of the same initiative, more than 80 employees took part in a program, together with local charity Sembawang Family Services Center, to raise funds and arrange the distribution of care packs to low-income families living in the area around our Woodlands Height facility.

TEACHING CHILDREN STEM BASICS WITH FIRST LEGO® LEAGUE

Since 1998, the First LEGO® LEAGUE has been offering primary schools in more than 110 countries the opportunity to introduce children to the basics of STEM subjects (science, technology, engineering, and mathematics), through an annual contest that tests their creativity by building and programming LEGO® robots.

For the school season of 2022/23, ASM sponsored the contest in the region of our headquarters (the Dutch province of Flevoland). We also supported the program through guest lectures about ASM's technology at a local primary school. In addition, we helped the children understand how to test robot solutions and solve problems by working in a structured way when setting up a test.

We were impressed by the 11- and 12-year-old girls and boys, who immediately wanted to start applying what they had learned when tackling their own robot challenges.

These are just a few examples of the many volunteering projects ASM's people took part in. We also strive to make an enduring impact on our industry and society by collaborating on important opportunities.

ASM team members gave a guest lecture at a primary school in the Netherlands.

11. PLANET

Our planet is a shared resource. It is a focus for ASM and our stakeholders to preserve and protect our environment and create positive impact for a sustainable future.

2035
Target year for Net Zero emissions

76%
Electricity from renewable sources

+109%
Packaging material reuse

86%
Landfill diversion rate

11.1 INTRODUCTION

At ASM, our commitment to care for our planet starts with accelerating sustainability as a pillar of our strategy. But it does not end when we meet our objectives. We recognize the importance of sustainability in our own efforts and results, and hope to inspire others to do the same.

Our main contribution to environmental sustainability is in the technology we enable, such as the computing power needed to help reduce mankind's environmental footprint through renewable energy, electric vehicles, and technologies like AI that can help solve complex environmental challenges.

Our focus areas and priorities reflect the priorities of our stakeholders, as 'Planet and Climate' is a high priority in our materiality assessment, as well as in the assessment of our own significant aspects and impacts. We have also included our value-chain impacts in our focus, and we engage with both upstream and downstream stakeholders.

Based on all the inputs, we have prioritized focus on:

- Climate response
- Water security
- Circularity

We are continuing to engage in other aspects, such as creating our first policy on biodiversity, as our impacts and ways we can respond become clearer. We are not limited to making a positive impact through our operational footprint. We recognize that our greatest impact is in our customers' use of our products, which can be one to two decades of product life. The direct use of our product involves energy consumption, water use, and the direct material consumption and processes to create our customer's end product.

Since 2003, ASM has been certified to the ISO 14001:2015 environmental management system (EMS) standard, which includes all of our primary engineering and manufacturing locations. The scope of a global EMS supports consistency in practice across our operations, and provides a foundation for best practices to be shared and learned across our sites. Our current environmental policy is included within our Corporate Responsibility policy, which can be found on our website. The EMS sets a foundation for our programs and progress.

We aim to collaborate across industries, with the ambition to bring faster and more meaningful change to the environmental challenges facing the world today.

As of this report, the acquisition of LPE S.p.A. and its operations, which was completed in October 2022, are not included in the Net Zero baselines and targets, and other emissions and performance indicators, as covered in the Planet section of this report.

11.2 CLIMATE RESPONSE

Climate change is a risk the whole planet is facing together. We may expect extreme weather events, habitat and biodiversity loss, and increased risk of more frequent pandemics, among potential other global impacts. It also poses risks to ASM and its stakeholders, including our supply chain. We recognize these risks and aim to mitigate them. Enhanced collaboration is key to our efforts.

NET ZERO

In 2021, ASM announced its target and put in motion a climate policy to achieve our target of Net Zero emissions by 2035, which aligns with the Paris Agreement 1.5°C pathway. This includes setting targets for Scopes 1, 2, and 3 greenhouse gas (GHG) emissions, with the aim of reducing emissions as near to zero as possible, and neutralizing remaining emissions. We aim to further conserve energy use, maximizing the use of renewable electricity.

Steps toward Net Zero by 2035	Progress and Discussion
Re-baseline Scopes 1 and 2	**Completed in 2022.** Identified sources not included in prior years for both scopes. The 2022 figures shared in the Non-Financial Table at the end of this report reflect this revised baseline. The 2021 data will be updated to reflect the revised baseline after SBTi validation.
Baseline Scope 3	**Completed in 2022.** To align with our SBTi validation baseline year of 2021, we completed a full initial assessment of Scope 3 for 2021. The 2022 Scope 3 assessment is in progress at the time of this report and results will be published at a later date in line with our 2022 CDP Climate Report.
Set targets for all scopes	**Completed in Q4 2022** as part of SBTi target submission.
100% renewable electricity globally by 2024	**On target.** We continue to source 100% renewable electricity for the US, the Netherlands, Finland, Singapore, and Japan operations. South Korea continues to be a challenging market, but we are working to enable our 2024 target.
Submit for SBTi validation	**Completed in Q4 2022.** As of the finalization of this report, we are awaiting validation by SBTi. Currently expected in H2 2023. The submission included Near-Term (2032) and Long-Term (2035) targets.
Develop an emissions compensation and neutralization strategy to address residual emissions	**Pending.** This objective is pending the validation by SBTi in H2 2023.

In mid-November, ASM signed the 'Business Ambition for 1.5°C Commitment' letter. The Business Ambition for 1.5°C is led by the Science Based Targets initiative (SBTi), in partnership with CDP, the UN Global Compact, and the We Mean Business Coalition commitments. It is a call to action from a global coalition of UN agencies, business and industry leaders, calling on companies to commit to set ambitious science-based emissions-reduction targets. In doing so, ASM joins more than 600 companies, representing more than US$13 trillion in market capitalization, who have responded to the open letter from global leaders and signed the Business Ambition for 1.5°C commitment.

ASM engaged the services of a leading climate consultancy to help guide a re-baseline of our Scope 1 and 2 boundary and emissions, as well as conduct a first full assessment and baseline of Scope 3 emissions. These measurements form the basis of our SBTi net zero submission, which was completed in the fourth quarter of 2022. We will assess any uncertainties in our modeling with SBTi in 2023 during the validation process. We aim to provide more transparency and refine our modeling where there might be uncertainties in the near future.

RENEWABLE ELECTRICITY

ASM's first major step toward Net Zero is reducing our Scope 1 and 2 emissions, of which our indirect emissions through purchased electricity is the most significant aspect. Our aim is to source 100% of our electricity from renewable sources for all of our global operations by 2024, with the following path to that goal:

- Source 100% of electricity from renewable sources for key sites in the United States, the Netherlands, Finland, Japan, and Singapore, from 2021 onwards
- Source 100% of electricity from renewable sources for the remainder of global operations from 2024 onwards

ASM intends to achieve this through market-based electricity purchases of high-quality Energy Attribute Certificates (EACs). The market-based method uses contractual arrangements, where electricity is procured from specific sources instead of a location-based approach of only procuring energy available from local grids. ASM targets the procurement of high-quality certificates, intended to focus on in-market sourcing and focused on providing additionality. This means the funds contribute to the continued growth of renewables capacity in the markets where we operate.

In 2022, the purchases included the following types of EACs by region:

- Europe – the Netherlands and Finland – 100% in-market EU GoOs and EKOenergy-labeled wind
- United States – 100% in-market Green-e Renewable Energy Certificates (RECs) of wind
- Singapore – 100% in-market TIGRs of solar
- Japan – 100% in-market NFCs (Non-Fossil Certificates)

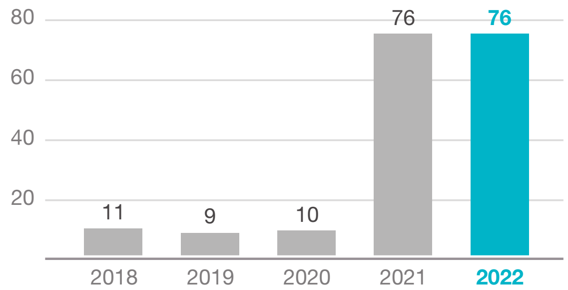
Currently, ASM is not subject to any energy regulations or policies, including any that would restrict our renewable-electricity purchases.

ASM operates a key facility in South Korea, where the renewable electricity market recently opened and is developing. We are monitoring this market carefully in relation to our 2024 target to power our South Korean location, in the event it becomes feasible to meet this target earlier. We included our global service and sales offices in our 2024 target, and are also evaluating if or how we may address these locations earlier.

Renewables, whether electricity or other forms of energy, are limited from a market-availability perspective. As such, we continue to also focus on conservation, and in 2022 we conducted energy audits at our key sites to continue to identify conservation opportunities. We are analyzing the results and hope to implement further meaningful action toward infrastructure improvements or conservation activities that reduce our overall footprint, regardless of where the energy is sourced.

Electricity from renewable sources (in %)

Primary manufacturing and engineering sites



COLLABORATION

The climate crisis transcends the actions of any one company, industry, or country, and so we look to collaborate across our value chain for a collective global impact. We strive to embody high standards in the definition, scope, transparency, and realization of this target.

Semiconductor Climate Consortium
FOUNDING MEMBER

ASM is a founding member of the Semiconductor Climate Consortium (SCC). The semiconductor industry value chain consortium was formed in 2022 to leverage the potential scale of collaboration to speed up our industry's progress on climate issues. ASM was a primary contributor to its formation, ideating the concept of the consortium, forming and chairing a SEMI working group to build the framework, and leading the transition from concept to kick-off of the full consortium in the fourth quarter of 2022. In January 2023, ASM was elected to a seat on the SCC's Governing Council, and subsequently elected to Chair the Governing Council. The SCC grew out of SEMI's Sustainability Advisory Council (SAC), of which ASM is a charter member. ASM participates in multiple working groups focused on issues across sustainability. The SAC and the SCC are examples of where ASM aspires to collaborate, engage, lead, and inspire scale for change.

John Golightly
Senior Director Sustainability, Climate, and Global EHS
Chair SEMI SCC Governing Council

"PAST METHODS OF ENGAGING OUR VALUE CHAIN ARE INSUFFICIENT. TOGETHER THROUGH THE SCC WE STRIVE TO ACHIEVE IMPACT AND SCALE WELL BEYOND OUR INDIVIDUAL EFFORTS IN RESPONSE TO CLIMATE CHANGE."

Collaboration with our value chain on a climate response is critical to our Scope 3 reduction goals. Our engagement with them, including in our leading role of the CDP Supply Chain system, is covered in the Supply Chain section of this report.

GHG EMISSIONS

Purchased electricity and its indirect GHG emissions are only a part of our overall emissions inventory, yet it accounts for a significant portion of our Scope 2 emissions potential. Continuing to move towards a Net Zero objective requires a full understanding of all emissions.

At ASM, our GHG emissions, are attributable to the following:

- **Scope 1** – Chemical and by-product emissions such as NF_3 and CF_4; fuel from onsite heating and abatement units; fuel from emergency generators; fugitive emissions of refrigerants
- **Scope 2** – Purchased electricity; district heating in limited locations
- **Scope 3** – A full baseline and inventory was completed in 2022 using 2021 available data as a baseline year; we identified 11 out of 15 GHG Protocol categories as applicable to ASM. See the 2021 baseline calculations on the next page. We will compile and calculate the 2022 emissions for our 2022 CDP Climate Report.

GREENHOUSE GAS PROTOCOL

Our approach to emissions measurement is aligned with the GHG Protocol, the internationally recognized standard for corporate emissions accounting.

In 2022, we sourced the emission factors used for calculating our Scope 1 and Scope 2 (location-based) emissions from the IEA and the US EPA.

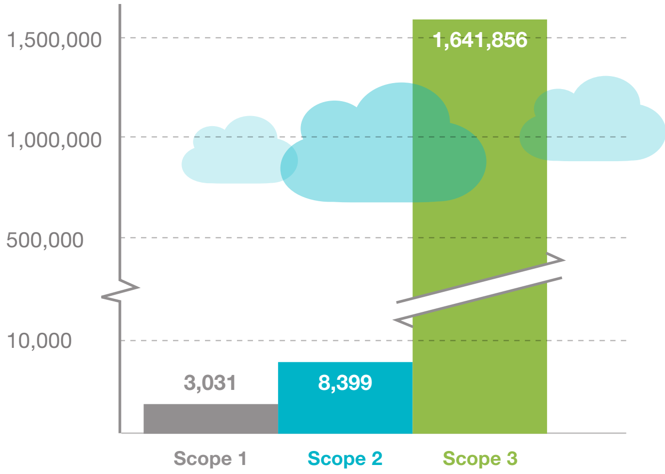
In 2022, as a result of updating our Scope 1 and 2 emission boundaries to support our SBTi submission, our scope boundary will change, all from non-electric sources principally from one source not previously accounted for. The overall boundary remains aligned with our Net Zero ambition including key sites in the U.S., The Netherlands, Finland, Japan, South Korea, and Singapore. Our use of electricity from renewable sources for 2022 is 75.6%, within our current methodology. Our SBTi submission reset our baseline year for emission improvement to 2021, pending validation. At that time, we will publish the validated targets and objectives relative to the accepted baseline year in our Climate Transition Action Plan in H2 2023 or in our 2023 Annual Report.

In calculating the Scope 3 emissions for 2021, we followed the GHG Protocol methodologies, and when totaled with the re-baselined Scope 1 and Scope 2 data for 2021, Scope 3 emissions accounted for >99% of ASM's GHG footprint, as shown in the chart on this page.

ASM's 2021 GHG footprint

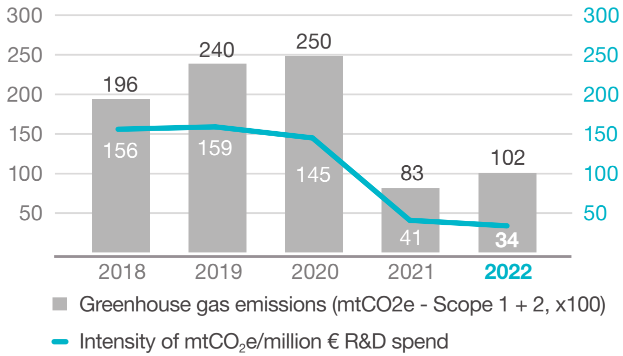
The majority of emissions (>99%) are from Scope 3

in $mtCO_2e$



Greenhouse gas (GHG) emissions

(Scope 1 and 2* emissions and normalized per R&D investment)



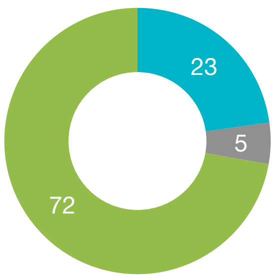
* Since 2021, Scope 2 emissions presented are based on the market-based method

SCOPE 3 2021 emissions by category

Category #	Category name	2021 metric tons CO_2e
1	Purchases goods and services	380,924
2	Capital goods	4,306
3	Fuel and energy-related activities	4,956
4	Upstream transportation and distribution	17,683
5	Waste generated in operations	316
6	Business travel	7,621
7	Employee commuting	1,918
8	Updtream leased assets	Not applicable
9	Downstream transportation and distribution	14,306
10	Processing of sold products	Not applicable
11	Ude of sold products	1,186,593
12	End-of-life treatment of sold products	1,293
13	Downstream leased assets	Not applicable
14	Franchises	Not applicable
15	Investments	21,940

2021 GHG emissions by source (all scopes)

in %



- Purchased goods and services
- Use of our products
- Other:
  - Electricity (market-based) - 0.5%
  - Fuel & energy related - 0.3%
  - Upstream transport & distribution - 1.1%
  - Business travel - 0.5%
  - Downstream transportation & distribution - 0.9%
  - Investments - 1.3%

OTHER EMISSIONS

Consistent with our environmental policy, we also place significant focus on improving all emissions linked to our operations. ASM equipment, which is installed and used in our R&D labs globally, generates effluents that must be treated or removed from releasing to the air. This includes non-GHG emissions, such as particulates, volatiles, and other emissions. ASM has stringent air-quality permits and regulatory standards we must meet, and we continuously drive initiatives to improve our performance. At sites where only general-use conditions are required, we strive to use the best-known methods (BKMs) to help make sure our abatement equipment is operating at peak performance to minimize emissions. We closely monitor emissions and efficiencies of the air-abatement systems, which abate GHG and non-GHG effluents from gas exhaust. We engage outside consulting experts to help guide us with the best-known technologies in abatement for the processes we develop. Many of the abatement units need a thermally based reaction to destruct potentially harmful or high Global Warming Potential (GWP) effluents. We are actively working with a third party to assess options to switch to lower carbon-footprint alternatives to reduce emissions related to the abatement-related combustion of current fossil fuels in use.

CLIMATE ADAPTATION (TCFD)

ASM is committed to aligning with the Task Force on Climate-related Financial Disclosures (TCFD). This is our second TCFD disclosure, reflecting our actions and processes as of December 31, 2022. This disclosure summarizes how ASM assessed risks and opportunities related to climate change in 2022. It is structured across the four TCFD recommendations: governance, strategy, risk management, metrics and targets.

Governance

The Management Board has final responsibility and approval of ASM's sustainability/ESG and environmental strategy, including climate-related matters and disclosures. Certain members of the Supervisory Board maintain sufficient qualifications in climate-related matters to fulfill their oversight responsibility.

The Management Board has tasked the Corporate Vice President of Sustainability (who reports to the CFO) with responsibility for strategic ESG/sustainability matters, including climate change. The Corporate Vice President of Sustainability reviews the organization's environmental strategy (including climate-related), policies, performance against agreed major plans of action, and reports the findings to ASM's Management Board regularly. Ultimately, the environmental and climate-related issues discussed by the Management Board have an influence over ASM's overall strategy, investments, and KPIs.

The Supervisory Board receives periodic updates on ASM's environmental strategy (including climate-related aspects), policies, and performance against major plans of action. Climate-related risks and opportunities are also reviewed as part of the periodic reviews of risks and opportunities identified at corporate level by the Enterprise Risk Committee.

At the management level, the Senior Director Sustainability, Climate, and Global EHS (reporting to the Corporate VP of Sustainability, and a key member of the ASM Sustainability Leadership Council) is responsible for identifying, creating, and managing progress against climate goals, targets, and policies, including matters involving climate change.

Strategy

In 2022, ASM completed its first assessment of its exposure to climate-related risks in alignment with the TCFD recommendations.

ASM worked with cross-functional stakeholders and a dedicated climate consultancy to develop an initial list of climate-related physical and transition risks that could impact the business. ASM held climate-scenario workshops with key stakeholders to prioritize risks based on their importance to the business as a first phase of assessment. Respective long-lists of physical and transition risks were put forward for a scenario analysis. The results of the analysis were discussed with the respective stakeholders. Based on their potential materiality, five physical and four transition risks were chosen and further analyzed.

Physical risks

The analysis of physical risks considered the following countries from ASM's operations and value chain: the United States (Phoenix, Arizona), Netherlands, Belgium, Finland, Singapore, Korea, Japan, and Taiwan.

The most relevant hazards for ASM identified for each country were:

a. Tropical cyclones – Korea, Taiwan, and Japan
b. Heat waves and extreme temperatures – United States (Phoenix), and Singapore
c. Heavy precipitation and flooding – the Netherlands, Belgium, Japan, and Singapore
d. Sea level rise and flooding – the Netherlands, Belgium, Finland, and Japan
e. Water availability and drought – United States (Phoenix), and Singapore

Transition risks

The analysis of the transition risks and opportunities analyzed projected climate-related changes across four main areas: policy and legal, technology, market, and reputation. The geographical locations considered for this analysis were the European Union, Singapore, Korea, US, and Japan, as key locations for ASM's operations and key suppliers.

The relevant transition risks identified for ASM are:

a. Stricter regulations on the reporting and reduction of fluorinated and other GHG emissions;
b. Changes in carbon-pricing schemes;
c. Mandatory compliance on measuring and reporting GHG emissions; and
d. Failure to respond or communicate climate-related disclosures.

Impact on ASM's financial performance in the near to mid-term horizon

At this time,we believe that the occurrence of prioritized physical or transition risks do not represent a material financial impact in the near to mid-term horizon.

Business resilience

The findings of the in-depth assessment in different scenarios, both for physical and transition risks and opportunities, will be integrated into the business strategy beginning in 2023, enabling the development of further mitigation and/or adaptation actions that increase business resilience.

Risk management

In 2022, ASM defined a formal process – called the Climate Adaptation Risk and Opportunity Assessment (CAROA) process – to identify, assess, prioritize, and integrate climate-related risks and opportunities into ASM's sustainability program and enterprise risk-management processes. The CAROA process consists of four main steps:

1. **Risk monitoring and identification:** The ASM sustainability team will review ASM's climate risk long-list annually. The purpose is to review previously identified climate-related risks and opportunities, assess progress against actions defined against these, and identify any new or emerging risks or opportunities that must be added to the long-list based on emerging climate science, regulation, or other.
2. **Risk assessment:** This step involves conducting a scenario analysis for prioritized climate-related risks and opportunities, and quantifying their potential impact for ASM's business strategy and financial planning.
3. **Risk prioritization:** Once these risks have been assessed in more detail, they will be prioritized based on ASM's materiality threshold. The potentially most material risks will be integrated into the risk universe and managed by the risk owner, with oversight as part of the annual risk-management process led by the risk management team.
4. **Risk management:** Relevant climate-related risks and opportunities will be continually managed by the sustainability function and the Sustainability Leadership Council as per ASM's standard risk-management process. For key company risks, risk management activities are agreed by the Management Board and internal Risk Committee.

The CAROA process uses the risk terminology introduced by the TCFD and presented in the Strategy section to identify, assess, prioritize, and manage climate-related risks

Metrics and targets

The ASM metrics and targets for climate-related are being developed.

Next steps

We will continue to assess and identify any climate risks and opportunities in the future and continuously update our TCFD disclosures in line with the evolution of both our business and climate science. We will continue to incorporate the findings from the scenario analysis conducted in 2022, if or as applicable, into our long-term strategy, enterprise risk-management processes, and risk-mitigation planning. We will further improve and refine our CAROA process, piloted in 2021-2022. We intend to establish this as an ongoing business activity from 2023 onwards, to continue to bring us in line with the TCFD recommendations.

Further Climate Adaptation / TCFD details can be found in the Other Information section (25) of this report.

OUR CDP SCORES

Founded as the Carbon Disclosure Project, and with its first report published in 2003, CDP has evolved to become the trusted environmental disclosure platform. ASM has participated in the annual climate disclosure since 2013, and water security since 2017.

The latest completed disclosure cycle is for calendar year 2021, reported in July 2022. ASM reported to both the climate disclosure and water-security disclosure, and their respective supply-chain modules in coordination with requesting customers.

CDP DISCLOSER 2022

2022 CDP disclosure scores

Climate disclosure	Water security disclosure
B	**B**

ASM is focused on improving its structural approach to both climate and water security.

In 2022, ASM joined the CDP Supply Chain system in a leader role, and we are actively engaging our supply chain in strengthening their climate disclosures. For additional information on this supply-chain collaboration and engagement, see section '12.4 Supply Chain'.

11.3 WATER

Less than 1% of all water on earth is available for human and environmental use, making it a precious resource. ASM recognizes that it operates and takes water withdrawals in regions that are currently experiencing high water stress, according to the WRI Aqueduct 2019 assessment[1]. Taking the global and local need for water into account means that managing water responsibly has become even more of a priority for us in recent years.

ASM publishes its new water policy, which aims to define how we engage in water security including our dependencies, setting our water stewardship principles, sharing how we will collaborate and engage on the issues related to water security, how we align to recognized standards, and how we will set targets to measure our progress. This new policy is shared in this section of the report.

ASM has a water objective to maintain or reduce our normalized water withdrawal revenue intensity at or below our 2020 level of 91.4 m^3/€ million revenue, across all operations, through reduction, reuse, or restoration methods. Our absolute water consumption decreased in 2022, by 7,328 m^3 (or 4.7%) relative to 2021 due to implementation of conservation projects in Phoenix and Singapore. This helped to reduce our normalized water withdrawal per revenue by 31.4% to 61.7 m^3/€ million in 2022. Despite this year's positive result, ongoing focus and additional actions will be required to ensure that we continue to meet our target in the coming years.

Our three primary engineering centers in South Korea, Japan, and Phoenix (U.S.), accounted for 66% of our water consumption in 2022, primarily for cooling and abatement purposes related to our process equipment use, and all are located in medium-high or extremely high water-stressed regions based on WRI Aqueduct Water Stress baseline assessments.

ASM is forward looking, and recognizes that 2030 projected water stress is likely to worsen in all locations. With this in mind, ASM focuses on proactive water conservation and implementation of a best-practice approach in all regions, regardless of water-stress level. In previous years, ASM has significantly reduced its absolute water withdrawals. As a course of standard practice, the wastewater treatment systems at our engineering sites all have water reuse/recirculation capabilities to minimize consumption. This includes our Phoenix site, which implemented a significant engineering project in 2019 to maximize water reuse, leading to ongoing water savings. ASM does not currently generate or use ultra-pure water (UPW) for any of our process equipment, which typically requires large water withdraws to manufacture.

1 Water stress is defined as the ratio of total water withdrawals to the available renewable surface and groundwater supplies.

Water stress

Location	Key operations	2019 baseline water stress	2030 projected stress	Withdrawals m^3 x 1000
Almere	Special projects	Low	Medium-high	1.6
Singapore	Manufacturing	Low	Extremely-high	49.5
Dongtan	Engineering, manufacturing	Medium-high	High	29.3
Tama	Engineering	Medium-high	Extremely-high	7.4
Phoenix	Engineering	High	Extremely-high	61.0

Based on WRI Aqueduct 2019 Water Stress Assessment

In 2022, we took action on opportunities that we identified in water audits at our key engineering sites in 2021. The objective of the audits was to strengthen our understanding of our means of consumption, and identify where opportunities may exist for further conservation through equipment, system, or operational enhancements. In 2022, our resulting progress included the following:

a. Our Singapore manufacturing site implemented an engineering solution to reduce the use of Process Cooling Water (PCW) by an estimated 1,658 m^3/year.
b. Our Phoenix engineering site implemented a cooling tower consumption-reduction solution that will reduce consumption by around 25,741 m^3/year.
c. Our Phoenix engineering site completed an in-depth engineering assessment with an external firm, and expects to implement further consumption reduction projects in 2023.

Ways in which we engaged and collaborated in 2022 included:

a. We are closely following activities within the RBA, which has partnered with the Alliance for Water Stewardship (AWS) to promote awareness and action on water among ICT companies and others with microelectronics supply chains, following corporate water-stewardship principles.
b. ASM is also a charter and active member of SEMI's Sustainability Advisory Council (SAC), and the initiatives it has deemed material. In this way ASM is active in industry engagement, which has potential through its initiatives to engage with public policy on important issues such as water.
c. ASM engaged a leading environmental-sustainability consultancy to further inform our water security and quality response.

NEW WATER POLICY

Water is essential for all forms of life, communities, and businesses. Less than 1% of all water on earth is freshwater that is easily accessible and available for humans and all living beings, making it a precious resource.

ASM operations, and the products we develop and sell, depend on reliable access to water. We recognize the contribution we can make to protecting this valuable resource. ASM will work toward water stewardship principles, which includes contributing towards reducing competing demands and where possible to have a positive impact at the watershed level where we operate and source from. At the same time we are committed to maintaining the highest quality in our products, services, and new materials to enable our customer's success.

We aim to collaboratively address water challenges and build water resiliency for the future in all watersheds we operate and source water from. ASM will work toward Corporate Water Stewardship, a globally applicable framework for companies to understand their water use and impacts, and to work collaboratively and transparently for sustainable water management.

Corporate Water Stewardship recognizes that shared water challenges are not the responsibility of any one individual entity. They need to be addressed through collective responses at a watershed level. To contribute towards addressing shared water challenges, we aim to develop actions and measures in watersheds where we operate to start with. Also, we will encourage and support our stakeholders along the value chain to move in the same direction. We will initially focus on sites where water-related risks are higher: local water-risk assessment allows us to have a better understanding of our impacts and dependencies, and determine the stakeholders to involve to efficiently concentrate efforts. We aim to reduce our impact through direct conservation efforts, responsible water use and discharge, and on addressing associated triggers to water security, including climate change.

We acknowledge the recognized standards, policies, and guidelines, including the OECD, the United Nations SDGs, the Alliance for Water Stewardship (AWS) Standard, and recognized water initiatives. We also monitor the release of relevant new standards and guidelines as they are published, in consideration of further advising our water policy.

We encourage performance that goes beyond compliance on legal aspects and local requirements. We will set targets and objectives to measure our progress, and communicate these annually through the CDP Water Security report and our Annual Report, and intend to drive progress on water security in our supply chain.

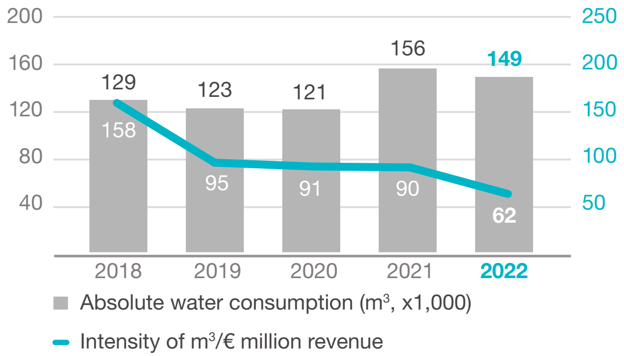
ASM recognizes that collaboration at the watershed level is indispensable to build resilience and safeguard business continuity. ASM will strive to engage with our stakeholders on water challenges and promote the adoption of water-stewardship practices throughout the value chain. We aim to go beyond our own operations and work collaboratively with industries, governments, and upstream and downstream stakeholders, developing a strategy for water stewardship in highest-risk areas through definition of specific action plans and setting of water targets to enable ongoing monitoring and continuous improvement.

Engagement with the consultancy led to a further refining of our roadmap on water security and policy, including:

1. Moving beyond a growth in awareness, internal engagement, and basin-level risk assessments – all of which we have made progress on in the past few years
2. Identifying hotspots from the basin level risk assessment
3. Performing operational risk assessments and prioritizing results
4. Developing tailored action plans
5. Developing a water strategy connecting to the broader business strategy
6. Setting targets against the strategy
7. Strengthening collaboration with others and engaging in collective action
8. Setting forth a process of continual improvement

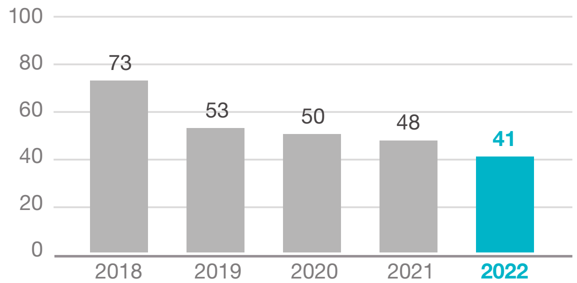
Water withdrawals

(Absolute and normalized per € million revenue)



Water from stressed regions (in %)

WRI – water stress – high and extremely-high rankings



Water-effluent quality is maintained within regulatory control parameters. Local requirements and capabilities for wastewater collection and control vary, but ASM adheres to all applicable regulatory discharge limits and permit conditions. This includes making sure that our discharges meet local requirements for adequate treatment and return to our ecosystems. In some regions, we are able to pre-treat and discharge to a publicly operated treatment-works facility. In others, the municipality does not receive industrial wastewater, so we need to collect wastewater for offsite transport, treatment, and management. In all cases, our first responsibility is to make sure our collection systems are robust so there are no leaks or releases within our wastewater collection system boundaries. Once ready for discharge, we make sure we are operating within all permit and regulatory collection/disposal parameters in such a way that the licensed receiving treatment facility can effectively manage the effluent.

11.4 BIODIVERSITY

Biodiversity and nature are essential to our survival on this planet. Earth's ecosystems underpin human life, providing clean air, water, and food, as well as the building blocks of our economic, social, and cultural ways of life.

World Wide Fund for Nature's (WWF) Living Planet Report 2022 shows that global wildlife populations have declined by an average 69% in the past 50 years[1]. Meanwhile, the world's coral reefs have halved and more than 85% of the world's wetlands have been lost in the past 150 years[2]. These are some of the most biodiversity-rich places on earth. Collectively as a species, we need to act.

At the end of 2022, we defined our first biodiversity policy as a starting point, to guide how we will begin to address this environmental aspect and develop our roadmap.

OUR VIEW

Our view is a world where biodiversity is flourishing – a world where business is no longer dependent on biodiversity loss. As such, we will strive toward optimally reducing our impact on biodiversity and where possible make a positive contribution.

1 www.livingplanet.panda.org
2 www.ipbes.net/sites/default/files/inline/files/ipbes_global_assessment_report_summary_for_policymakers.pdf

POLICY

Our goal is to strive for no net loss of biodiversity and zero net deforestation through our operations and tier 1 supply chain.

We will take a science-based approach to measurement and target setting, using leading international methodologies and recognized science-supported tools to assess impacts and dependencies on biodiversity across our supply chain, then report our impact according to leading standards, and via independent bodies. To do this, we will align with the mitigation hierarchy, aiming at avoiding operations in high-value biodiversity areas. After all, nature is interconnected and interdependent. We will adopt a monitoring, reporting, and verification (MRV) approach to deliver data and drive decision making.

In all material aspects, ASM strives to comply with national guidelines, industry standards, and best practices in all markets we operate in. We also acknowledge the Convention on Biological Diversity goals.

Recognizing the intrinsic connection between climate change and biodiversity, ASM is following the developments of leading biodiversity-focused reporting frameworks.

A WORLD FULL OF BIODIVERSITY

Partnership is key to reaching our goals. This means collaborating with others in our value chain and beyond, supporting actions implemented by third-party organizations in the protection of threatened and/or endemic species, and participating in local projects for biodiversity conservation and restoration. This makes participation in third-party verified projects important. This will allow us to ensure our efforts have meaningful impact.

We will strive to work collaboratively with all stakeholders in our supply chains, which may include local communities, indigenous people, governments, and local NGOs. Their localized and specialized knowledge is key to reaching our goals.

We recognize the role stakeholder engagement plays. Like most organizations, we expect our biggest impacts will likely be in our supply chain, so we aim to work across our value chain to build understanding and co-create solutions. This is in line with the sustainable landscape approach ASM considers in its biodiversity policy, taking into account the demands of many land uses in a single area, and helping to balance the needs of different stakeholders.

A world full of biodiversity

Our challenge
The world is losing its fauna and flora. Some 69% of wildlife populations have declined in the past 50 years. Mining of materials used in our products can be part of the problem.

In the short term
We are assessing the impacts and dependencies of our operations and supply chain, and we will design our corporate biodiversity strategy.

In the medium term
We will engage stakeholders in a collaborative approach to identity priority landscapes and best actions to implement.

Our goal

Zero net deforestation and no net loss of biodiversity

11.5 CIRCULARITY

We are engaging across our operations to identify opportunities and reduce risks in resource and material consumption, and waste generation. There are opportunities for all companies in operations, product design, logistics and packaging, and building design. Like other aspects of sustainability, some of the most significant opportunities rely on collaboration with our value chain. Some of our achievements so far involve directly engaging and coordinating with our customers, suppliers, and contract manufacturers. An example of such achievement is our 'value-chain reuse' of shipping materials, as discussed in the Packaging section below, where reuse increased 109% from 2021, and 488% from the start of this program in 2017.

MINIMIZING RESOURCE CONSUMPTION

A circular economy generally focuses on materials needed or put into use. Avoiding consumption is still the most important first step to not only reduce ecological impact from raw material extraction, but also contribute to reducing our water and greenhouse gas footprint. Less material means less production of resources, leading to a lower logistics and transportation footprint, and a lower footprint overall. In this way, every opportunity we take to reduce our consumption has a compounding effect on our overall environmental footprint, and contributes to our Net Zero by 2035 ambition.

Ways we reduce consumption:

- **Data science** – As a technology and science-driven company, we are able to build theoretical models of our technology, reducing the amount of experimental wafers needed and other resources consumed for process testing and validation. For additional information, see section 'Innovation and Sustainability';
- **Parts refurbishment** – We can extend the life of some of our tool parts through refurbishment and reuse. For additional information on how we do this, see the section 'Innovation in Spares & Services';
- **Product lifecycle** – Whether it is in the engineering and design of our products, or extending the useful life of the products through upgrades or refurbishment, we make efforts to reduce material needs and increase circularity. For additional information on our sustainable-parts lifecycle, and how we extend the life of our systems, see section 'Product Lifecycle'; and
- **Packaging** – Our incoming materials, finished product, and spares packaging significantly contributes to our potential for waste generation. The cycle of packaging use extends upstream and downstream in our value chain. So, collaboration to reduce packaging use and waste across our value chain is key.

PACKAGING

Across our global value chain, moving engineering resources, materials for production, final products, and spares presents opportunities to reduce the consumption of resources through reused packaging.

Our products are large when assembled and shipped, and due to the extreme performance and sensitivity of the equipment, they need packaging that is carefully engineered. The industry standard practice for packaging has been one-time-use wood crating. After uncrating at the delivery site, the packaging materials may be recycled with other wood products. In regions where recycling wood is a challenge, it is disposed of in a landfill. We recognize there is an opportunity to reduce the lifecycle waste associated with this process, not only at our sites but throughout our value chain.

With the lack of consistency for recycling or disposal where we ship, we felt compelled to start addressing how we ship product. We have engineered reusable crates and have established third parties globally that are capable of disassembling the crates after delivery – for compacted return to an inspection and refurbishment to as-new location, then ultimately back to our production facilities for reuse. Most of our products are now supported with reusable crates, and it is a requirement of all new product programs. We work with customers to adopt the reuse process. There are logistical challenges and risks involved since their docks and uncrating areas are often run to very tight schedules.

Procedures are developed for the maintenance and continued operation of the crating to prolong its life. Only when it has been determined that the packaging is no longer fit for purpose will it be taken out of service. As the reusable containers are modular and of robust design, the crates have proven to be very durable, needing only inspection, cleaning, and minor refurbishment before being ready for reuse. Almost no reusable crates have been scrapped to date due to wear and tear or damage from use. Should crates no longer be fit for use, we work with partners in our value chain on the responsible disposal of the materials. In many cases, that means the wood and metal parts can be recycled.

We focus on sustainable consumption for our upstream and downstream packaging. It is our policy that only wood products certified by the Forest Stewardship Council (FSC) can be used in our crates. FSC is the 'gold standard' for wood harvested from forests that are responsibly and environmentally managed, and provide social and economic benefits. All corrugated fiberboard packaging materials are to be sourced from managed forest outlets as defined by the Forest Stewardship Council (FSC) to ensure an inherently sustainable resource. ASM prefers corrugated fiberboard packaging with recycled, post-consumer content for further sustainable benefits and paper-waste reduction. We are committed to increasing the use of reusable and sustainable product packaging across our value chain, including efforts to minimize the use of plastic, and banning materials such as Expanded Polystyrene (EPS).

The same principles we have in applying crate reuse with delivered product to customers are also applied to how parts and materials move between some of our suppliers and contract manufacturers and to ASM.

Our packaging value-chain reuse is measured through the avoidance of landfill disposal. In a one-time-use scheme, every shipment could have resulted in landfill disposal. Through the ASM value-chain reuse of these packaging materials, 542 metric tons of landfill disposal was avoided in 2022, up 109% from 259 metric tons in 2021 (and 488% since program inception), in these areas:

Circular program	Description	Metric tons of waste disposal
ASM to customer	Product and supporting equipment sales to customers	88.4
ASM to supplier	Parts and sub-assemblies shipped between ASM and suppliers as part of the production process	4.9
ASM to contract manufacturer	Assembled equipment and sub-assemblies	446.2
ASM to other vendors	Miscellaneous programs with indirect spend in engineering or other functions where commodities are transported	2.2

WASTE GENERATION

Production and engineering ultimately generates solid and hazardous waste, and it is our ambition to eliminate all waste through avoidance, reuse, or recycling. We are constrained in some cases by regional capabilities for recycling or reclaim, or in others by the required co-mingling of all waste for regional sorting. We track all waste at our production and engineering sites, and account for it in one of the following general waste streams:

a. Recycled or reclaimed – Examples include segregated metal, wood, paper products;
b. Reused – Examples include reused packaging or crating that would otherwise have been disposed of, and are kept in use through maintenance; and
c. Disposed (Landfill) – Solid waste that has no further value for recycle or reuse.

Reuse of shipping packaging

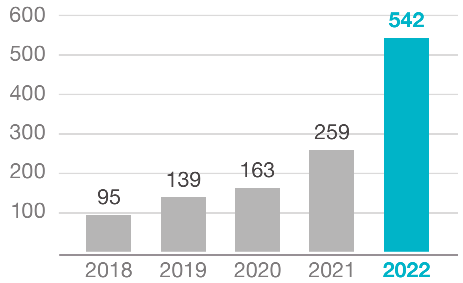
Reuse of shipping packaging helped avoid **542 metric tons of combined landfill disposal for ASM and our value chain.**

We measure success by avoiding landfill disposal. For non-hazardous wastes, the inputs are all materials that are deemed waste at the end of a manufacturing, engineering, or logistics purpose, including site-supporting waste such as office materials. This includes:

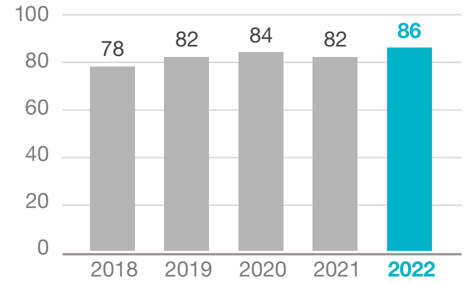
a. Production and engineering waste;
b. Packaging crates and materials received from suppliers or contract manufacturers that would require ASM to dispose or otherwise properly manage; and
c. Facilities support materials and general office waste.

If materials are recycled, reclaimed or reused, this is measured as avoiding landfill disposal. The landfill diversion rate for ASM sites for 2022 was 86% relative to our target of 90% by 2025.

Landfill diversion (in metric tons)
(All product packaging reuse – across ASM value chain)

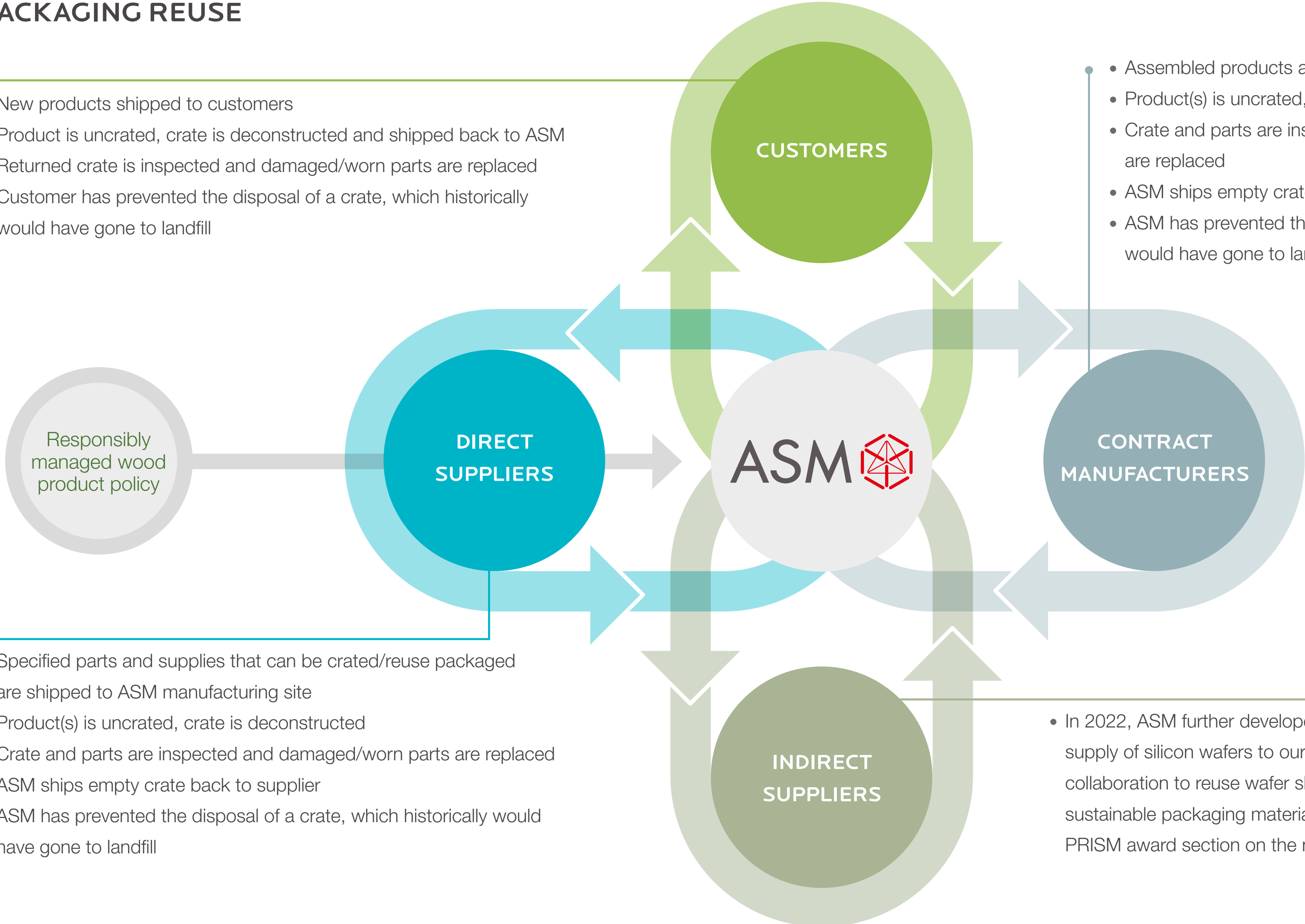


Landfill diversion rate (in %)
Primary manufacturing and engineering sites



PACKAGING REUSE

- New products shipped to customers
- Product is uncrated, crate is deconstructed and shipped back to ASM
- Returned crate is inspected and damaged/worn parts are replaced
- Customer has prevented the disposal of a crate, which historically would have gone to landfill



- Assembled products and parts shipped to ASM manufacturing site
- Product(s) is uncrated, crate is deconstructed
- Crate and parts are inspected and damaged/worn parts are replaced
- ASM ships empty crate back to contract manufacturers
- ASM has prevented the disposal of a crate, which historically would have gone to landfill

- Specified parts and supplies that can be crated/reuse packaged are shipped to ASM manufacturing site
- Product(s) is uncrated, crate is deconstructed
- Crate and parts are inspected and damaged/worn parts are replaced
- ASM ships empty crate back to supplier
- ASM has prevented the disposal of a crate, which historically would have gone to landfill

- In 2022, ASM further developed a key reuse opportunity around the supply of silicon wafers to our Phoenix location. It involved a supplier collaboration to reuse wafer shipping containers, and convert to more sustainable packaging materials. For additional information, see the PRISM award section on the next page.

"MINIMIZE WASTE TO LANDFILL FOR ASM, CUSTOMERS, SUPPLIERS, AND CONTRACT MANUFACTURERS"

RESPONSIBLE CHEMICAL AND WASTE MANAGEMENT

ASM is focused on managing chemical and waste responsibly. As a R&D and engineering company, we are constantly evaluating new processes at our engineering sites. We have robust controls to make sure all chemicals and gases are handled properly from 'cradle to grave' or 'cradle to cradle'.

The controls include:

a. Chemical approval process – A strict chemical request and approval process that engages experts from across the organization for all new chemicals, gases, and change of use requests. Experts involved in the process at all sites include EHS, product safety, facilities, and the requesting process R&D team. The process evaluates the request for legal compliance, health and safety, environmental management – including proper effluent and abatement, and, if required, waste disposal.

b. Physical controls – Once in use, we use leading technology and controls to monitor for leak detection, exposure controls, emission controls for gas abatement and wastewater treatment, and robust storage rooms and secondary containment to prevent release to the environment should there be a leak.

c. Industry associations – We are engaged in industry associations to stay informed of the latest developments and knowledge related to chemicals and gases in our industry, including SEMI, SESHA, and regional associations. This helps us stay informed, improve our operational safety, and collaborate with customers to support transitioning processes safely from R&D to their production processes.

d. Emissions and hazardous-waste management – This involves chemical or other hazardous content materials that must be properly managed. Our controls help minimize the risk of unabated emissions to air or water treatment systems. When chemicals are not managed as part of process exhaust or by-products, they are properly collected and stored for potentially hazardous waste disposal. All chemical waste is properly characterized and managed, according to local regulations and capabilities. The regions in which waste is generated at ASM are covered by the Basel Convention definition of waste, and properly managed – in some cases as hazardous waste, and our goal is to have zero hazardous waste to landfill. ASM first focuses on hazardous waste minimization. For example, our Phoenix, Arizona, site has been a very small quantity generator (VSQG) for several years. This is the lowest classification of hazardous waste-generation status in the United States.

COMPLIANCE

Under our Environmental Management System (EMS), our goal is to be compliant with all applicable environmental laws and regulations with no Notices of Violation (NOVs), and we maintain an environmental legal register to assess regulatory applicability annually at a minimum. In 2022, we did not sustain any environmental related violations or non-compliances, nor any significant (> US$10,000) environmental-related fines or penalties.

MEET OUR EMPLOYEE PRISM AWARD WINNER

Jake Upshaw – warehouse employee, is the proud winner of a PRISM award for sustainability.

Launched in 2021, the PRISM award recognizes contributions or achievements in sustainability and is available to anyone in ASM's ecosystem, including employees, suppliers, or other partners. This year, Jake is the first ASM employee to win a PRISM award. He works at our Phoenix site in the Shipping and Receiving department, where he's cultivated his passion for sustainability in his daily work.

Jake was chosen as a winner for his work with one of ASM's wafer suppliers to transition from one-time use to reusable wafer-shipping packaging. Through Jake's partnership with this supplier, we were able to avoid 744 disposable boxes and 1,488 disposable foam inserts through the use of just 62 reusable containers. In addition to this fantastic reduction in disposable materials, the use of ground versus air shipments has reduced shipping costs and greatly decreased the carbon footprint of this activity.

12. RESPONSIBLE SUPPLY CHAIN

ASM's global operations and supply chain combine to give the company the infrastructure to build world-class semiconductor tools. ASM is committed to growing a responsible supply chain that mirrors our initiatives of 'We Care' and 'We Deliver'.

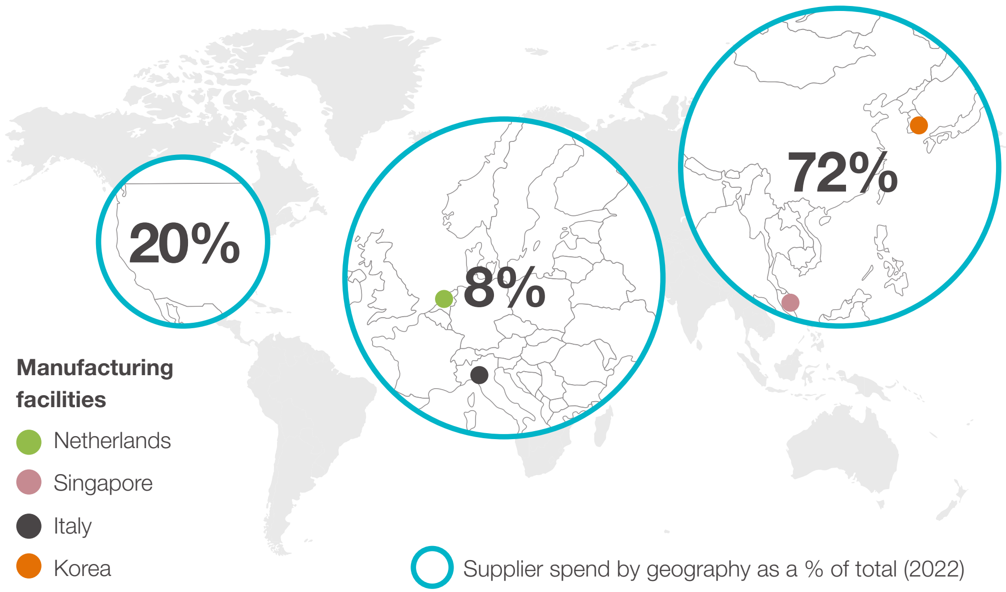
84%
Supplier RBA self-assessment with low/medium risk

3x
Increase in global capacity (early 2023)

1,197
Manufacturing employees

51%
Strategic suppliers disclosed to CDP

Our manufacturing footprint and global sourcing



12.1 OUR OUTSOURCED MANUFACTURING MODEL

ASM uses a distributed business model where we outsource common modules and sub-assemblies to contract manufacturers in the region. Once we receive these from the contract manufacturers, we assemble and test the final product at ASM before shipping it to our customers.

We see these contract manufacturers, who are our key partners, as 'ASM's extended factories'. We have invested in having cross-functional teams from ASM to be on-site at their premises to support their operations, and foster strong collaboration and seamless executions.

12.2 MANUFACTURING OPERATIONS

ASM has global manufacturing sites in Singapore, the Netherlands, and South Korea. In adding LPE – a manufacturer of epitaxial reactors for silicon carbide (SiC), based in Italy – as a fully owned subsidiary of ASM, we are excited to have expanded our global manufacturing footprint.

A Plan of Record (PoR) process guides our manufacturing strategy. This consists of detailed analyses of all critical parameters allowing us to deliver tools in the most efficient manner, maximizing our global footprint while aiming to be closer to our customers. The PoR processes governs decision on new product pilots and future manufacturing sites. Also, it validates the insourcing and outsourcing model to apply the most effective manufacturing strategy.

The supply-chain strategy will then support the PoR, aiming to be close to manufacturing. This strategy has proven to be critical, especially in dealing with the COVID-19 situation over the past three years. The challenges our industry faces are unlike any we have seen before, and require a paradigm shift in the way we support our suppliers and customers. One encouraging sign is that relationships are developing beyond the transactional level of a supplier/customer to more of a partnership.

In addition to ASM's new facility in Singapore, our global manufacturing footprint and capacity have increased steadily through hiring and training. Also, through initiatives such as innovative line design, the expansion of modular test bays, and by enhancing facilities. Globally, ASM continued to expand in 2022, and this remains the focus for 2023:

- SiC is benefiting from strongly growing adoption of SiC power electronics in EVs. One of our key focuses in 2023 is to work with the LPE team to ramp up capacity.
- In Korea, we are expanding our footprint as several of our new applications progress into the high-volume manufacturing phase.
- In Singapore, the second manufacturing floor in our new Woodlands Height facility was completed and ready for production as of Q1 2023. This will increase the capacity of our Singapore facility >100%, and provide us with the flexibility to deliver on our growth plans.

We continue to invest in our people in learning and deploying LEAN methodology, building a Kaizen mindset in our daily execution to improve efficiency, and increase factory utilization.

Our manufacturing facilities comply with the requirements of the RBA Code of Conduct, and have self-assessed as 'low risk' using the RBA SAQ tool.

IMPROVING PRODUCT QUALITY

As well as expanding infrastructure and capacity, improving product quality remains a top priority. We continue to enhance quality standards for high-volume products and new products by identifying risk early within production processes, and eliminating it. This process includes process characterization to identify the critical parameters, optimize them, and control them. As the challenges that we face evolve, we adjusted the control plan to make sure shipped quality is not affected. We strongly believe that sustaining quality results can only be shown through the repeatability of success stories.

In 2022, there were many success stories in ASM manufacturing worldwide. These include:

- Overcoming the challenge of setting up a new product pilot during the pandemic without traveling;
- First-of-a-kind training lab on critical processes; and
- Formation of cross-functional quality-response team for all products.

With these experiences, we have outlined new initiatives for 2023 to further lead our team on our continuous improvement journey.

HOW WE NAVIGATED SUPPLY CHAIN CHALLENGES

A key challenge in 2022 was the tight supply-chain situation, combined with strong growth in our customers' demand. Supply-chain conditions remained tight throughout the year, particularly in the first three quarters, and resulted in extended lead times and shortages of materials and parts. As one ASM team, and closely collaborating with our suppliers, we remained focused on meeting our customers' requirements as best as possible. Also, supported by earlier actions such as qualification of additional suppliers and advanced ordering of strategic supplies, we were able to grow our shipments quarter to quarter. We increased our sales by 33% at constant currencies in 2022, outperforming the overall WFE market that grew by close to 10%. In terms of our own manufacturing capacity, we benefited from our timely investment in our new and expanded facility in Singapore.

"It's down to great team effort that, despite the many global challenges we've been facing in the supply chain, we managed yet again to achieve record-high sales in 2022. This truly reflects an attitude of 'We Deliver' at ASM."

Kent Rossman – Senior Vice President Global Operations

Manufacturing collaborates strongly with field service engineering teams in different regions to make sure we maintain start-up quality through inreach and outreach programs that facilitate mutual learning. Through this, we listen to the voices of our customers and give them as much support as possible as one ASM team.

FORMALLY LAUNCHING OUR NEW SINGAPORE FACILITY

Our facility in Singapore is ASM's main manufacturing facility, responsible for the largest part of our global manufacturing output. Our employee base here grew to >1,000 in 2022. FEMS is also the operations hub for multidisciplinary global leadership roles based in Singapore. In addition to Global Operations, it aims to grow Asia infrastructure with opportunity to expand Singapore capabilities in various disciplines, such as People, and Spares & Services. In March 2022, we celebrated the official opening ceremony of our new facility in Woodlands Height. Including the second manufacturing floor that we completed in early 2023, our global capacity has increased 3x compared to the level in 2020.

FEMS has successfully demonstrated the new product commercialization capability, and is growing to be the PoR site for our new vertical furnace product, SONORA. Despite COVID-19 travel restrictions, SONORA's transition in 2022 from development stage to production managed to go ahead with the support of advanced technology and strong collaboration between the design, business, and manufacturing teams. We aim to create high-value engineering and manufacturing roles to support innovation in our employees as we deliver quality products. The training lab in Singapore has grown significantly as we introduced an innovative training methodology that will benefit our manufacturing employees and field service engineers.

The addition of a second floor with production and cleanroom floor space means additional capacity to build and create output. With the expansion, we will continue to aim for generating zero liquid and chemical wastes from our new Woodlands manufacturing site.

Benjamin Loh, ASM CEO, and Tan See Leng, Singapore Minister for Manpower and Second Minister for Trade and Industry, at the opening ceremony of our facility in Singapore.

Our facility in Singapore, officially inaugurated in March 2022.

12.3 GLOBAL SUPPLY CHAIN

ASM continues to expand its global supply chain to support the need for technology, capacity, flexibility, and sustainability. This is critically important as ASM's direct materials spend grew to >€1.2 billion in 2022. With a global footprint of suppliers in more than 20 countries, we have been able to push through the supply-chain disruptions of recent years. Despite these hurdles, ASM has continued to grow its spend, mitigate risks, and advance plans for long-term growth.

Supply-chain disruptions pushed ASM to update its approach to supplier risk and resiliency as a cornerstone for a secure, future supply chain. Also, it led ASM to partner more closely with our suppliers on investment needs, redefining strategies around key and critical parts, and updating our approach to outsourcing.

The acquisitions of LPE and Reno have also presented opportunities to integrate new supply chains, along with other opportunities to make the best use of each company, and enable their fast scaling in ASM's portfolio.

SUPPLY-CHAIN CHALLENGES

Over the past year, ASM and its supply-chain partners have faced many challenges as part of the ongoing impact of the pandemic, shortages of raw materials, geopolitical unrest, chip scarcity, and labor shortages. Yet overall, while still tackling difficulties, ASM has been able to continue expanding its supply chain.

To manage the skilled labor shortages in the industry, most particularly where constraints significantly impact critical parts requiring these highly skilled workers, ASM has developed solutions to combat this challenge. These include:

- Development and qualification of second suppliers
- Increased automation
- Increased standardization of manufacturing methods

These actions also set the foundation for future growth in capacity and increased flexibility.

Previously, it was not necessary to actively manage suppliers several tiers down the supply chain, like components (semiconductors, wire, connectors) and raw materials (seal materials, copper, steel). But this has changed in recent years. Many resource shortages resulted from geopolitical conflicts limiting and, in some cases, stopping output altogether. Semiconductor and electrical component availability was particularly hard hit, as a result of overall industry growth following factories standing idle during the pandemic. Though gradually recovering in the second half of 2022, demand continued to outpace our supply-chain capacity during the year. To combat this, ASM partnered with suppliers to qualify second sources, develop improved long-term supply chain strategies, and update to newer and more available components.

To mitigate risk, ASM is also working with suppliers to ensure redundancy of operations, and support continuity of supply despite disruptions from political unrest, ever-changing global restrictions on movement, and labor shortages. Disruptions are not limited to any one geography, and ASM is working to make sure our supply chain is as diversified as possible, and less dependent on country and location.

Supply chain challenges impacting our industry

Outsourcing

To build flexibility in manufacturing, ASM engages several contract manufacturers to outsource modules and assemblies. ASM targets outsource assemblies with low IP content that can be manufactured at suppliers in high volumes. This model enables ASM to maintain lower fixed costs. It needs exponentially fewer resources and infrastructure to support the demand growth and fluctuations.

Customer and process-specific configure-ability is generally brought into ASM manufacturing. This allows suppliers to focus on high run-rate assemblies and improve output and efficiencies. Some assemblies even come to ASM fully assembled and tested. This means modules can be delivered straight to the customer without ASM needing to unpack, inspect or test it. It is end-customer delivery ready.

Most of ASM's contract manufacturers are global suppliers with a manufacturing presence close to ASM's key manufacturing sites (Singapore and Korea). This cuts down on delivery cost and lead-time, as well as enabling close, on-site support.

ASM has dedicated teams from sourcing, supplier development, supplier quality, and manufacturing engineering to support these key suppliers. In effect, they are an extension of ASM's manufacturing offering.

Going forward, contract manufacturing will continue to become more important for ASM's scaling and efficiency. ASM is continuing to increase testing, a modular-build approach, and overall engagement from contract manufacturers in new products up-front, to improve speed-to-market and cycle time from early-learning tools.

LPE and Reno integrations

The recent acquisitions of LPE and Reno have presented ASM with the opportunity to on-board some new suppliers with good capabilities. Also, to integrate both companies' supply chains with ASM's supplier scope to enable them to scale. While new at the end of 2022, ASM and LPE's partnership in supply chain has enabled a fairly quick plan on integrating and developing their current suppliers, leveraging common suppliers, and driving selective dual-sourcing and contract-manufacturing opportunities for growth and scale.

Supplier risk management

The recent challenges and uncertainty around geopolitical situations is an area of concern for ASM as we look to grow for the future. To mitigate those impacts, and ensure continuity, ASM is continuing to grow and develop its Supplier Resiliency Program. This includes more dedicated support teams, formalized supplier risk-management tools, and deeper supplier engagement overall. This serves to uncover, document, and manage supply-chain risks all the way down to the level of raw materials.

Business Continuity Planning (BCP) and IT security are also areas of focus to make sure suppliers and sub-tier suppliers have clear contingency plans to continue to supply parts in the event of external events, natural and otherwise. Having robust IT plans in case of cyberattacks and other threats are also growing in priority. We are working with suppliers to validate that ASM IP is protected, and is able to continue to operate should an attack take place.

Risk management areas and tools

12.4 GLOBAL OPERATIONS AND SUSTAINABILITY

RESPONSIBLE AND SUSTAINABLE SUPPLY CHAIN

Our suppliers are key partners in our efforts to create value in and beyond our operations. Together, we can create positive impact for our stakeholders, the planet, and society overall – well beyond our individual scale. We have taken significant steps in this journey to a sustainable, responsible supply chain, but we know there is much more to do in coming years.

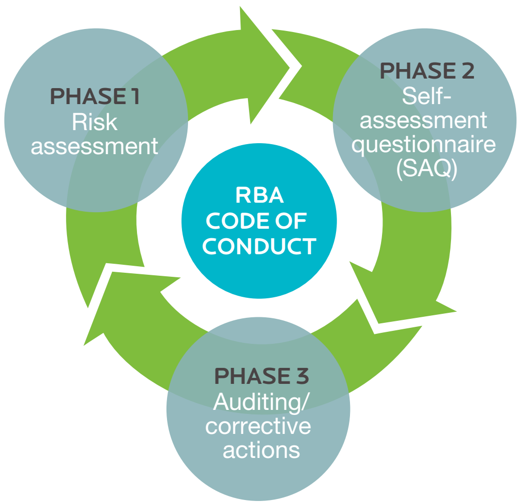
For 2022, we prioritized our focus in four areas:

- RBA Code of Conduct and worker safety
- Environmental footprint
- Human rights
- Supplier diversity

Our supply chain code of conduct

ASM has applied the RBA Code of Conduct (RBA CoC) to its supply chain since 2014. We focus particularly on strategic and critical suppliers that collectively represent the majority of our direct materials spend.

Key supplier compliance process



ASM requires suppliers to regularly reaffirm their commitment to the RBA Code. Through the RBA online platform, we also expect critical and strategic suppliers to provide a self-assessment questionnaire response (RBA SAQ) to ASM every two years. ASM reviews SAQ results, and will engage with any supplier with a high-risk SAQ result to understand the issues, define and drive a remediation plan, and if necessary conduct supplier audits. Our process for managing code commitment, supplier self-assessment, auditing, and corrective action is consistent with RBA requirements.

For 2022, 100% of our critical and strategic suppliers committed to the code. Some 84% of our critical and strategic suppliers receiving performance scorecards completed the RBA SAQ, and were rated low/medium risk. Overall, around 70% of ASM's direct material spending is covered by suppliers that have completed a recent RBA SAQ. The RBA applies strict criteria in scoring SAQs for supplier risk-level. Suppliers that complete the RBA SAQ and self-assess as high risk need to complete a corrective action plan, and may be audited. Late in 2022, one supplier submitted their SAQ that was assessed as high-risk. ASM is actively working with this supplier to understand the potential issues and develop corrective action plans as necessary.

In line with ASM's growth, our number of key suppliers has also grown. In 2023 and beyond, we aim to increase supplier engagement and capability building. Also, we intend to periodically audit a risk-based sample of our supply chain to further enhance due diligence. Risk identification is based on various aspects, such as management system availability, but also the presence of vulnerable groups, including young workers and foreign migrant workers.

Worker safety

We extend our intensive commitment to safety into our supply chain. We strive to hold our suppliers to the same high standards to which we hold ourselves. Supplier representatives that come to work at ASM sites are trained on ASM safety expectations and requirements. We are actively looking for additional ways to extend our ZERO HARM! safety vision to our supplier partners.

Environmental footprint

A significant portion of our Scope 3 GHG emissions results from our supply chain. As such, throughout 2022 ASM increased supplier engagement towards better understanding and addressing these emissions. To best support this, ASM joined the CDP supply-chain program at the Lead level. From 2022 onwards, we require critical and strategic suppliers to complete the CDP Climate Change disclosure annually. In 2022, 51% did so and shared their data directly with us. We are following up with those that did not complete the disclosure to understand why and how we can help. In 2023, we expect to meaningfully increase the percentage of suppliers completing the disclosure. This will further improve the visibility to and quality of our Scope 3 emissions data, and how it informs our actions and progress toward targets. Achieving challenging environmental objectives like ASM's Net Zero by 2035 target requires full value-chain engagement and collaboration. For this reason, we are actively encouraging suppliers to consider engaging in initiatives like the Semiconductor Climate Consortium, of which ASM is a founding member, along with some ASM suppliers.

HUMAN RIGHTS

Responsible minerals sourcing

Conflict minerals are those minerals mined in the Democratic Republic of Congo (DRC), adjoining countries (Covered Countries) or Conflict Affected High Risk Areas (CARHAs). Profits from the sale of these minerals may directly or indirectly benefit those involved in rebel conflicts and human-rights violations. These minerals, and the metals created from them – tin, tantalum, tungsten, and gold (3TG) – can make their way into the supply chains of products used around the world, including the semiconductor industry. As a responsible member of the global community, we are committed to preventing such human-rights violations.

The annual process for survey and engagement with suppliers starts in Q4 and ends 1 May of the following year. For the 2021 reporting cycle, which ended May of 2022, ASM requested 81 suppliers to respond to our Conflict Minerals survey, which accounted for 82% of 2021 ASM direct spending, and 100% of the suppliers who had 3TG in their products provided a Conflict Minerals Reporting Template (CMRT). Of the supplier CMRT responses, 33 suppliers reported no 3TG in their products, five reported using 3TG sourced from outside the DRC, and 11 from DRC conflict-free certified smelters/refiners.

ASM's third-party partner in this process reaches out to smelters/refiners who have been reported to be in our supply chain but that are not certified conformant per the RMI (RMAP approved) and requests that they work to get certified. In addition, those suppliers who report high-risk smelters (due to geo or removal from RMAP certification list) are notified of the presence of these smelters by our third-party partner, it is recommended that they re-confirm the presence of these smelters in their supply chain, and if confirmed, work to remove as appropriate. In addition, starting next year, ASM will be ramping up its engagement with suppliers who flag high-risk smelters, requesting specific action plans, after some additional training and expectations setting in 2023.

For additional information on our responsible minerals sourcing policy and processes, see section '25 Other sustainability information'.

LIVING WAGE

In addition to our commitment to a living wage for our own employees, ASM also engages the RBA to bring visibility and action to the importance of providing a living wage in our value chain. Our advocacy efforts culminated in the RBA forming a Living Wage Task Force in 2021 (in which ASM is an actively engaged member) to study the impacts and recommend best practices for implementation. A third-party analysis of the RBA Code versus related standards this year identified living wage as a key gap in the Code. The RBA Living Wage Task Force is currently working to bridge the gap by publishing a Practical Guide and is evaluating amendments to the RBA Code to include this important human-rights priority.

FORCED AND BONDED LABOR

In 2022, our forced & bonded labor (FLBL) due diligence focused on two elements:

- Continued engagement in our extended supply chain through responsible-minerals sourcing and RBA Code of Conduct conformance activities. The scope of suppliers we ask to show conformance to these expectations continues to grow.
- Development of a Supplier Risk and Maturity Assessment, including several known indicators of human-rights risks. Based on the outcome of this analysis, and building on prior work we have done related to FLBL mapping in our supply chain, we are developing a targeted strategy for additional due diligence and supplier engagement for 2023 and beyond.

SUPPLY-CHAIN DIVERSITY

While we continue to look for ways to increase the diversity of our own supply chain, we have also actively looked for other ways to encourage the growth of opportunities in the broader supply chain. In 2022, ASM was selected to co-chair SEMI's Manufacturing Ownership Diversity Working Group (known as the SEMI MOD WG).

Across 2022, ASM's participation contributed the following achievements:
- Helped lead the organization of a SEMICON West conference panel on 'Strengthening the Supply Chain through Diversity'
- Increased MOD WG participation by 25%
- Doubled the number of diverse suppliers in the SEMI directory
- Created a subcommittee structure with supporting charters (meetings, promotions, best practices)
- Co-wrote and published a blog in SEMI Global Edition
- Wrote a supply-chain diversity best-practices document scheduled for year-end release

Our 2023 supply chain sustainability priorities include:

Environmental:
- Increasing supplier use of renewable electricity and progress toward Net Zero
- Improving the percentage and accuracy of supplier CDP climate-action disclosure
- Further innovation in component and materials sustainability selections for our products
- Increasing value-chain packaging reuse

Social:
- Safety – Sharing our vision for Zero Harm! and improving visibility to the safety programs and performance of our critical and strategic suppliers
- Increasing due diligence in the assurance of human rights
- Collaboration to further positive community impact

Governance:
- IP protection and cybersecurity

We are continuously looking for more ways to engage and collaborate with our suppliers, so that together we can increase our positive impact. In 2023 and beyond, we will take a further targeted approach to supplier engagement and our shared opportunities, based on topic applicability, risk, and considering supplier scale and capabilities.

SUPPLIER DAY – CELEBRATING PERFORMANCE AND SUSTAINABILITY

We held our annual Supplier Day at the Singapore Woodland Heights facility on 10 November, 2022. Significantly, it was the first time in three years that we were able to host this meeting in person, as well as being the first opportunity for most suppliers to see our new facility and tour the manufacturing floor. The meeting highlighted ASM's ongoing Growth through Innovation journey, as well our acquisitions of Reno and LPE. We awarded suppliers whose performance had a tangible impact on our success in 2022, despite it being a challenging year. The awards recognized suppliers for their flexibility, strong collaboration for technical developments, commitment to supporting ASM's business success, and being able to navigate and recover from supply-chain challenges.

We awarded the following suppliers awarded for performance and partnership:
- Joungwoo N-Tech
- Techcom Technology Pte. Ltd
- AGC Electronics America, Inc

Our host welcoming our suppliers at the ASM Supplier Day 2022.

Collaboration with our suppliers is critical to increasing the shared positive impact of sustainability initiatives. We recognize supplier achievements and contributions through our Sustainability PRISM Supply Chain award, first introduced in 2021 with Leadership and Innovation categories. We encourage suppliers to self-nominate, sharing results of their initiatives across the range of ESG topics. In 2022, we added the ‘Collaboration’ category, to celebrate suppliers that collaborate and contribute in a meaningful way to achieving positive impact together – beyond our individual scale.

2022 Sustainability PRISM Supply Chain award recipients

Recognition
Leadership

Supplier
Thermocoax

Achievement
GHG emissions reduction, water conservation, and positive biodiversity impact

Recognition
Innovation

Supplier
Plexus

Achievement
Employee engagement and innovation in sustainability and community impact

Recognition
Collaboration

Supplier
HQ Pack

Achievement
Collaborative engineering and business processes for global value chain packaging reuse

GOVERNANCE

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13. CORPORATE GOVERNANCE

Good corporate governance is about applying sound business practices. At ASM, we do business in an ethical and transparent manner. We achieve this by setting up transparent processes and following internal policies and procedures that enable us to operate in the best interests of all our stakeholders, and which comply with applicable Dutch corporate governance requirements.

13.1 HIGH STANDARDS OF CORPORATE GOVERNANCE

ASM aspires to high standards of corporate governance and ethics practices. Sound corporate governance is a key component of our culture, behavior, and management, and this is consistent with our core values: We Care, We Innovate, We Deliver. Our corporate governance is supported by a strong focus on integrity, transparency, and clear, and timely communication. This aims to support our business and meet the needs of our stakeholders.

We continue to review and update our policies and procedures in order to comply with the applicable Dutch corporate governance requirements – including the Dutch Corporate Governance Code[1], and other relevant laws and regulations – a dynamic and evolving landscape with frequent updates and new legislation. Examples in 2022 include (i) the update of the Dutch Corporate Governance Code[2] (December 2022, the 'Updated Code'), which will apply to Dutch listed companies as of book year 2023, (ii) the adoption of the Corporate Sustainability Reporting Directive (November 10, 2022), amending the Non-Financial Reporting Directive that already applies to ASM, and (iii) the proposal for a Corporate Sustainability Due Diligence Directive (published on February 23, 2022, followed by the European Council's general approach thereon on December 1). ASM continues to monitor applicable laws, regulations and rules, and will be revising and enhancing its constitutional documents and policies with a view to ensure compliance with these.

CORPORATE GOVERNANCE FRAMEWORK

The corporate governance framework describes how we embed ASM's strategy, mission, vision, and objectives across our organization. Our Code of Business Conduct (COBC) sets clear standards in different areas of business life. Its purpose is to provide a clear, strong, and consistent culture of ethics that applies to all at ASM.

1, 2 Available on www.mccg.nl

ASM's policies and regulatory framework guide how we work. Key components are our financial, ESG and sustainability, IT, product safety, environment, health and safety (EHS), compliance, and business continuity frameworks. These are supported by transparency and accountability through our monthly business review cycle, our internal control framework, and our performance management cycle.

Corporate governance framework

* Management Board, Supervisory Board and its committees, and Executive Committee.

Our risk management approach enables us to identify and manage the strategic, operational, financial, sustainability (including climate), and compliance risks to which ASM is exposed. It also helps us develop even more effective and efficient operations. It promotes reliable financial and non-financial reporting and compliance with laws and regulations, increasing transparency and accountability.

Corporate governance-related documents are available on our website, including:
- Supervisory Board Profile;
- Supervisory Board Rules;
- Management Board Rules;
- Executive Committee Rules;
- Audit Committee Charter;
- Nomination, Selection and Remuneration Committee Charter;
- Remuneration policy of the Management Board;
- Remuneration policy of the Supervisory Board;
- Code of Business Conduct;
- SpeakUp procedure (whistleblower policy);
- Policy Communications and bilateral contacts with shareholders;
- Diversity policy
- Policy on prevention of fraud; and
- Rules concerning insider trading.

COMPANY STRUCTURE

ASM International N.V. is a limited liability company established under Dutch law and is listed on Euronext Amsterdam. It is a holding company and the parent company of the ASM group of companies. The company's management and supervision structure is organized in a two-tier system, comprising a Management Board, composed of executive directors, and an independent Supervisory Board, composed of non-executive directors. Since February 1, 2022, the company also has an Executive Committee.

We conduct our business through wholly-owned subsidiaries, the most significant being ASM Front-End Manufacturing Singapore Pte Ltd (FEMS) in Singapore, ASM Europe B.V. (ASM Europe) in the Netherlands, LPE S.p.A. in Italy, ASM America Inc. (ASM America) in the United States, ASM Japan KK (ASM Japan) in Japan, and ASM Korea Ltd. (ASM Korea) in South Korea. The location of our facilities allows us to interact closely with customers in the world's major geographical market segments: Europe, the United States, and Asia.

CHANGES IN ASM'S GOVERNANCE STRUCTURE IN 2022

Given ASM's mid-term strategic objectives – as announced during the Investor Day on September 28, 2021 – and the company's continued growth, a study was done to determine the optimal governance structure to support ASM's strategic goals. The study was conducted in 2021 and early 2022, and the Management Board and Supervisory Board discussed the results in 2022.

Based on the study, it was concluded that the governance structure needed to be modified. To this end, following the approval of the Supervisory Board, two decisions were taken in February 2022:
- Firstly, it was decided to expand the Management Board and nominate Mr. Hichem M'Saad as third member of the Management Board with the function of Chief Technology Officer (CTO). The expansion was considered necessary in view of ASM's strong growth in recent years, the growth ambitions for the coming years, and the ever-increasing technological complexities. Under the responsibility of the CTO, product management and research & development will be integrated, which will support ASM in remaining on top of the accelerating pace and increasing complexity of technology developments in our industry. The expansion of the Management Board and appointment of Mr. M'Saad as CTO were approved during the AGM on May 16, 2022.
- Secondly, an Executive Committee would be set up, consisting of the members of the Management Board and initially four executive leaders (one of whom has since resigned). The Executive Committee assists the Management Board in managing the company in respect of, among other duties: day-to-day management, strategic matters, leadership, people, culture, and sustainability. With the Executive Committee, ASM is further improving its efficiency, effectiveness in decision-making, and sharing of information. The Executive Committee came into effect as of February 1, 2022.

By expanding the Management Board and setting up the Executive Committee, ASM is well positioned to execute its Growth through Innovation strategy.

MANAGEMENT BOARD AND EXECUTIVE BOARD

The Management Board is responsible for the day-to-day management of the company. It manages and is responsible for defining and executing the strategy, including the long-term value-creation, the risk management framework, management of the operational, organizational and financial objectives, and the sustainability/ESG aspects relevant to ASM. When executing its tasks, it takes into account the interests of ASM's stakeholders. The Management Board has its own Rules of the Management Board as published on the website. ASM's Management Board has divided the roles in line with the Articles of Association and approval from the Supervisory Board. The Management Board meets regularly to discuss, evaluate, and review the performance of the company. The Management Board held various meetings throughout 2022.

Appointment of Management Board members

The General Meeting appoints a Management Board member based on a binding nomination drawn up by the Supervisory Board. The decision to nominate a member to the Management Board follows from the recommendation by the Nomination, Selection and Remuneration (NSR) Committee. The General Meeting may set aside a binding nomination by a resolution taken with an absolute majority of the votes cast, representing at least one third of the share capital. If such a binding nomination is set aside, a new binding nomination will be drawn up by the Supervisory Board and submitted to a newly called General Meeting. If such binding nomination is also set aside, the General Meeting is free to appoint a Management Board member, but only with an absolute majority of the votes cast representing at least one third of our issued share capital.

Members of the Management Board are appointed for a maximum term of four years, expiring at the close of the Annual General Meeting held at the end of the term for which the member of the Management Board is appointed. Members of the Management Board may be reappointed.

All members of the Management Board have entered into a management services agreement (MSA) for the term of their assignment. The MSA also contains specific provisions with respect to severance payments in the event of termination in line with the Dutch Corporate Governance Code; reference is made to the Remuneration report (see chapter '15 Remuneration report').

Suspension or dismissal of Management Board members

The Supervisory Board may suspend a Management Board member at any time. In addition, a Management Board member may, in accordance with a proposal by the Supervisory Board, be dismissed by the General Meeting through a majority vote representing at least one third of the issued capital. A resolution to suspend or dismiss a member of the Management Board, other than in accordance with a proposal of the Supervisory Board, requires the affirmative vote of a majority of the votes cast at a meeting. These votes must represent at least one third of the issued capital.

Appointment of other Executive Committee members

The other members of the Executive Committee – those who are not members of the Management Board – are appointed by the Management Board following consultation with the Supervisory Board and further to the Executive Committee Charter. The same applies with respect to the Executive Committee's size and composition. The Management Board determines the Executive Committee's remuneration, including long-term and short-term incentives, on an annual basis, subject to consultation with the Supervisory Board.

Suspension or dismissal of Executive Committee members

The Management Board may suspend or dismiss a member of the Executive Committee subject to consultation with the Supervisory Board.

Tasks and responsibilities of the Executive Committee

The Executive Committee's responsibilities are divided based on business and functional areas, each of which will be reviewed regularly. The current business and functional areas are: sales, global operations and supply chain, and people.

The Executive Committee shall assist the Management Board in managing the company, in particular with the day-to-day management, including driving the strategic agenda, and in respect of compliance, leadership, culture and sustainability/ESG. The Management Board may delegate one or more specific tasks and duties to one or more Executive Committee members. The Executive Committee shall be guided by the interests of the company and its affiliates in executing its tasks, taking the interests of all stakeholders into account. The Executive Committee members are accountable and report to the Management Board.

The Executive Committee is chaired by the CEO and meets on a regular basis. In 2022, the Executive Committee met 12 times, sometimes in sessions taking multiple days. Meetings took place in person as well as via video call, due to ongoing travel restrictions related to sustainability, cost, and pragmatism. All of the then current Executive Committee members attended the meetings. Meetings of the Executive Committee may be combined with Management Board meetings if so decided. The Management Board shall regularly, but at least once a year, review and assess the effectiveness of the Executive Committee's governance structure. The Rules of the Executive Committee are published on the ASM website.

Responsibility and accountability of the Management Board

Regardless of the activities of the Executive Committee and its role, the Management Board remains collectively responsible and accountable for the management of ASM. Its members are collectively and individually accountable to the Supervisory Board and the General Meeting for executing its responsibilities. The Management Board is responsible for providing the Supervisory Board with all the information it needs to fulfil its obligations and exercise its powers, and the General Meeting with all information it needs to exercise its powers in a timely fashion.

The Management Board is also responsible for the quality and completeness of financial and other (non-financial) reports that are publicly disclosed by or on behalf of the company, including all reports and documents the company is required to file. In addition to the duties of the Management Board stipulated by law and regulations and our Articles of Association, the Management Board has the following responsibilities:

- achieving the aims, strategy, policy, and results of ASM;
- managing the risks associated with the activities of ASM;
- ensuring proper financing of ASM;
- establishing and maintaining disclosure controls and procedures that make sure all major financial information is known to the Management Board so that the external financial reporting is achieved in a timely, complete, and accurate manner; and
- determining relevant aspects and achieving aims relating to ESG and sustainability and reporting on in accordance with applicable law and regulation.

SUPERVISORY BOARD

The Supervisory Board supervises and advises the Management Board and Executive Committee in the execution of their tasks and responsibilities. The members of the Supervisory Board are guided by the interests of the company and its affiliates, through which the interests of the stakeholders are taken into account.

Independence of the Supervisory Board

Under Dutch law, the Supervisory Board is a separate body independent of the Management Board, which constitutes a so-called two-tier structure. This is also reflected in the requirement that a member of the Supervisory Board cannot be a member of the Management Board nor be an employee of ASM.

The members of the Supervisory Board assess their independence on an annual basis as set out in the Dutch Corporate Governance Code and confirm this in writing. All members of the Supervisory Board are to be regarded as independent on 31 December, 2022.

Tasks and responsibilities of the Supervisory Board

The Supervisory Board supervises and advises the Management Board in executing its responsibilities, in particular regarding:

- the achievement of the company's objectives;
- the corporate strategy and the risks inherent in the business activities;
- the structure and operation of the internal risk management and control systems;
- the financial reporting process;
- the compliance with legislation and regulations;
- the relation of the company to its shareholders; and
- the relevant aspects of ESG and sustainability-related matters.

Apart from supervising and advising, the Supervisory Board must also approve important decisions by the Management Board. Such approvals include – but are not limited to – those with respect to: defining objectives of the company's strategy, issuance and repurchasing of ASM shares, important acquisitions and mergers, and dividend payments. The Management Board, and where needed and so decided, the Executive Committee, provide all the information needed to be able to make these decisions. This allows the Supervisory Board to carry out its duties properly.

In addition to its supervision and advising role, the Supervisory Board establishes the Management Board members' individual remuneration, within the boundaries of the remuneration policy approved by the Annual General Meeting and the recommendations by the Nomination, Selection and Remuneration ('NSR') Committee.

Appointment of Supervisory Board members

The members of the Supervisory Board are appointed by the General Meeting following a binding nomination drawn up by the Supervisory Board. The General Meeting may overrule the binding nature of a binding nomination at a General Meeting by an absolute majority of the votes cast, representing at least one third of the issued share capital. In that event, the Supervisory Board may draw up a new binding nomination to be submitted to a subsequent General Meeting. Should such a second nomination also be deprived of its binding character, then the General Meeting shall be free to appoint a member, provided that such a resolution shall require an absolute majority of the votes cast representing at least one third of the company's issued capital. In the event the second binding nomination is overruled without the required proportion of the capital represented – but an absolute majority of the votes cast was in favor of overruling the binding nomination – then a new General Meeting shall be convened, at which the resolution may be passed by an absolute majority of the votes cast.

The appointment of a Supervisory Board member is for a period of maximum four years and will last until the General Meeting at the end of the term. For reappointment, the candidate's performance during the previous period shall be taken into account. A Supervisory Board member who is available for reappointment must be interviewed by the Chair of the Supervisory Board and the Chair of the NSR Committee. The Chair of the NSR Committee must be interviewed by the Chair of the Supervisory Board. Following a first term, a member may be reappointed for a subsequent term of four years. Subsequently, a member who has served eight years on the Supervisory Board may be appointed for another two-year period, followed by another period of two years. However, the Supervisory Board must provide the reasons for such reappointment after eight years. For the rotation schedule of the Supervisory Board members, see chapter '13.8 Supervisory Board'.

All members of the Supervisory Board follow an induction program after their first appointment, in which financial, legal, financial reporting, and specific features, including technological, are taken into consideration.

Supervisory Board composition

In accordance with Dutch law and the Corporate Governance Code, the Supervisory Board has drawn up a profile for its own composition. This Supervisory Board Profile is available on our website. For the selection of future members of the Supervisory Board, the Supervisory Board actively seeks candidates that support the realization of diversity as per the criteria mentioned therein, as well as in ASM's Diversity policy available on our website. Any appointment or reappointment to the Supervisory Board shall be based on the candidate's match with the Supervisory Board Profile. In case of a vacancy in the Management Board, the Supervisory Board prepares a profile based on the required educational and professional background. In the search, it will actively seek candidates that support the realization of diversity on the criteria set out in the Diversity policy.

The Rules of the Supervisory Board are available on our website. The Supervisory Board determines the number of members required. However, the Dutch Civil Code stipulates that the minimum number of members is three. The members should operate independently of each other. They must be experienced in the management of an international, publicly-listed company, and have sufficient time available to fulfill the role. The Supervisory Board members appoint a Chair from amongst themselves. Since the retirement of Mr. Van Pernis at the Annual General Meeting in 2022, the Supervisory Board consists of six members and all members meet the required profile.

Supervisory committees

To more efficiently fulfill its role, and in compliance with the Corporate Governance Code, the Supervisory Board has created two committees: the Audit Committee and the NSR Committee. The committees assist the Supervisory Board in performing its duties.

Committees structure and member information

	Audit Committee	Nomination, Selection and Remuneration Committee	Supervisory Board
Pauline F.M. van der Meer Mohr		M	C
Stefanie Kahle-Galonske €	C		M
Marc J.C. de Jong	M		M
Didier R. Lamouche		C	M
Adalio T. Sanchez	M	M	M
Monica de Virgiliis	M		M

C Chairperson M Member € Financial expert

Audit Committee

The Audit Committee assists the Supervisory Board in its responsibility to oversee, among others, ASM's financing, financial statements, financial reporting process, cybersecurity, and system of internal business controls and risk management. The Audit Committee also advises the Supervisory Board on the nomination of the external auditor of the company.

The Audit Committee consists of:

- Stefanie Kahle-Galonske (Chair);
- Marc de Jong;
- Adalio Sanchez; and
- Monica de Virgiliis

The Audit Committee supervises the activities of the Management Board and fulfills its supervision responsibilities with respect to:

- integrity and quality of ASM's financial statements;
- release of financial information;
- accounting and financial-reporting processes and the audits of the financial statements;
- structure and operation of the internal risk management and control systems, including supervision of the enforcement of the relevant legislation and regulations;
- role and functioning of internal audit;
- policy on tax structure;
- applications of information and communication technology, including cybersecurity;
- financing of the company;
- compliance with recommendations and observations of internal and external auditors; and
- relations with the external auditor, including, in particular, its qualifications, performance, independence, remuneration, and any non-audit services performed for the company.

The Audit Committee meets periodically to:

- consider the adequacy of the internal control procedures;
- review the operating results with management and the external auditors;
- review the scope and results of the audit with the external auditors;
- review the scope and results of internal audits with internal audit;
- review performance evaluations relating to the auditor's independence;
- review performance and services of the external auditor; and
- review adequateness of the financing structure and tax structure of the company.

The Chief Executive Officer, Chief Financial Officer, Senior Director Internal Audit, Vice President Director Group Control, and representatives of the external auditor are invited to, and also attend, the Audit Committee meetings.

Mrs. Kahle-Galonske, Chair of the Audit Committee and member of the Supervisory Board, is the financial expert, taking into consideration her extensive financial background and experience. The Charter of the Audit Committee is available on the ASM website.

Nomination, Selection and Remuneration (NSR) Committee

The NSR Committee advises the Supervisory Board on matters relating to the selection and nomination of the members of the Management Board and Supervisory Board. The NSR Committee further monitors and evaluates the remuneration policy for the Management Board.

The NSR Committee consists of:

- Didier Lamouche (Chair);
- Pauline van der Meer Mohr; and
- Adalio Sanchez

The NSR Committee makes sure that a competitive remuneration structure is provided by benchmarking with other multinational companies of comparable size and complexity operating in comparable geographical and industrial markets. The NSR Committee evaluates the achievement of performance criteria specified per Management Board member. After the evaluation, it recommends the level of remuneration to the Supervisory Board.

On an annual basis, the NSR Committee reports to the Supervisory Board on the application of the remuneration policy in the previous year, and recommends the remuneration policy and remuneration report for the following years.

The Chief Executive Officer (CEO) and the Corporate Vice President Global Human Resources are invited to, and also attend, the NSR Committee meetings. However, the CEO does not take part in meetings relating to his own remuneration.

The Charter of the NSR Committee is available on our website.

DIVERSITY

The Supervisory Board attaches value to diversity amongst its members and the members of the Management Board. Pursuant to our Diversity policy, diversity is considered in any event to consist of gender, specific knowledge, work background, nationality, age and ethnic diversity, (technical) experience and skills. With respect to gender, the Supervisory Board strives to have a composition of both the Supervisory Board and Management Board, representing at least 30% of the seats held by either gender at the same time. As set out above, in the case of open positions on the Supervisory Board or Management Board, the Supervisory Board prepares a profile based on the required educational and professional background. In the search, it will actively seek candidates that support the realization of diversity against the criteria set out in the Diversity policy.

On January 1, 2022, a new Act came into force in the Netherlands to enhance the gender balance in the top management of large Dutch companies. Pursuant to that Act:

- For Dutch companies listed on Euronext Amsterdam, a quota of at least one-third for both women and men on their supervisory boards apply. If a new appointment does not contribute to the gender balance, such appointment will in principle be declared invalid (null and void) if the company has not yet met the one-third quota.
- All large companies that meet the criteria set out in the Act will need to set appropriate and ambitious gender-balance targets for the management board, supervisory board and other senior management. What the latter category consists of, is up to the company to determine. Moreover, these large companies will need to have an action plan to achieve such targets. In addition, they will need to report annually to the Dutch Social Economic Council on the total number of men and women on the supervisory board, management board, and other senior management, the annual targets, and the aforementioned action plan.

On July 1, 2022, an amendment to the Decree content management report (Besluit inhoud bestuursverslag) entered into force. Pursuant to this amendment, listed companies will need to include the information set out in the previous paragraph in their annual report for 2022.

Under the Updated Code, companies are required to implement a broader diversity and inclusion policy. The policy should, in any case, set specific, appropriate, and ambitious targets in order to achieve a good balance in gender diversity and other company-relevant diversity and inclusion aspects with regard to the composition of the Management board, the Supervisory Board, the Executive Committee and a category of employees in management positions ('senior management') to be determined by the Management Board.

The existing Diversity policy will therefore be further enhanced.

2022 gender diversity numbers

The Supervisory Board has challenged the Management Board with respect to diversity, and then in particular regarding gender diversity.

This has resulted in ASM defining the senior management as referred to above as any person holding the position of 'Director' and up. For additional information on the targets adopted for the male and female composition of the Supervisory Board, Management Board, Executive Committee, and senior management for 2022, as well as the actual numbers and the percentages, see chapter '10.1 Diversity & Inclusion (D&I)'.

The composition of the Supervisory Board is currently such that both genders are evenly represented.

As of the date of this annual report, the composition of the Management Board is such that it only consist of men, despite the fact that its composition is diverse in terms of specific knowledge, work background, nationality, ethnic diversity and skills.

Mr. M'Saad was appointed as third Management Board member in 2022, despite his gender not contributing to the desired 30% of the opposite gender as included in our Diversity policy. However, Mr. M'Saad was already in an executive position at ASM, and the Supervisory Board believes that, in this instance, other diversity factors weighed more heavily than gender, such as his deep knowledge and experience of the products and industry, education, and ethnicity.

The Executive Committee consists solely of male members, who already had the most senior positions within ASM. When it was established in February, 2022, it was actually a formalization of the status quo, not a selection of new senior executives. This also means that there was no specific target for the Executive Committee as it was newly established in 2022. If one takes into account the full percentage of females in the senior management group (including the Executive Committee), one sees an increase as set out in chapter 10.1.

GENERAL MEETING

ASM's shareholders exercise their rights through Annual and Extraordinary General Meetings. ASM is required to convene an Annual General Meeting in the Netherlands each year, no later than six months after the end of the company's financial year, ending for ASM on December 31 of each year. This allows the shareholders to discuss the financial statements, management report, and any topics related to applicable laws and regulations. The Supervisory Board or Management Board may convene additional Extraordinary General Meetings at any time. The convocation date is legally set at 42 days prior to the date of the General Meeting. The record date is legally set at 28 days prior to the date of a General Meeting. Those who are registered as shareholders at the record date are entitled to attend the meeting and exercise voting rights. Shareholders may be represented by written proxy.

The voting results are generally published on the ASM website within one week following the relevant Annual or Extraordinary General Meeting. The draft minutes of the meeting are published on the same site within three months following the meeting. In the event that no comments are received, the minutes are signed by the Chair of the Supervisory Board and the secretary of the meeting and made final. The minutes are published on the ASM website six months after the meeting.

Powers

The powers of the General Meeting are defined by Dutch law, the Dutch Corporate Governance Code, and our Articles of Association. The main powers of the General Meeting are to:

- appoint, suspend, and dismiss members of the Management Board and Supervisory Board;
- approve the financial statements; declare dividends; adopt the remuneration policy of the Management Board and Supervisory Board;
- discharge the Management Board and Supervisory Board from responsibility for the performance of their respective duties for the previous financial year;
- appoint the external auditors;
- approve amendments to the Articles of Association;
- authorize the Management Board to issue shares and grant subscriptions for shares;
- withdraw preemptive rights of shareholders upon issuance of shares;
- authorize the Management Board to withdraw preemptive rights of shareholders upon issuance of shares; and
- authorize the Management Board to repurchase or cancel outstanding shares.

Voting rights

At the General Meeting, each ordinary share with a nominal value of €0.04 entitles the holder to cast one vote, each financing preferred share with a nominal value of €40 entitles the holder to cast 1,000 votes, and each preferred share with a nominal value of €40 entitles the holder to cast 1,000 votes. Pursuant to Dutch law, no votes may be cast at a General Meeting in respect of treasury shares, i.e. shares which are held by the company.

There were no preferred or financing preferred shares issued on December 31, 2022. Financing preferred shares are designed to allow ASM to finance equity with an instrument paying a preferred dividend, linked to EURIBOR loans and government loans, without the dilutive effects of issuing additional common shares.

2022 Annual General Meeting

ASM held its Annual General Meeting on May 16, 2022. It was organized as a hybrid meeting, so shareholders could attend in person or remotely by video link. Shareholders were also given the opportunity to vote through different means: (i) by providing a power of attorney with voting instructions prior to the meeting; (ii) electronically during the meeting while present in person, and (iii) by voting through electronic means while not physically present at the meeting. The attendance rate was 74.27% of the total issued share capital of ASM as at the registration date.

One agenda item was considered specifically important – the nomination of Mr. M'Saad as a new member of the Management Board and CTO. As set out as above under 'Changes in ASM's governance structure in 2022', this would lead to an expansion of the Management Board to three members. In line with the recommendations by the Management Board and Supervisory Board, the Annual General Meeting adopted all resolutions proposed to it. The voting results and the minutes of Annual General Meeting – and other Annual and Extraordinary General Meetings – are published on our website.

During the Annual General Meeting of 2022, it was resolved to authorize the Management Board to issue shares or to grant rights to acquire shares in ASM as well as to restrict or exclude the pre-emption rights. This is, however, subject to approval by the Supervisory Board, and the authorization applies for 18 months.

ASM SHARES

ASM's common stock trades on the Euronext Amsterdam Stock Exchange (symbol: ASM). ASM common shares, which are held in the United States as New York Registry Shares, are eligible for trading on the OTC market.

The company's authorized capital amounts to 82,500,000 common shares of €0.04 par value, 88,500 preferred shares of €40 par value, and 6,000 financing preferred shares of €40 par value. As at December 31, 2022, there were 49,348,548 common shares issued and fully paid.

On July 18, 2022, the contemplated acquisition of the Italian company LPE S.p.A. (LPE) was announced. ASM paid the acquisition price partly in cash and partly in shares. This resulted in the issuance of 51,154 ASM shares on October 3, 2022. In addition, 580,000 treasury shares were used as payment for LPE. On October 3, 2022, closing of the transaction took place.

Preferred shares

Preferred and financing preferred shares may be issued in registered form only and are subject to transfer restrictions. Essentially, a preferred or financing preferred shareholder must obtain the approval of the ASM Supervisory Board to transfer shares. If the approval is denied, the Supervisory Board will provide a list of acceptable prospective buyers who are willing to purchase the shares at a cash price agreed by the Supervisory Board and the seller within two months of the approval being denied. If the transfer is approved, the shareholder must complete the transfer within three months, after which time the approval expires.

Preferred shares are entitled to a cumulative preferred dividend based on the amount paid up on such shares. Financing preferred shares are entitled to a cumulative dividend based on the par value and share premium paid on such shares.

STICHTING CONTINUÏTEIT AGREEMENT

ASM is party to an agreement with Stichting Continuïteit ASM International (Stichting), pursuant to which the Stichting is granted an option to acquire up to a number of our preferred shares corresponding with a total par value equal to 50% of the par value of our common shares issued and outstanding at the date of the exercise of the option. The Stichting is a non-membership foundation organized under Dutch law. The objective of the Stichting is to serve the interests of ASM. For that objective, the Stichting may, among other things, acquire, own, and vote on preferred shares.

The members of the board of the Stichting are:

- Dick Bouma (Chair), retired Chair of the Board of Pels Rijcken & Droogleever Fortuijn;
- Rob Ruijter, former Chair of the Supervisory Board of Delta Lloyd; and
- Rinze Veenenga Kingma, President of Archeus Consulting B.V.

The purpose of the above-mentioned option is to protect the independence, continuity, and identity of ASM against influences that are contrary to the interests of ASM, its enterprise, and the enterprises of all its subsidiaries and stakeholders.

CONFLICTS OF INTEREST

As provided for in the Rules of the Supervisory Board, a Supervisory Board member facing a conflict of interest, potential or otherwise, shall inform the Chair of the Supervisory Board immediately. The course of action shall be discussed in consultation with the other members of the Supervisory Board. The member facing the possible conflict of interest shall not be part of these discussions.

Each Management Board member shall immediately report any potential conflict of interest to the Chair of the Supervisory Board and to the other Management Board members. In such cases, a Management Board member shall provide the Chair of the Supervisory Board and the other Management Board members with all information relevant to the conflict, and follow the procedures as set out in the Rules of the Management Board.

The provisions of the Rules of the Management Board regarding conflict of interest of Management Board members shall apply mutatis mutandis to members of the Executive Committee, provided however that a member of the Executive Committee not being a Management Board member, shall report any potential conflict of interest to the CEO. In addition, an Executive Committee member shall not participate in the deliberation and/or any decision-making, if his/her participation and/or decision-making would be contrary to applicable legislation, regulations and/or internal policies.

PUBLICATION IN ENGLISH

The Annual Report, the financial statements, and other regulated information as defined in the Dutch Act on Financial Supervision ('Wet op het financieel toezicht') will only be published in English on our website.

EXTERNAL RELATIONS

At ASM we believe that an open dialogue with our external stakeholders is important. We provide accurate and timely information through, among other things, press releases, our annual reports, quarterly earnings calls and webcasts, and meetings. At these meetings we discuss the company strategy and performance, and request input for our materiality assessment. For additional information on our materiality assessment, see chapter 'Other information', under paragraph 25 "Materiality and stakeholder relations". These meetings typically include investors. It is our policy to not make donations to any political party. Reference is made to the policy regarding communications with shareholders as can be found on our website.

As set out above, the Dutch Corporate Governance Code was updated in December 2022. One of the revisions includes the introduction of a best practice provision, which prescribes that the interests of relevant stakeholders must be taken into account in determining the vision for long-term value-creation, with the corresponding strategy and specific objectives. For that purpose, companies will need to establish a policy for stakeholder dialogues and publish this on their website, and should enter into a dialogue with the relevant stakeholders about the sustainability aspects of the strategy and its implementation. Stakeholders are groups and individuals who, directly or indirectly, influence – or are or may be influenced by – the attainment of the company's objectives: employees, shareholders and other lenders, suppliers, customers and other stakeholders.

ASM has taken note of this best practice provision and will establish a policy, which it will publish in due course on its website.

RISK MANAGEMENT AND CONTROL FRAMEWORK

The Management Board ensures that the company has an adequately functioning internal risk management and control framework. A comprehensive risk management and control framework, based on the 'three lines of defense model', has been established. This provides the Audit Committee and the Management Board with a clear overview of the effectiveness of internal controls and risk management. For additional information, see chapter '13.2 'Risk management'. The Management Board periodically discusses the internal risk management and control systems with the Supervisory Board and the Audit Committee.

REMUNERATION

During the Annual General Meeting, which took place on May 16, 2022, a new remuneration policy was adopted for each of the Management Board and Supervisory Board.

For information regarding the remuneration of the Management Board, please see the Remuneration Policy of the Management Board posted on our website, the Remuneration report, included in chapter 15 of this report, and [Note 25] to the consolidated financial statements.

For information regarding the remuneration of the Supervisory Board, please see the Remuneration Policy of the Supervisory Board posted on our website, the Remuneration report, included in chapter 15 of this report, and Note 25 to the consolidated financial statements.

13.2 RISK MANAGEMENT

To support our strategic objectives in an ever-changing world, we need to manage risk effectively and efficiently. We have set up our risk-management framework in such a way that we may spot risks early on, as well as opportunities for growth, based on follow-up actions we prioritize and initiate.

Our methodology works to monitor risks and key mitigating controls proactively and regularly. It is based on our top-down risk assessment, bottom-up business processes, and the process controls embedded in these. In 2022, we extended our assessment process to include velocity and risk interconnectivity. Also, we made our process-level ownership stronger, so we can manage risk proactively and in line with our core values: We Care, We Innovate, We Deliver.

RISK-MANAGEMENT APPROACH

ASM's approach to managing risk is based on the reference model of the Committee of Sponsoring Organizations (COSO). It is a key part of our Corporate Governance Framework, which describes how we embed our strategy, mission, and objectives across our organization.

Our risk-management approach sets out to identify and manage the current and emerging strategic, operational, financial, ESG, and compliance risks ASM is exposed to. It helps us make our operations more effective and efficient, promotes reliable financial and non-financial reporting, and compliance with laws and regulations.

Every year, we assess the risks that could prevent us from achieving our strategic objectives. We do this at a consolidated level (top-down approach) with our Risk Committee and senior management team, and on a process level (bottom-up approach). In 2022, we extended our risk-assessment process to include risk velocity and interconnectivity, so we can more deeply understand how our key risks affect each other, and define more specific following-up actions. We also re-evaluated our risk appetite to improve how we treat risk and reduce its impact. Our countermeasures are part of our risk management and control framework.

Business management provides the Executive Committee with an annual assurance letter on the reliability of their financial reporting, the effectiveness of their internal controls, risk management, and compliance with internal policies, as well as laws and regulations.

Risk management approach

Our risk management and internal control activities are organized through the three lines of defense model. The Executive Committee – consisting of the Management Board and three senior executive leaders who are considered essential in driving and executing the strategy – is entrusted with risk management and compliance in line with the risk appetite, and is supported by a:

- First line of defense: Business and operations management owns and manages risk, which includes identifying, assessing, controlling, and mitigating risks;
- Second line of defense: Oversight functions support business and operations management and help make sure that the risk and control procedures have effective metrics and are operating as intended; and
- Third line of defense: Internal Audit provides independent objective assurance on the effectiveness of governance, risk management, and internal controls, including how business and operations management, and the oversight functions, manage and control risk. Internal Audit brings a systematic, disciplined approach to evaluating and improving the effectiveness of risk management, control, and governance processes.

RISK CULTURE

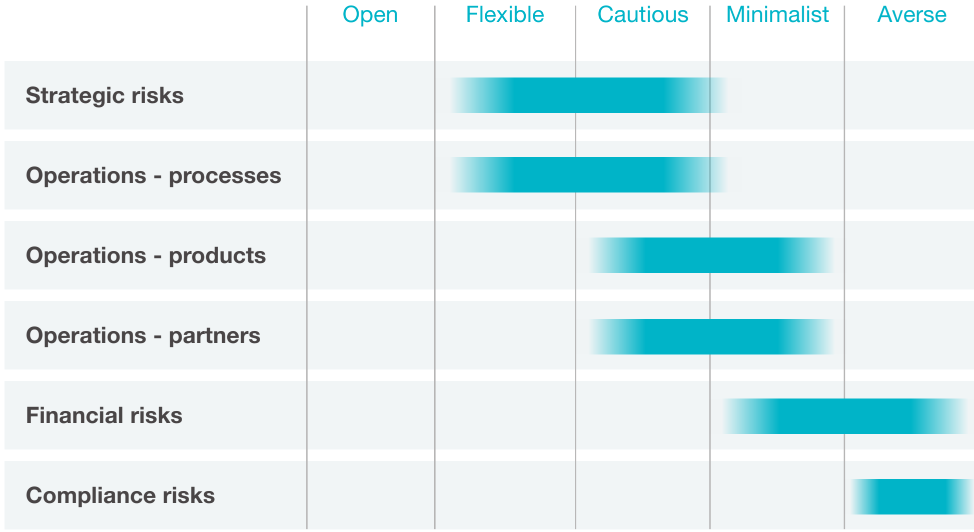
In line with our core values (We Care, We Innovate, We Deliver), ASM strives for a culture of openness and transparency. In this culture, identified risks are disclosed proactively, unexpected events are reported as soon as they occur, and improvement opportunities are discussed and followed up on. The Risk Committee plays a key role in our risk culture. It is chaired by the Vice President of Strategy and, as all business units and key departments are represented, key follow-up on the monthly meetings is efficiently implemented throughout ASM. Through the Risk Committee, periodic control self-assessments, and a focus on aligning our top-down risk assessment to our business processes, we are continually increasing risk awareness to make it an integral part of our company culture and our primary processes. Our Code of Business Conduct (COBC) applies to all ASM employees and temporary staff, and describes how we work in an open, transparent, honest, and socially responsible way. We assess the effectiveness of and adherence with the code by actively investigating any alleged misconduct reported through the Whistleblower program, SpeakUp!, and other means, taking appropriate action, including disciplinary action, where necessary.

RISK APPETITE

Any business activity inevitably leads to taking risks. We deal with each risk in a way that aligns with the risk appetite established by the Executive Committee. Risk appetite is the level of risk we deem acceptable to achieve our objectives. ASM's risk appetite is primarily determined based on the defined and agreed strategic plan and the individual objectives in this plan. Our COBC and other detailed policies and procedures also help guide our risk appetite. Our risk appetite is the total residual impact of the risks ASM is willing to accept in pursuing its objectives, and ranges from open to adverse. The Executive Committee sets the risk appetite per objective or risk area annually, and it is evaluated on an ongoing basis as events occur throughout the year.

The nature of the risk is a key determinant of our risk appetite. We avoid risks with an adverse risk appetite, for which we always choose the lowest risk option as there is no trade-off – this applies to compliance-related risks. Our strategic and operations-processes risks have the highest upside, so we are more flexible taking strongly justified risks while managing the impact of these risks.

Risk appetite



CONTROL EFFECTIVENESS STATEMENT

The Management Board is responsible for ASM's internal risk management and control framework. This system is designed to manage the main risks that may prevent ASM from achieving its objectives. The internal risk management and control framework, and the evaluation of the effectiveness of our internal controls and areas for improvement, are regularly discussed with the Audit Committee and KPMG Accountants, our external auditor. The Audit Committee reports on these matters to the Supervisory Board.

The Management Board has conducted an assessment of the design and operating effectiveness of the internal risk management and control framework. Based on this assessment and the current state of affairs, to the best of its knowledge and belief, the Management Board confirms that:

- The internal risk management and control framework provides reasonable assurance that the financial reporting does not contain any material inaccuracies;
- The management report provides sufficient insights into any failings in the effectiveness of the internal risk management and control systems; and
- The management report states those material risks and uncertainties that are relevant to the expectation of ASM's continuity for at least 12 months after the date of this annual report. Based on the current state of affairs it is justified that the financial reporting is prepared on going concern basis.

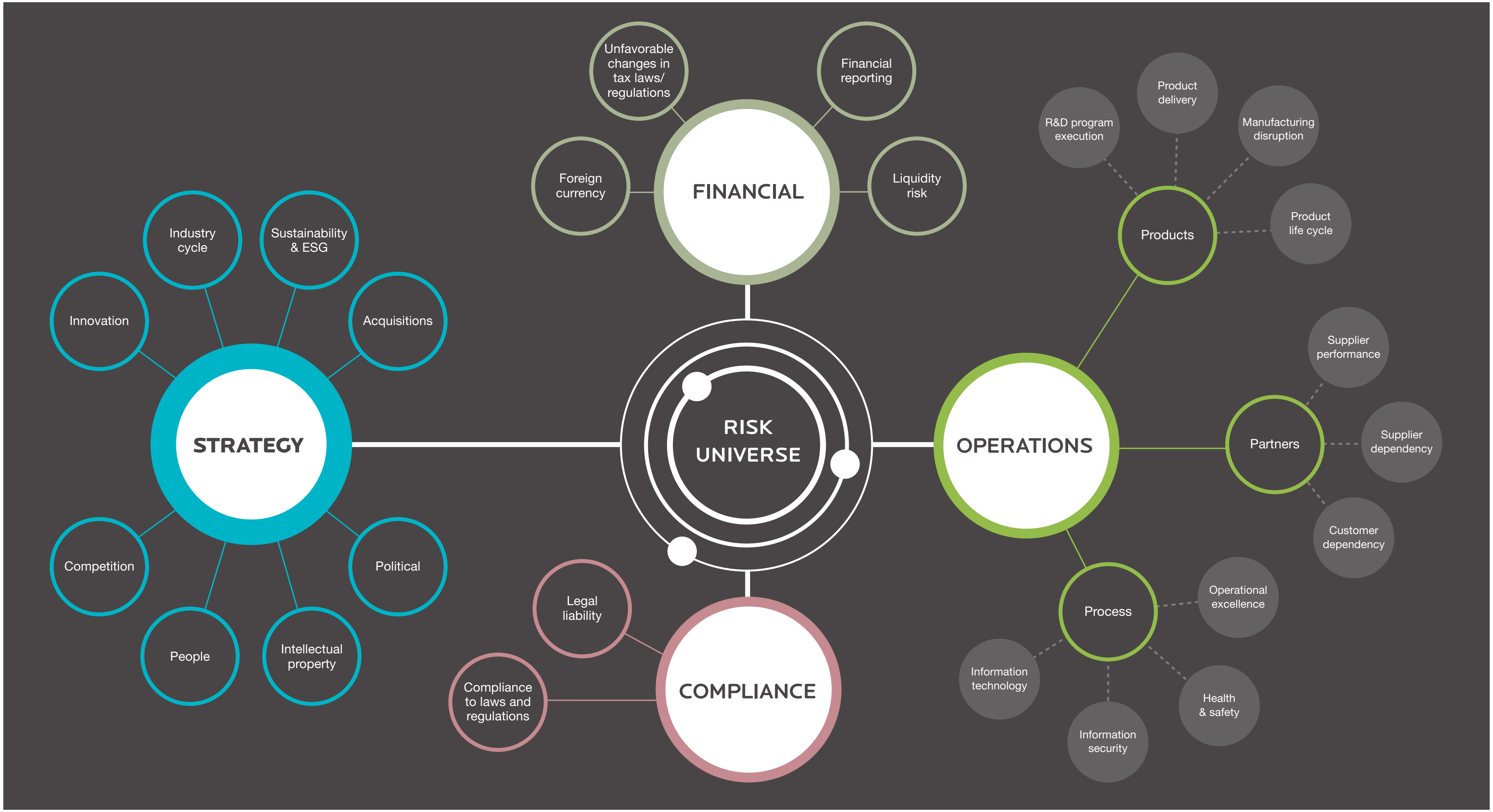
For the declaration of the Management Board required pursuant to Section 5:25c of the Dutch Act on Financial Supervision on the principal risks ASM faces, see chapter '30 Responsibility statement'.

All internal control systems, no matter how well designed and implemented, have inherent limitations. Even systems determined to be effective may not prevent or detect misstatements or fraud, and can only provide reasonable assurance with respect to disclosure and financial statement presentation and reporting. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate due to changed conditions, and that the degree of compliance with the policies or procedures may deteriorate.

In view of all of the above, the Management Board believes that it complies with the requirements of best practice provisions 1.2 and 1.4 of the Dutch Corporate Governance Code.

RISK CATEGORIES AND FACTORS

ASM and its business is subject to risks and uncertainties. We have detailed those risks currently most relevant to our company on the following pages. Our risk management process is set up to facilitate a company-wide understanding of the nature of these risks, the impact they may have on our business, and the way they develop over time. This enables risk-informed decision-making. These risks are not the only ones we face and actively mitigate. Some risks may not yet be known to us, and certain risks we do not currently believe to be material could become material in the future. Our risk universe forms the basis of our risk assessment. On the next page, we have listed the most important risks and risk clusters, along with our response. This list is not exhaustive.



STRATEGY

The realization of our growth strategy may be impacted by our ability to stay ahead of the competition in a demanding and evolving technological environment.

We operate in an unique environment that requires continuous innovation and customer focus to enable us to outperform the wafer fab equipment market and realize our strategic objectives.

Long-term success in this area depends on a number of factors:

- Innovation requires continuous investment, and in 2022 we continued to increase our R&D investment.
- We enhanced our R&D and process-development capabilities by extending our working relationship with the University of Helsinki to include the ALD Center of Excellence, and with imec to include emerging-technology areas. Also, we joined the Semiconductor Research Corporation's nanomaterials program. In addition, we have extended our metrology capabilities to effectively characterize our processes.
  Through our innovation, and differentiating processes and equipment, we have successfully maintained long-term relationships with our strategic customers, mapping our own technology roadmaps to theirs.
- In 2022, we continued to invest in market intelligence, which has resulted in better forward-looking and competitive market insight. This has enabled more focused R&D efforts and early warning of potential market-share shifts.

The geopolitical environment and export restrictions may continue to impact our sales and deployment of international knowledge workers.

Export restrictions are increasing, impacting our ability to sell and service systems in certain jurisdictions and for certain customers. In addition, restrictions are impacting the movement of our employees across countries and access to technology. To mitigate this emerging risk, we monitor geopolitical developments as well as laws and regulations on a continuous basis. We adjust our procedures to ensure compliance with laws and regulations, and apply for export licenses as required. When the US government announced the most recent export regulations on October 7, 2022, we performed internal reviews which led us to conclude that these restrictions negatively affect 15%-25% of our sales to Chinese customers, as we communicated on November 28, 2022.

Also, we obtained extensive clarification to assess the impact of these regulations on our internal procedures, as well as our financial reporting, implementing key process updates as needed.

Climate change and transition risk impacting ASM, our customers, and our supply chain could cause disruptions in our value chain and markets.

If we are not able to respond fast or well enough to the physical and transition risks and potential impacts of climate change, such emerging risks may impact our operations, supply chain, and end markets. Beginning in 2021 and extending into 2022, we completed our first climate-adaptation risk assessment. Our sustainability materiality assessment includes five key focus areas: Innovation, people, planet, responsible supply chain, and sustainability governance. Within our risk universe, we have identified several risks related to these focus areas, including climate and sustainability, health & safety, and compliance to laws and regulations. In the next iteration of our sustainability materiality assessment, we may identify additional risks as we continue engaging with stakeholders.
For additional infomation, see section 'Planet' of this report.

OPERATIONS

We may face challenges in maintaining quality and operational execution while dealing with a competitive labor market.

We experienced our sixth consecutive year of double-digit growth in 2022, as well as outperforming the wafer fab equipment market. Translating our continuous innovation to high-volume manufacturing at a competitive price – while driving cost-efficiency and ensuring consistent quality – depends on our ability to execute our processes efficiently and effectively, as well as successfully overcome the challenges of attracting, retaining, and developing people.

We are continuously improving our manufacturing capabilities and quality. In 2022, we improved our quality organization, focusing on customer quality, total quality management, productization, operational management system, and supplier quality. In addition, our continued focus on enhancing our software/platform and service processes is enabling our key quality processes. This is in line with market developments and the tool base that is operational at our customers. In addition, we have improved our process-management approach to better enable scalability across our organization.

To meet growing demand, we have expanded our manufacturing capacity by bringing forward the opening of additional cleanroom space in our Woodlands facility.

People is one of our emerging risks. To be successful in an increasingly competitive labor market, we focus on five key areas: Attracting and retaining talent, culture and engagement, leadership and development, inclusion and diversity, and employee experience. For additional information, see chapter '10 People'.

Suppliers that do not deliver on time or on specification may impact our manufacturing process.

In support of the need for technology, capacity, flexibility and sustainability, we have high expectations of our suppliers, as their capacity to meet these expectations may impact our ability to meet our customer's expectations.

Supply-chain disruptions pushed us to update our approach to supplier risk and resiliency as a cornerstone of a secure, future supply chain. It also led to closer partnerships with suppliers on investment needs, redefining strategies around key and critical parts, and an updated approach to outsourcing. For additional information, see chapter '12.3 Global supply chain'.

CYBER ATTACKS MAY IMPACT OUR OPERATIONS AND COULD LEAD TO A LOSS OF INTELLECTUAL PROPERTY

In an increasingly digital world, ASM is subject to cybersecurity attacks. If successful, these could impact our operations and lead to a loss of intellectual property. Our IP is a critical asset that we must protect. Failure to do so can lead to negative consequences, including loss of revenue and market position, disruptions, regulatory penalties, and a reduction in public trust. Protecting our physical and intangible assets such as ASM's facilities and intellectual property, and that of our supply chain, is a fundamental part of our business and one of our highest priorities. The Global CIO is responsible for ASM's overall cybersecurity, and the Corporate Director, Global IP and Licensing, is responsible for intellectual property and physical security. These leaders work closely together to ensure a harmonized approach to protecting ASM's core assets throughout our global locations.

To protect our data and systems, ASM continuously strives towards safeguarding our environment from any potential cyber threats. Our general principle is to implement in-depth defense and a zero-trust environment, using solutions/controls such as detection mechanisms, anti-malware, anti-phishing protection, and identity threat-prevention solutions/controls. In addition, we have implemented monitoring mechanisms to detect any potential vulnerability or weakness that may expose us to cyber threats. We will continue to educate our employees and enhance our cybersecurity training programs to minimize cyber risk. In addition, the working model of ASM's cyber-response team is 'Always assume breach' and 'Fail gracefully', which strives towards zero data loss. We will continue to review and improve our incident response by automating it, and conducting cyber drills to make sure ASM is equipped to handle any such incidents.

13.3 SHAREHOLDERS

We have ongoing dialogue with our shareholders and investors, striving always for the highest standards of open communication and the regular sharing of information. We keep investors up to date through several channels, including press releases, the AGM, conference calls and webcasts, conferences and roadshows. ASM fully commits to the importance of transparent and equal information to all parties, as outlined in our Policy regarding communications and bilateral contacts with shareholders, that can be found on our website.
In 2022, we continued our year-round conversations with investors, with ASM management and investor relations engaging in a global program of events. We chose a mix of virtual and in-person meetings, especially from the second quarter of the year when we resumed travel to a number of locations worldwide, including Europe and the United States.

During investor meetings, we provide insights into our:

- Industry and competitive landscape
- Business model and financial performance
- Capital-allocation priorities
- Progress on the execution of our strategy and sustainability agenda

Also, in 2022, we again held several dedicated ESG meetings with investors.

Finally, throughout the year, we saw an increase in sell-side research coverage. As of year-end 2022, ASM stock was covered by 18 analysts – both from brokers and independent research firms – seven of whom either launched or reinitiated coverage in 2022.

SHARE LISTING AND PERFORMANCE

ASM's shares are listed on Euronext Amsterdam under the symbol ASM. Since March 2020, our shares have been included in the AEX index. This consists of the 25 largest companies listed on Euronext Amsterdam measured by free-float adjusted market capitalization. Since February 2021, our shares have also been included in the MSCI Global index.
ASM is also part of the STOXX Europe 600, which includes the 600 largest listed companies.

ASM's market capitalization at year-end 2022 was €11,623 million, based on the closing share price of €235.65 on Euronext Amsterdam on December 30, 2022 (€388.70 on December 31, 2021), and 49.3 million total outstanding shares at year-end. The market capitalization at year-end 2021 was €18,879 million.

The highest closing share price during the year was €390.80 on January 3, 2022, and the lowest was €198.74 on July 5, 2022.

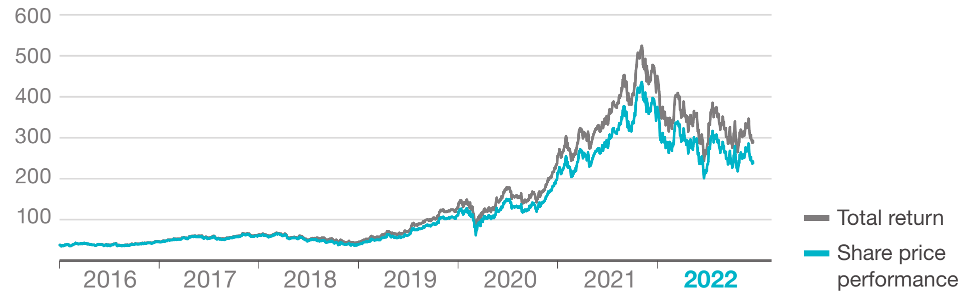
The average daily trading volume of ASM shares on Euronext Amsterdam in 2022 was 265,174. This compares to an average daily volume of 310,625 in 2021.

Our NY Registry Shares have been eligible for trading on the over-the-counter (OTC) market in the United States under the symbol ASMY since 2015. Trading in our shares in the OTC market increased accordingly from an average daily volume of 754 in 2021 to 11,396 in 2022.

The graph below shows the performance of ASM's shares on Euronext. The total share return in this graph is the performance of the share, including dividends paid and capital returned over the period.

Share price performance and total shareholder return

in %



ISSUED AND OUTSTANDING SHARES

On December 31, 2022, the total number of issued common shares was 49,348,548 compared to 49,297,394 at year-end 2021. This increase was the result of 51,154 new shares issued as part of the financing of the LPE acquisition

On December 31, 2022, we had 49,326,319 outstanding common shares, excluding 22,229 treasury shares. This compared to 48,568,677 outstanding common shares and 728,717 treasury shares at year-end 2021. The change in the number of treasury shares in 2022 was the result of 126,488 treasury shares that were used as part of share-based payments and 580,000 treasury shares used to finance the acquisition of LPE.

On December 31, 2022, 47,752,219 of the outstanding common shares were registered with our transfer agent in the Netherlands, ABN AMRO Bank N.V., and 1,574,100 were registered with our transfer agent in the United States, Citibank, NA, New York ("NYRS"). While still representing a smaller part of our total shares, the number of NYRS increased substantially in 2022 from 286,592 in 2021.

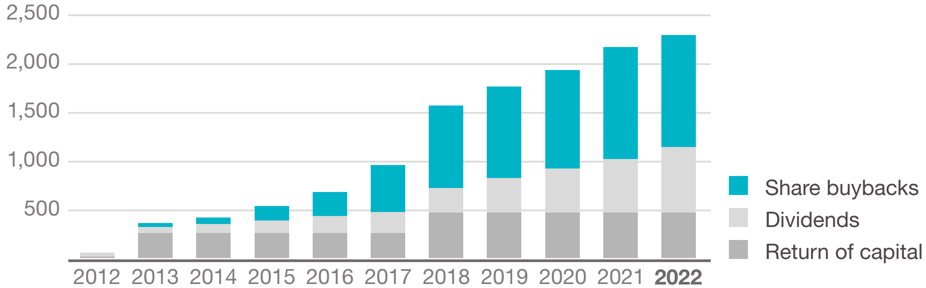
	2021	2022
As per January 1:		
Issued shares	49,797,394	**49,297,394**
Treasury shares	1,082,712	**728,717**
Outstanding shares	**48,714,682**	**48,568,677**
Changes during the year:		
Issue of common shares related to the acquisition of business combinations	—	**51,154**
Treasury shares transferred related to the acquisition of business combinations	—	**580,000**
Cancellation of treasury shares	500,000	**—**
Share buybacks	462,988	**—**
Treasury shares used for share-based performance programs	316,983	**126,488**
As per December 31:		
Issued shares	49,297,394	**49,348,548**
Treasury shares	728,717	**22,229**
Outstanding shares	**48,568,677**	**49,326,319**

SHAREHOLDER RETURNS

Over time, ASM has returned significant amounts of cash in different forms to our shareholders. In 2022, we returned €122 million to our shareholders. This follows an amount of approximately €237 million returned in the form of dividends and share buybacks in 2021. Since 2018, we have returned €1.3 billion in cash to our shareholders.

Cumulative cash returned to market

€ million

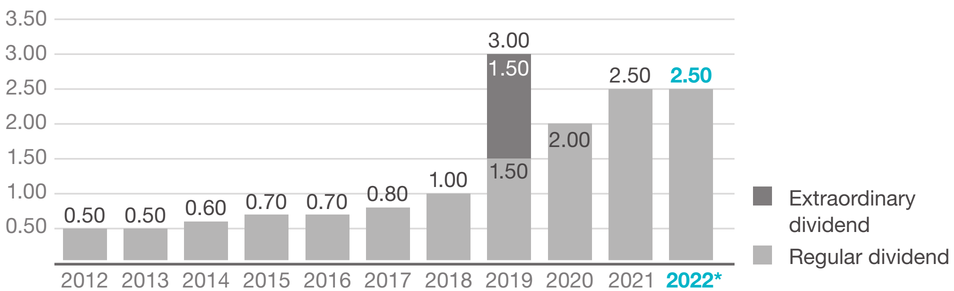


Dividends

ASM aims to pay a sustainable annual dividend. ASM has been paying dividends since 2010.

ASM announced on February 28, 2023, that it would propose to the upcoming AGM a regular dividend of €2.50 per common share over 2022, maintaining the same level of regular dividend paid over 2021 (€2.50 per common share).

Dividend per share in € paid over



* Proposed

Share buyback

In February 2022, we announced a new share buyback program of up to €100 million to be carried out within the 2022/2023 time frame. However, it did not start in 2022, due to the cash required for the financing of the acquisitions of Reno Sub-Systems and LPE. We still plan to execute this program in 2023.

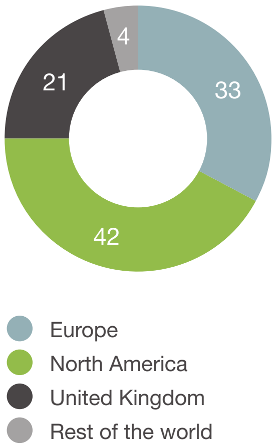
The following table shows details of our three most recent share buyback programs. Visit the section 'Investors' on our website for more details on our historical share buyback programs.

SHAREHOLDER BASE AND MAJOR SHAREHOLDERS

ASM shares are held by an international and diversified shareholder base. At the end of 2022 about 82% of our shares was held by institutional investors, and the remainder by broker and retail investors. Geographically, 21% was held by institutional investors in the UK, 42% in North America, and 33% in Europe.

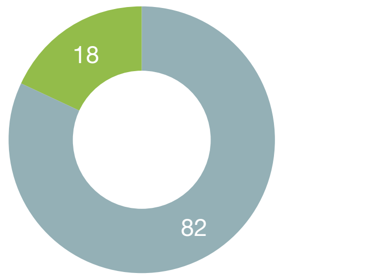
Institutional investors by geography

in %



Investors by profile*

in %



* Excluding treasury shares

According to Dutch law, shareholders should notify the AFM when their shareholding equals or exceeds 3% and certain higher thresholds including 5%, 10%, and 15% of the issued capital and when it subsequently falls below those thresholds. As of December 31, 2022, four investors – Tokyo Electron, BlackRock, Norges Bank, and WCM – reported a shareholding of more than 5%.

	Number of shares	Percent [1]	Number of voting rights	Percent [1]
ASM International N.V. [2]	22,229	–%	–	–%
Tokyo Electron Ltd. [3]	2,699,000	5.5%	2,699,000	5.5%
BlackRock, Inc [4]	3,160,593	6.4%	3,782,142	7.7%
Norges Bank [5]	2,464,834	5.0%	2,464,834	5.0%
FMR LLC [6]	1,554,177	3.1%	1,554,177	3.1%
WCM Investment Management, LLC [7]	2,595,144	5.3%	2,595,144	5.3%

1 Calculated on the basis of 49,297,394 issued common shares as of December 31, 2022.
2 On December 31, 2022, ASM held 728,717 common shares in treasury.
3 Based on the notifications filed with the AFM:
3) July 1, 2013; 4) May 18, 2022; 5) July 21, 2022; 6) May 27, 2022; 7) March 29, 2022

KEY FIGURES PER SHARE

(€, except number of shares)	2020	2021	2022
Net earnings per share, diluted	5.78	10.11	**7.93**
Normalized net earnings per share, diluted [1]	6.04	10.36	**12.77**
Dividend per share paid over	2.00	2.50	**2.50**
Shareholders' equity per share	38.07	46.16	**55.74**
Issued shares year-end (thousand)	49,797	49,297	**49,348**
Outstanding shares year-end (thousand)	48,715	48,569	**49,326**
Average outstanding shares basic (thousand)	48,907	48,645	**48,820**
Average outstanding shares diluted (thousand)	49,359	48,909	**49,096**
Closing share price Euronext Amsterdam			
Year-end	179.95	388.70	**235.65**
High	179.95	434.60	**390.80**
Low	59.18	186.40	**198.74**
Market capitalization year-end (€ million)	8,766	18,879	**11,624**

1 Excluding amortization other intangible assets from purchase price allocation and impairment of ASMPT

13.4 TAX PRINCIPLE

We see tax as an integrated part of doing business, and that tax should follow business. This resonates with our core value 'We Care', and contributes to the societies in which we operate. The respective taxes are determined and paid in the countries where the respective value is created, in accordance with all relevant rules and regulations. See Note 22 of this Annual Report for the total income-tax expense in the Netherlands and abroad. Tax is one of the many factors we take into account when doing business, including locally available tax incentives and exemptions. We seek to establish and maintain an open and constructive relationship with the tax authorities in the countries where we operate. We do not use artificial tax structures aimed at tax avoidance. We aim to follow both the letter as well as the spirit of the law.

We support the arm's-length principle to determine transfer prices. This conforms with domestic and international rules and standards, such as the OECD guidelines for multinational enterprises. Our disclosures are made in line with the relevant local and/or international regulations and guidance, based on all the relevant facts and circumstances.

TAX STRATEGY

ASM has a tax control framework in place, including the use of certain tax technology that ensures correct data for tax purposes. As part of this, we continuously monitor our tax positions and tax developments, and review key tax positions quarterly in accordance with the respective processes. As part of our tax strategy, the tax department recommends a balanced approach in the interests of all stakeholders, while adhering to ASM's tax policy and complying with all relevant tax laws and regulations. ASM's tax department is responsible for tax management. It is supervised by the Management Board via the CFO, who discusses the tax strategy with the Supervisory Board's Audit Committee. In line with our tax principles, we do not use artificial tax structures solely aimed at tax avoidance, nor do we use tax havens or non-cooperative jurisdictions to avoid transparency on our tax position. ASM proactively engages with tax authorities seeking to develop an open and transparent working relationship with early engagement in advance of transactions and filing tax returns. For specific transactions and/or a specific approach, for example with respect to the application of the at arm's length principle in transfer pricing matters, we may seek certainty upfront by requesting a tax ruling from the respective tax authority. We believe such certainty is valuable for our stakeholders, including the respective tax authority.

13.5 BUSINESS ETHICS

ASM's Code of Business Conduct (COBC) management system includes 18 underlying policies, including fair competition, gifts, entertainment and hospitality, corruption and improper advantages, and anti-fraud. The ASM COBC reflects the RBA Code of conduct standards framework.

The ASM COBC comes with training for all employees in multiple languages. The training is set to effectively influence desired conduct rather than merely reinforce rules. At the same time, it further defines the consequences of such violations through our disciplinary policy. All training is supported by multiple resources. This includes a dedicated web page on ASM's intranet, reference material, and tools for specific areas, such as gifts and entertainment, the Whistleblower program, and SpeakUp procedure, an anonymous way to voice concerns or violations of the COBC.

The COBC applies to our Supervisory Board, Management Board, Executive Committee, all employees, consultants, contractors, temporary employees, and critical and strategic suppliers.

SPEAKING UP

The SpeakUp! program enables employees, suppliers, customers, and other stakeholders to report ethics issues and concerns anonymously and in their own language. People can report potential violations of our COBC through the SpeakUp! process, or directly to management, the People team, or the Global Compliance Officer. The Ethics Committee investigates any reports. Independent of how an issue is reported, our COBC includes a non-retaliation policy that applies to any person making use of this process.

In 2022, seven concerns were reported through our SpeakUp! system, while one case was reported via another channel to the Ethics Committee. We reviewed and responded to all concerns. In one concern, the investigation revealed a non-conformity with the COBC and related policies, and appropriate action was taken.

PRIVACY

We have established our privacy policy and practices, which is in line with GDPR, and have formalized privacy-protection agreements with third parties where applicable. In our effort to protect the confidentiality of our employees' data, we conduct regular audits and act on any filed reports. The same applies to the privacy of our customers and suppliers.

13.6 IP AND CYBERSECURITY

INTELLECTUAL PROPERTY

ASM's intellectual property (IP) includes our patents, trade secrets, trademarks, and copyrights.

We strategically develop our IP portfolio to:
- Grow shareholder value
- Strengthen our competitive advantage in the marketplace
- Help support our freedom to sell our products and services

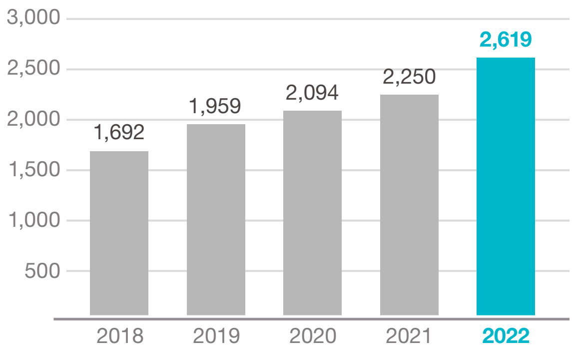
We fully understand that our IP is a critical asset we must protect. Failing to do this can have negative consequences, such as a loss of revenue and market position, disruptions to our supply chain, regulatory penalties, and a reduction of public trust. IP protection is also a key priority of our stakeholders – as indicated in our sustainability materiality analysis – and for this and other reasons, establishes this topic as a priority for ASM.

Patents and trade secrets

New deposition technologies and chemistries continue to drive growth in our global patent portfolio. Patents give us the right to protect and license our innovative processes, products, and services. They also make it possible for us to confidently share our innovations with the market. We have developed ASM's trade secrets over decades of focused R&D. They help us design and make industry-leading equipment and processes, and they strengthen our patent portfolio, licensing, and sales processes. Our patent portfolio has once again been recognized by LexisNexis® in their Innovation Momentum 2023: The Global Top 100 report.

We generally file patents in the principal countries where semiconductor devices and related equipment are made and/or sold. Every year, we review our portfolio to make sure it is as effective as it can be, while limiting the increase in maintenance and prosecution costs linked to an expanding portfolio. As of December 31, 2022, we had more than 2,600 patents in force worldwide protecting our products and services. This includes the patents that came with the acquisitions of Reno Sub-Systems and LPE.

Patents in force



Trademarks and copyrights

We have registered a number of trademarks covering our product portfolio in the principal countries where we do business (as of December 31, 2022):

- ASM, the ASM International logo, Advance, Aurora, Dragon, Eagle, EmerALD, Epsilon, Intrepid, LPE logo, Powering The Future logo, Previum, Pulsar, Silcore, SONORA, Synergis, XP, and XP8 are our registered trademarks.
- The ASM Qualified Licensed Supplier logo, AEGIS, A400, A412, ES, ESA, EVC, GenMatch, Level-to-Level, Precis, TENZA, and Velocity are our trademarks.
- 'Drive Innovation. Deliver Excellence.' is our service mark.

CYBERSECURITY

Protecting our physical and intangible assets, such as ASM's facilities and intellectual property and that of our supply chain, is key to our business, and a key priority of our stakeholders as indicated in our sustainability materiality analysis, and is thus one of our highest priorities. The Global CIO is responsible for ASM's cybersecurity, and the Corporate Director, Global IP and Licensing, is responsible for protecting ASM's physical security and intellectual property. These leaders work closely together to make sure we are consistent in how we protect ASM's core assets in our global locations.

We have established global security policies and systems across our many facilities. We recognize, however, that each of our offices is unique. This may call for customized security solutions, such as those protecting our R&D and manufacturing facilities. We maintain a multi-year security budget and implementation plan to help make sure we approach security proactively. Our security efforts are in line with our broader business resiliency and risk-management activities. We strive for continuous improvement in our security personnel and systems.

ASM is unceasing in its efforts to strengthen its cybersecurity capabilities against increasingly sophisticated forms of cyber attacks. In 2022, we introduced a planned enhancement to our existing Information Rights Management (IRM) infrastructure. We will continue to expand on its capabilities in 2023, which will help secure ASM endpoints and data at rest and in transit. It also better protects the data of our global supply chain, including our customers and suppliers.

As well as upgrading our IRM capabilities, we focused on strengthening our cybersecurity posture – how effective our controls, protocols, and defenses are against cyberattacks. For instance, we provided training to new and existing employees, that is focused on our new IRM capabilities, the importance of protecting our intellectual property, and the confidential data of our supply chain. Future training will include refresher courses as we roll out new technologies and enhance our existing policies and procedures.

We continue to refine our use of continuous threat detection and monitoring technology. We also keep our emphasis on operating effectively in a zero-trust environment. We have streamlined our internal IT testing and deployment approach to new hires, given our significant headcount growth, and made new software and patch installations faster and less disruptive. We have an extensive IT support team to support our on-site employees as well as our large and growing remote workforce.

We have given our employees the means to alert IT and other personnel if there is an actual or perceived security incident. Also, we have brought in rapid escalation measures to minimize any disruption this may cause. We hold practice exercises from time to time to gauge our response to common cyberattacks such as phishing, malware, and ransomware, and adjust our training and procedures accordingly. We conduct similar exercises for physical security, too, such as addressing unauthorized visitors to any of our buildings or handling an unexpected power outage. We hold regular internal and external audits on our systems and procedures related to physical security and cybersecurity.

13.7 MANAGEMENT BOARD AND EXECUTIVE COMMITTEE

COMPOSITION OF THE MANAGEMENT BOARD

Name	Position	Nationality	Year of birth	Initial appointment	Term expires
Benjamin Loh	CEO	Singaporean	1963	2020	2024
Paul Verhagen	CFO	Dutch	1966	2021	2025
Hichem M'Saad	CTO	US and Tunisian	1965	2022	2026

The Management Board's composition is as follows:

BENJAMIN LOH

CEO

Mr. Loh was appointed as Chair of the Management Board and President and Chief Executive Officer on May 18, 2020, for a period of four years.

Mr. Loh worked for Oerlikon Corporation from the late 1990s until 2005. He became senior vice president in 2002 and was responsible for Asia until 2005. He then joined Veeco Instruments Inc., an American thin-film process semiconductor equipment manufacturer, as senior vice president and general manager for Asia, before becoming executive vice president responsible for global field operations. In 2007, he moved to FEI company as senior executive, holding various positions responsible for sales and service, global business operations, and finally as chief operating officer. In 2015, Mr. Loh joined VAT Vacuum Valves, based in Switzerland, as executive vice president and member of the Group Management Board, where he was responsible for and led worldwide sales and marketing until late 2017. Mr. Loh is a non-executive director of ASMPT, and in the past also held positions as non-executive director in several companies (Schneeberger, Schweiter Technologies AG, and Liteq BV). He was also an advisory board member of Semi China. Mr. Loh has a wealth of experience working in the electronics and semiconductor industry, and vast experience as a leader. Mr. Loh has a bachelor's degree in electronic engineering from the Tohoku University in Japan. He is of Singaporean nationality, but has spent the last 30 years living mostly outside of Singapore – in Japan, Hong Kong, China, the UK and the US.

PAUL VERHAGEN

CFO

Mr. Verhagen was appointed as member of the Management Board with effect from June 1, 2021 by the Annual General Meeting of May 17, 2021. Following this appointment, he was appointed as CFO from June 1, 2021 by the Supervisory Board.

Mr. Verhagen has a proven track record and background in Dutch listed companies and the electronics industry. He made a career within Royal Philips – starting in the early 90s and until 2013, he fulfilled numerous executive positions in the Netherlands, the US, Hong Kong, and China. His last two assignments – from 2007 until 2013 – were as executive vice president and CFO of Philips Consumer Lifestyle, and executive vice president and CFO of Philips Lighting. In 2014, he became the CFO and member of the Management Board of the Dutch stock listed company Fugro N.V. Mr. Verhagen is a non-executive director of ASMPT Ltd ('ASMPT'). He is a Dutch national, holds a Master of Business Administration degree, and has a post-graduate degree as Chartered Controller.

HICHEM M'SAAD

CTO

Mr. M'Saad was appointed as a member of the Management Board and Chief Technology Officer as of May 16, 2022. As CTO, Mr. M'Saad oversees ASM's technical product portfolio, platform group, and future technologies and innovation.

Mr. M'Saad joined ASM in 2015 as the senior vice president and general manager of the Thermal Products business unit. From 2019, he held the role of executive vice president and general manager of Global Products, including responsibility for developing ASM's ALD, Epi, VF, and PECVD products. In addition, he has been instrumental in several of ASM's successful new innovative products, including the Intrepid ES, Synergis, Previum, and A400 DUO. Before joining ASM, he had a 15-year tenure with Applied Materials. He started his career as a process development engineer working on various dielectric CVD applications. He rose to the level of corporate VP and general manager of the Dielectric Systems and Modules (DSM) and the Chemical Mechanical Polishing (CMP) divisions. He also served as CEO of a start-up in the solar photovoltaic industry for six years. Mr. M'Saad received a bachelor's degree in metallurgical engineering from the Colorado School of Mines, a master's degree in materials science & engineering from Cornell University, and a PhD in electronic materials science from the Massachusetts Institute of Technology. He has written 57 technical articles and holds nearly 200 granted patents. He is a US and Tunisian national.

COMPOSITION OF THE EXECUTIVE COMMITTEE

The Executive Committee was set up on February 1, 2022. The committee consists of the following members:

Name	Position	Nationality	Year of birth
Benjamin Loh	CEO	Singaporean	1963
Hichem M'Saad	CTO	US and Tunisian	1965
Paul Verhagen	CFO	Dutch	1966
Brian Birmingham	Senior Vice President Global Sales	US	1968
Kent Rossman	Senior Vice President Global Operations	US	1969
Ralph Otte	Corporate Vice President Global People	Dutch	1964

Mr. Bruce Ragsdale resigned in August 2022 for personal reasons. In early 2023, the Management Board filled this vacancy by promoting Kent Rossman. Mr Rossman, who was Corporate Vice President Spares & Services, and already an Executive Committee member, became Senior Vice President Global Operations.

BRIAN BIRMINGHAM

Senior Vice President Global Sales

Mr. Birmingham serves as Senior Vice President Global Sales. He joined ASM in May 2021.
Brian has more than 26 years of experience in the semiconductor equipment industry. He has a strong track record working with customers' R&D teams to capture new applications and grow business across the American, Asian and European customer base. Prior to joining ASM, Brian spent 20 years with Lam Research & Novellus Systems (acquired by Lam in June 2012). His most recent assignment with Lam was as corporate VP and general manager responsible for the relationship with a major memory manufacturer in China. Previously, he held positions as VP global field development, and VP/GM of major semiconductor manufacturers in both memory and logic/foundry. Brian worked in both Japan and Taiwan as vice president business development.

He has a master's degree in systems engineering from the University of Southern California, and a bachelor's degree in general engineering/management studies from the United States Military Academy at West Point. He is a US national.

KENT ROSSMAN

Senior Vice President Global Operations

Mr. Rossman joined ASM in 2019, and served as the Corporate Vice President Global Spares & Services. He was appointed as an Executive Committee member of ASM International on February 1, 2022. As of February 1, 2023, he was promoted to Senior Vice President Global Operations.
Kent has more than 28 years of experience in the semiconductor equipment industry. Before joining ASM, he had a 26-year tenure with Applied Materials. He started his career as a process development engineer, working on various dielectric CVD film applications, and served in various capacities – from sales, to product management, to leading technology-development teams. Within Applied, Kent rose to the level of vice president in charge of business management for chemical mechanical polishing and packaging, plating, and cleans product families, business development for new markets and alliances, and head of sourcing for the global services and spares group.

Kent has a bachelor's degree in chemical engineering from the University of Minnesota and holds 22 granted patents. He relocated from Silicon Valley, northern California, to Singapore in 2022.
He is a US national.

RALPH OTTE

Corporate Vice President Global People

Mr. Otte serves as Corporate Vice President and Chief People Officer. He joined ASM in 2013.
Ralph has a proven track record and background in a variety of industries and within listed companies. After graduating from the Royal Military Academy in the Netherlands in the late 1980s, he began a career with the Royal Netherlands Air Force. From 1993, he held various senior HR positions in specialized healthcare, and led a merger and integration between three healthcare organizations. He then moved to Accenture as a strategy consultant, specializing in organization and change strategy. From 2000 until 2010, Ralph held various executive HR leadership positions at ASML, before transferring to DAF / PACCAR to become a member of their management team, responsible for HR.
Ralph has a master's degree in human resources, and an executive master's in financial economics, both from the University of Tilburg. He also completed the post-graduate master's program in executive change management at Sioo in Utrecht. He is a Dutch national.

13.8 SUPERVISORY BOARD

The Supervisory Board consists of six members and its composition is as follows:

COMPOSITION

Name	POSITION	Nationality	Year of birth	Initial appointment	Term expires
Pauline F.M. van der Meer Mohr	Chair	Dutch	1960	2021	2025
Stefanie Kahle-Galonske	Member	German and Swiss	1969	2017	2025
Marc J.C. de Jong	Member	Dutch	1961	2018	2026
Didier R. Lamouche	Member	French	1959	2020	2024
Adalio T. Sanchez	Member	United States	1959	2021	2025
Monica de Virgiliis*	Member	Italian and French	1967	2020	2024

* Mrs. De Virgiliis has decided not to seek a second term as Supervisory Board member given her current and future commitments, as published in ASM's press release of February 16, 2023, available on www.asm.com.

PAULINE F.M. VAN DER MEER MOHR

Chair of the Supervisory Board

Mrs. Van der Meer Mohr was elected as a member to the Supervisory Board on September 29, 2021, for a period of four years. She was appointed as Chair of the Supervisory Board as of May 16, 2022, when the then Chair, Mr. Van Pernis, retired from the Supervisory Board.
Mrs. Van der Meer Mohr is a seasoned non-executive director, and brings more than 35 years' experience in leadership positions in multinational businesses and academia. She started her career as a lawyer in private practice, prior to joining the Royal Shell group in 1989. In 2004, she joined TNT NV as group HR director. From 2006, she served as senior executive vice president and head of group HR for ABN AMRO Bank N.V. Mrs. van der Meer Mohr was appointed president of the executive board of Erasmus University Rotterdam in 2010. Until her retirement from her executive career in 2016, she was also a member of the Banking Code Monitoring Commission, and has served on several advisory and supervisory boards.

Mrs. Van der Meer Mohr currently serves as non-executive director of the Euronext-listed NN group and Ahold Delhaize, as well as the Nasdaq-listed Viatris Inc. Until December 31, 2022 she chaired the Supervisory Board of EY Netherlands LLP and chaired the Dutch Monitoring Committee Corporate Governance. Her past Board mandates include non-executive director of London-listed HSBC Holdings Plc, member of the Supervisory Board of Dutch-based ASML Holding N.V. and deputy Chair of the Supervisory Board of DSM N.V.

Mrs. Van der Meer Mohr holds a master's degree in law from Erasmus University Rotterdam, as well as a master's degree in advanced dispute resolution from the University of Amsterdam. She is a Dutch national.

STEFANIE KAHLE-GALONSKE

Member of the Supervisory Board

Mrs. Kahle-Galonske was elected as a member of the Supervisory Board in May 2017 and reappointed for a period of four years on May 17, 2021.
Mrs Kahle-Galonske has more than 25 years of experience in various senior executive finance roles in the technology industry. In these roles, she managed transformations, reorganizations and M&A, as well as start-ups and scale-ups. Since April 2016, Mrs. Kahle-Galonske is Group CFO of Egon Zehnder International AG in Zurich, Switzerland. From March 2013 until March 2016, she was CFO of Markem-Imaje at Dover Corporation based in Geneva, Switzerland. Between January 2007 and February 2012, she held various senior executive positions at NXP Semiconductors in France and the Netherlands. She started her career at Philips Electronics.

Mrs. Kahle-Galonske currently serves as a non-executive member of the Supervisory Board at Smart Photonics B.V., the photonics semiconductor foundry based in Eindhoven, the Netherlands. In the past, Mrs. Kahle-Galonske served as non-executive board member of Micronas Semiconductors AG in Switzerland, and Nu-Tune Singapore.

Mrs. Kahle-Galonske graduated in economics from the Ruhr-University of Bochum, Germany, and has been a Certified Public Accountant (CPA) since 2002. Mrs. Kahle-Galonske is a German and Swiss national.

MARC J.C. DE JONG

Member of the Supervisory Board

Mr. De Jong was elected as a member of the Supervisory Board on May 28, 2018, for a period of four years and reappointed for a period of four years on May 16, 2022.
Mr. De Jong was CEO of LM Wind Power A/S until April 2018. Prior to that, until 2009, he was a member of the Executive Management Team of NXP Semiconductors. After that, until 2013, he was responsible for professional lighting solutions at Philips Lighting. At the same time, he was a member of the Group Management Committee of Philips.

Mr. De Jong is currently a member of the Supervisory Boards of Fugro N.V., a Dutch-listed company, Nissens A/ S, based in Denmark, Fiberline Composites A/S, based in Denmark, FiberSail SA based in Portugal, and Sioux B.V., based in the Netherlands. He is also Chair of the Supervisory Board of BDR Thermea Group B.V.

Mr. De Jong holds a master's degree in physics and mathematics from the VU University of Amsterdam, the Netherlands, and a Master of Business Administration (MBA, executive program) from Erasmus University Rotterdam, the Netherlands, and Rochester, in the United States. Mr. De Jong is a Dutch national.

DIDIER R. LAMOUCHE

Member of the Supervisory Board

Mr. Lamouche was elected as a member of the Supervisory Board on May 18, 2020, for a period of four years.
Until the end of 2018, Mr. Lamouche was the CEO of IDEMIA (formerly Oberthur Technologies), the world leader in security and identity solutions. Prior to that, he was CEO of the Euronext-listed Bull Group until 2010. Before that, Mr. Lamouche held several senior executive positions in the semiconductor industry, most recently as COO of ST Microelectronics, and CEO of ST-Ericsson until 2013.

Mr. Lamouche has held non-executive positions on the public boards of Atari, Soitec and STMicroelectronics. He is currently non-executive Chair of the Board at Quadient, a Euronext-listed company and leader in enterprise-communication systems. He has been a member of the Supervisory Board of Adecco since 2011 (listed on the SIX in Zurich), and of ACI Worldwide, a leading, Nasdaq-listed software company serving the fintech industry.

Mr. Lamouche graduated in 1981 from the Ecole Centrale de Lyon as an engineer, and has a PhD in semiconductor technology. Mr. Lamouche is a French national, and Chevalier of Legion of Honor.

ADALIO T. SANCHEZ

Member of the Supervisory Board

Mr. Sanchez was elected as a member of the Supervisory Board on September 29, 2021, for a period of four years.

Mr. Sanchez has more than 35 years' experience in the tech industry. He is a successful senior executive with strong operational acumen and a track record in growing complex global businesses. He was with the IBM Corporation from 1982 to 2014, where he held various senior executive officer and global general management roles. Most recently, he led two IBM divisions – the x86 systems unit and retail store solutions point-of-sale systems unit. Previous roles include vice president of corporate strategy, and head of IBM's microelectronics semiconductor division. He also led IBM's UNIX systems division.

Following the divestment of the IBM x86 division to Lenovo Group Limited, Mr. Sanchez moved to Lenovo and, from 2014 to 2015, served as senior vice president of Lenovo's Enterprise Systems Group.

Mr. Sanchez currently serves as a non-executive member of the board of directors of the following Nasdaq- listed US-based companies: Avnet, Inc. a global semiconductor sales and distribution company; ACI Worldwide, Inc. an electronic payments software company, and Snap One Holdings Corp., a smart home technology-solutions and distribution company. He is also a member of the board of Trustees of US-based MITRE Corporation, a non-profit organization for public good, and a member of the board of directors of Florida International University Foundation.

Mr. Sanchez has a bachelor's degree in electrical engineering from the University of Miami, and a Master of Business Administration degree from the Florida International University. He is a member of the United States National Academy of Engineering and a US national.

MONICA DE VIRGILIIS

Member of the Supervisory Board

Mrs. De Virgiliis was elected as a member of the Supervisory Board on May 18, 2020, for a period of four years.

Mrs. De Virgiliis has more than 25 years' experience in the tech industry. She is a successful senior executive with proven transformation and growth track records. She was with STMicroelectronics from 2001 to 2015, and then with Infineon Technologies from 2015 to 2017, where she held various senior executive officer and global general-management roles. From 2017 to 2019, Mrs. De Virgiliis fulfilled the role of chief strategy officer at CEA, the French Atomic & Alternative Energy Commission.

She is an experienced non-executive director in the energy and technology spaces. Since April 2022, she has been serving as Chair of Snam, one of the leading European players in the energy infrastructure and services industry.

Deeply passionate about the energy transition and industry transformation in alignment with the Paris agreement, Mrs. De Virgiliis recently founded Chapter Zero France – under the auspices of the World Economic Forum – as part of the global Climate Governance Initiative.

Mrs. De Virgiliis has a master's degree in electronic engineering summa cum laude from the University of Turin (Politecnico di Torino). Mrs. De Virgiliis is an Italian and French national.

14. SUPERVISORY BOARD REPORT

MESSAGE OF THE CHAIR

Dear stakeholder,

2022 was yet another strong year for ASM in terms of revenue, driven by strong ALD and Epi revenue growth. Given supply-chain constraints in the sector, geopolitical tensions, the 'war on talent', and lingering restrictions on operations due to COVID-19, I believe the results were impressive.

Growth strategy and operations

ASM's growth strategy comes with its own challenges. As part of our supervision of the company, we have discussed various operational matters in our meetings. To timely meet the demand for equipment, spares and service deliveries, we regularly discussed production capacity, staff, challenges in the supply chain, the importance of investing in R&D, and other important developments. In the past few years, due to COVID-19, we have not been able to visit the various ASM facilities in person. But with more and more countries lifting travel restrictions throughout the year, site visits became possible again in 2022. In March, ASM unveiled its new Woodlands Height production facility in Singapore. The Supervisory Board was present for the official opening, along with the Management Board, the Singapore Minister for Manpower, and Second Minister for Trade and Industry. In December, the Supervisory Board travelled to the ASM facility in Phoenix, Arizona. A highlight of this trip was a visit by Ms Katie Hobbs, Arizona's Governor-elect, with the Management Board and I taking her on a site tour.

Best people, culture and diversity

The so-called 'War for Talent' is recognized and felt by ASM. In 2022, ASM hired many new employees worldwide, and staff recruitment and retention was top of mind. The Nomination, Selection and Remuneration Committee (NSR), as well as the Supervisory Board as a whole, discussed the importance of a sound company culture – which includes Diversity & inclusion (D&I) – several times. This included discussions with management on targets for gender diversity. The Supervisory Board is pleased that the percentage of women as part of the total workforce

"ASM DELIVERED IMPRESSIVE RESULTS IN 2022, BOTH FINANCIALLY AND IN TERMS OF SUSTAINABILITY."

Pauline van der Meer Mohr
Chair of the Supervisory Board

increased in 2022. We recognize the company's efforts in this respect. Under the Dutch Corporate Governance Code, as updated on December 20, 2022, companies are required to implement a broader diversity and inclusion policy. This will continue to have the attention of the Supervisory Board and the NSR Committee, in 2023 and beyond.

Geopolitical challenges

Geopolitical tensions and events continued to have an impact on the global semiconductor ecosystem in 2022. On October 7, 2022, the US government issued new export-control regulations. The regulations are unilateral and have an impact on doing business with Chinese 'advanced fabs'. The Supervisory Board discussed these export restrictions and how they impact ASM, as well as measures taken to mitigate the effects. For additional information, see chapter '13.2 Risk management in "Governance"'.

Russia's invasion of Ukraine in February 2022 has led to volatility in the commodities markets and material prices, government-imposed trade barriers and energy policies, a surge in energy costs, and substantial inflation. In our meetings, we discussed the impact of these factors on ASM, and – with the Management Board – the measures the company has been taking to mitigate the risks. For additional information, see chapter '12.3 Global supply chain in "Responsible supply chain"'.

Acquisitions

ASM acquired two companies in 2022: Reno Sub-Systems (March) and LPE S.p.A. (October). The Management Board presented the reasoning and terms of the acquisitions to the Supervisory Board, which we discussed in our meetings. Besides the proposed terms for the relevant acquisition, the Supervisory Board also discussed the post-closing actions to integrate the companies into ASM. The acquisition of Reno Sub-Systems was the first for ASM in quite some time, and will contribute to enhancing the company's plasma products. The acquisition of LPE S.p.A. was larger, and considered an even more strategic step as it will address the power-electronics industry with innovative silicon carbide Epi solutions. This acquisition will contribute to the electrification of the automotive industry, which positively contributes to ASM's global footprint.

ESG / sustainability

The company has also addressed the increasing focus on ESG (environmental, social, and governance) and sustainability this year. For additional information, see chapter '6 Our sustainability approach' and other sections of this Annual Report. Particularly within Europe, one sees more and more laws and regulations in the field of ESG, and an increased focus on reporting additional non-financial information, including a proposal for European reporting standards. The Audit Committee discussed ESG reporting in several of its meetings. In the Supervisory Board meetings, we discussed the challenges ASM faces in decreasing its Scope 1, 2 and particularly Scope 3 emissions, as well as the actions taken and contemplated to decreasing greenhouse gas emissions (GHGs).

There are two matters of particular interest in 2022 that I would like to highlight here. The first relates to the Science Based Targets Initiative (SBTi). ASM signed the SBTi Business Ambition for 1.5°C and we submitted our Scope 1, 2, and 3 measurements and targets to the SBTi for their subsequent validation. For additional information, see chapter '11.2 Climate response'.

Secondly, ASM played a principal role in the formation of the Semiconductor Climate Consortium – the first global collaborative of semiconductor companies focusing on reducing GHGs. ASM became a founding member, and in January 2023, ASM was elected to chair the SCC's Governing Council. For additional information, see chapter '11.2 Climate response'.These initiatives are part of the ASM strategy to accelerate its commitment to sustainability. The Supervisory Board is very supportive of these developments.

Governance structure

ASM made important changes to the governance structure. Upon his nomination by the Supervisory Board, the Annual General Meeting approved the appointment of Hichem M'Saad as the third member of the Management Board in May. Furthermore, the Executive Committee became effective as of February 1, 2022. The Supervisory Board believes these changes will contribute to ASM's success and the execution of its Growth through Innovation strategy.

And last but certainly not least, during the Annual General Meeting in May, Mr. Martin van Pernis retired and stepped down as Chair of the Supervisory Board after being on the Supervisory Board for 12 years. As per the same General Meeting, I took over the role as Chair of the Supervisory Board, and I am honored and proud to do so. I am grateful to Martin for all the achievements he has made possible over the years, and for the very pleasant cooperation since my arrival as Supervisory Board member in the autumn of 2021.

To conclude, my Supervisory Board colleagues and I want to both compliment and thank the Management Board – and of course all the employees of the ASM group of companies – for all their dedication, hard work, and relentless effort over the year, which has culminated in another year of great results in 2022. We are looking forward to the future with confidence, and believe the company is more ready than ever before to execute on the Growth through Innovation strategy.

March 2, 2023

Pauline van der Meer Mohr
Chair of the Supervisory Board

INTRODUCTION

Supervision of the Management Board (and Executive Committee), its policy decisions and actions are entrusted to the Supervisory Board. In accordance with Dutch law, the Supervisory Board is a separate body, independent of the Management Board.

During the year under review, the Supervisory Board performed its duties in accordance with applicable legislation and the Articles of Association of ASM International N.V. and supervised, advised, and constructively challenged the Management Board and Executive Committee on an ongoing basis with respect to – among others – the management tasks, prioritization of activities, direction of the business, financial and non-financial results, ESG and sustainability matters, and evidently with respect to the execution of the Growth through Innovation strategy.

This report is prepared to provide further information on how the Supervisory Board performed its tasks throughout the year, and to present the Annual Report 2022.

Supervisory Board visiting ASM facility in Phoenix, Arizona.

MEETINGS OF THE SUPERVISORY BOARD

During 2022, the Supervisory Board met on eight occasions. The meetings varied from several hours to multi-session programs spread over several days. Looking at the average, 97.6% of the Supervisory Board members attended the meetings. This shows that the members are committed and engaged while spending sufficient time, attention, and effort to oversee the interests of ASM. The attendance of the individual Supervisory Board members is outlined in the overview below. Attendance is defined as the number of meetings attended out of the number of meetings eligible to be attended. The COVID-19 restrictions were still noticeable in the beginning of the year but in-person meetings were held after that.

	Supervisory Board	Audit Committee	NSR Committee
Martin van Pernis *	4/4	N/A	2/2
Pauline van der Meer Mohr	8/8	N/A	4/4
Adalio Sanchez	8/8	4/4	4/4
Stefanie Kahle-Galonske	8/8	4/4	N/A
Didier Lamouche	7/8	N/A	4/4
Monica de Virgiliis	8/8	4/4	N/A
Marc de Jong	8/8	4/4	N/A

* Mr. Van Pernis retired during the Annual General Meeting held on May 16, 2022.

The members of the Management Board joined all the regular Supervisory Board meetings. Prior to and on occasion following the regular Supervisory Board meetings, the Supervisory Board had meetings among themselves. The Supervisory Board-only meetings allow the members to discuss and reflect on specific items of interest and importance without the involvement of the Management Board. Outside of the collective and organized meetings there was regular interaction between the Chairs of the committees and the Chair of the Supervisory Board to ensure the proper distribution of information.

Some regular Supervisory Board meetings were also attended by members of the Executive Committee where these concerned agenda items in which the Executive Committee was involved. During the meeting in April, Mr. Hichem M'Saad joined the Supervisory Board meeting. Mr. Ralph Otte and Mr. Bruce Ragsdale joined the meeting in July. Mr. Otte also joined the meeting in October, and so did Mr. Rossman and Mr. Birmingham. During the strategy meeting of December 5, the entire Executive Committee joined the strategy session of the Supervisory Board meeting. The participation of the Executive Committee members enables the Supervisory Board to have direct contact with these members and allows for better supervision by the Supervisory Board.

In 2022, COVID-19 restrictions were abolished in various jurisdictions, which allowed the Supervisory Board to visit different ASM affiliates. This provided the Supervisory Board with the opportunity to interact with employees across the company, have one-on-one meetings with local executives, and get an even deeper understanding of the products and company. This year there were two site visits. One was to Singapore in March 2022. During the visit, the new state-of-the-art manufacturing facility in Woodlands was officially unveiled. There, the Supervisory Board was welcomed by local management and was given a tour of the new production facility. In addition, the Supervisory Board paid a site visit to the Singaporean facility of an important customer, which allowed the board to see ASM's solutions in a production environment. The second site visit was to Phoenix, Arizona, which is our main US site. The Supervisory Board was given a tour, and the thermal ALD and Epitaxy executives and staff presented and explained the R&D activities.

During the meetings, the Supervisory Board had discussions on a wide range of topics with the Management Board and on occasion with members of the Executive Committee. These related to, among others, and not listed in order of importance:

- changes in corporate governance, which included, among others, the expansion of the Management Board, establishment of an Executive Committee, changes in BU and KPU structure;
- succession planning of the Supervisory Board and changes to the Supervisory Board and changes to its committees;
- the execution on the Growth through Innovation strategy and the related long-term value-creation;
- the performance of the company and its underlying businesses from a business and financial perspective, the budget, investments, perform share buy-backs, acquisitions, and payment of dividends;
- oversight of the risk management and internal controls and the business processes at large. This includes the possible impact on the company in the event a risk will actually materialize;
- the increasing focus on ESG matters. With respect to environmental, the preparation of the science-based targets, the submission of these with the Science Based Target Initiative, and the Net Zero target were items structurally discussed;
- company culture, where the Supervisory Board has encouraged the efforts of the Management Board to create a strong culture across ASM which is focused on long-term sustainable value-creation. On several occasions, both formally and during informal contacts, the topic was raised and discussed in depth the 'People' strategy, culture transformation in view of the new values, succession planning and talent reviews, results of the engagement survey, the new onboarding process, diversity and inclusion;
- geopolitical environment and the impact of the US export control regulations;
- the execution and organization of the global operations and supply chain, and the supply-chain constraints;
- cybersecurity and the cyber resilience of the organization was discussed. A deep dive was done as explained in more detail below;
- a number of specific procedural and financial matters were discussed. This relates to, among others, the organization of the Annual General Meeting, the new revolving credit facility, and the new global approval matrix;
- the licensing and IP strategy;
- the regular update around developments, opportunities, and risks related to key customers;
- regular reviews and monitoring of (potential) acquisitions, divestments and partnerships. Specific discussions were initiated on the acquisitions of Reno Sub-Systems and LPE S.p.A.;
- the remuneration of the Management Board and the evaluation of the Management Board based on the achievement of specific targets approved by the Supervisory Board;
- product and market developments, management and financial structure, and financial and non-financial performance, including further profitability improvements; and
- the annual budget, the quarterly financial results review, and the preparation of the quarterly earnings press releases.

STRATEGY

Every year, one of the Supervisory Board meetings is tasked with discussing with the Management Board and senior management (this year including members of the Executive Committee who are not Management Board members) the company's strategy, long-term value-creation, and the planned implementation and risks attached with realizing it. This meeting lasted a full day.

In this year's strategy meeting, the boards discussed numerous matters, including:

- the semiconductor and semiconductor equipment market and outlook;
- the development of ASM's market share in the different segments it serves;
- the development of the competitive environment;
- the new technology and market trends for the coming years;
- the progress with ASM's strategic priorities;
- ASM's long-term revenue and profit & loss forecasts; and
- strategic initiatives to improve the company's long-term value-creation strategy.

The execution of the long-term strategy of Growth through Innovation means that apart from the profitability and growth goals, sustainability targets also need to be met. These targets were discussed when determining the Net Zero target, and reference is made to chapter '11 Planet' of this report. The continued focus on and importance of sustainability resulted in regular discussions with the Management Board around this topic as part of the ESG topics.

For Scope 1 and 2 emissions, these are being addressed by ASM's target to reach 100% use of electricity from renewable sources by 2024, and further GHG emissions-reduction efforts within our company boundary. Addressing Scope 3 emissions is considerably more challenging, and this has been discussed on several occasions with the Management Board and specialists. An important way this is currently addressed is by designing products to be more energy-efficient and we strive to accelerate industry value chain progress through the Semiconductor Climate Consortium of which ASM is a founding member, and which targets to provide methods and standards for addressing Scope 3 collaboratively across the semiconductor industry value-chain. ASM submitted its measurements and targets for all scopes to the SBTi in December of 2022, expects to complete SBTi validation within 2023, and to publish a Climate Transition Action Plan.

With respect to the execution of the strategy, both boards also discussed the actual M&A projects and M&A possibilities regularly throughout the year. The Supervisory Board reviewed and challenged the opportunities from a technology, economic, commercial, and competitive point of view. The result was that in 2022 two acquisitions were completed, both of which will contribute to the Growth through Innovation strategy. The acquisition of LPE S.p.A. fits ASM's strategy for a number of reasons. It contributes technologically and commercially, as well as fitting with ASM's sustainability efforts by providing sustainable solutions.

DEEP-DIVE ON CYBERSECURITY

Like most companies, ASM is increasingly exposed to cyber incidents. As these incidents can have an adverse effect on the business, revenue, and confidentiality, discussions with the Management Board about cybersecurity took place in the Audit Committee and Supervisory Board.

Given its importance, it was decided to spend more time on this matter and to do a deep-dive into the topic. ASM organizes its cybersecurity processes around the following pillars: defend, protect, detect, monitor, and respond. A renowned international third party was hired by the Management Board to do a maturity assessment of ASM's processes and systems, and measure the company's cyber resilience. The results were discussed in the Audit Committee, and subsequently in the Supervisory Board. An action plan was developed and the Audit Committee is updated regularly on the actions taken. Outside the regular Audit Committee meetings, the Audit Committee members and the CFO also had informal meetings about this topic during the year.

DEEP-DIVE CORPORATE GOVERNANCE

In view of ASM's strategic objectives, the Supervisory Board and Management Board have had several discussions on the topic of changing the ASM's corporate governance to make sure the company has an optimal governance model to execute on the Growth through Innovation strategy. There was an in-depth review of different options.

Based on the results of the review it was concluded that the following changes to the governance structure were required. The first decision, taken in February 2022, was the intention to expand the Management Board and nominate Mr. Hichem M'Saad as the third member of the Management Board with the function of Chief Technology Officer (CTO). Secondly, it was decided to set up an Executive Committee, consisting of the members of the Management Board and various executive leaders.

The Annual General Meeting approved the expansion of the Management Board and appointment of Mr. M'Saad. And the Executive Committee had its first meeting on February 1, 2022.

RISK MANAGEMENT

One of the responsibilities of the Supervisory Board is the oversight of risk management. Periodically, risk management updates are received and discussed in the Audit Committee, after which these are discussed in the Supervisory Board. Attention was given to the risk landscape and the developments thereof, and the risk appetite. The Supervisory Board and Management Board also zoomed in on the correlation between risks and how these can interact and even strengthen each other. During these sessions, the Management Board informed the Supervisory Board about the measures taken to manage and mitigate the critical risks.

For additional information on those risks and uncertainties currently most relevant to our company, see chapter '13.2 Risk Management'. For 2022, three particular areas of attention are highlighted.

The first is the 'war for talent'. Both boards have had several discussions on this topic as it may jeopardize the execution of the strategy. The discussions were centered around – among others – how to become the employer of choice, the results of the recruitment process and the updated processes, the succession and talent-retention activities, improvements on diversity & inclusion, how the engagement survey results were followed up on, and the leadership program.

The geopolitical tension between the US and China is the second area highlighted. In an effort to reduce the technology access of Chinese chip manufacturers and prevent them from being able to develop and manufacture their own high-end chips (below 14 nanometers), the US has issued numerous regulations in recent years. The impact of these regulations is regularly discussed with the Management Board. Items discussed were, among others, how much ASM is impacted by these regulations, how it may impact the Growth through Innovation strategy and what the mitigation measures are, whether these tensions will ultimately force ASM to choose sides, and whether the global semiconductor ecosystem responsible for the technological advances is impacted at large.

The third area relates to supply-chain constraints. Supply-chain constraints in 2022 were seen in many industries, including the wafer fab equipment-manufacturing industry. The impact of these constraints was discussed, as well as the mitigation measures. Furthermore, the outlook for the next quarters and years were discussed in order to limit the exposure in view of the strategic objectives.

DIVERSITY

The Supervisory Board recognizes the value of diversity among the members of the Supervisory Board and the Management Board, as stated in ASM's Diversity policy, but also the importance of diversity and inclusion more generally in the organization. A reference is made to the paragraph 'Diversity' in chapter 13.1 and 'Diversity & Inclusion (D&I)' in chapter 10.1.

Throughout 2022 and before, the Supervisory Board has challenged the Management Board with respect to diversity, and then in particular regarding gender diversity.

EXPERTISE

The profile of the Supervisory Board describes the range of expertise that should be represented within the Supervisory Board. An overview of the skills and expertise of the individual members is shown in the chart below.

Supervisory Board skills and expertise matrix

	Pauline van der Meer Mohr	Adalio Sanchez	Stefanie Kahle-Galonske	Didier Lamouche	Monica de Virgiliis	Marc de Jong
General						
General business and strategic policy	✓	✓	✓	✓	✓	✓
International (executive) experience	✓	✓	✓	✓	✓	✓
Finance, financial reporting, and accountability		✓	✓	✓		✓
Sustainability and environmental	✓				✓	✓
HR and remuneration	✓	✓		✓	✓	
Cyber and IT		✓	✓	✓		✓
Legal affairs	✓				✓	
Risk management	✓	✓	✓		✓	✓
Industry specific						
Micro-electronics market and system	✓	✓	✓	✓	✓	✓
Semiconductor technology and products		✓		✓	✓	✓
International semiconductor markets	✓	✓	✓	✓	✓	✓

SUPERVISORY BOARD COMMITTEES

Audit Committee

The role of the Audit Committee is described in its Charter, which is available on the company's website. The Audit Committee consists of four members: Stefanie Gahle-Kalonske (Chair), Marc de Jong, Monica de Virgiliis, and Adalio Sanchez. The Audit Committee assists the Supervisory Board in fulfilling its supervisory responsibilities to oversee ASM's financing, financial statements, financial reporting process, system of internal business controls, and risk management.

The Audit Committee met four times in person in 2022, and always before the publication of the quarterly, half-year and annual financial results. In addition to the Audit Committee members, the Chair of the Supervisory Board, CEO, CFO, the Group Controller, head of Internal Audit and the external Auditors are invited to the meeting. The Audit Committee also met separately with the external auditors in 2022.

The following lists the main topics discussed during 2022 by the Audit Committee:

a. the company's financial reporting, including the application of accounting principles;
b. the company's financial position and financing programs, and tax structure;
c. the company's internal risk management systems;
d. the effectiveness of internal controls;
e. the internal audits performed and its findings;
f. the Annual Report and financial statements, and the budget and quarterly progress reports prepared by the Management Board.

In addition, the following matters were discussed:
Each quarter, the CFO provides the Audit Committee with a detailed look into ASM's key financial performance. ASM's operational and financial short-term and long-term performance were extensively addressed in each quarter's discussion. In 2022, topics of particular interests included strong customer demand, the ability to meet customer delivery in view of supply-chain constraints, and investments for the future. Accounting matters and the impairment of the ASMPT investment were discussed in depth. The interim and annual reports were reviewed and discussed prior the publication.

In 2022, the Audit Committee was regularly updated on the status of and the follow-up actions from an earlier cybersecurity maturity assessment. Furthermore, the committee was regularly updated on the non-financial reporting matters relating to ESG and the EU taxonomy.

In addition, the Audit Committee reviewed the capital allocation model. This included a discussion on the amount of the final dividend payment per share. In addition, ASM's tax policy was extensively discussed.

The Audit Committee reviewed ASM's enterprise risk-management framework, focusing on top key risks identified by management and the external auditors. The effectiveness and results of the internal control assessments were reviewed each quarter. Additionally, observations made by the internal auditor and the external auditor on the design and effectiveness of internal controls were discussed with the Audit Committee. Follow-up actions were discussed and monitored closely by the Audit Committee.

The Audit Committee reviewed on a quarterly basis an update of the progress of the internal-audit plan, audit scope, detailed outcomes of each audit, and remediation status of the follow-up action plans. Additional topics such as staffing were also discussed.

The Audit Committee reviewed the 2022 external audit plan, key audit matters, audit scope, audit teams, materiality levels, and fees. The Audit Committee also reviewed and approved any non-audit services provided by the external auditor, in accordance with ASM's policies on audit and non-audit services provided by the external auditor. Each quarter, the Audit Committee received a quarterly update from the external auditor on the progress of the external audit activities.

The Audit Committee evaluated the performance, qualifications, and independence of the external auditor at the end of 2022. Based on the results of the evaluation, the Audit Committee reached an independent decision to recommend that the Supervisory Board submit to the 2023 Annual General Meeting a proposal to appoint KPMG as the external auditor for the reporting year 2023 and the reporting year 2024.

The ethics report was reviewed. This report contains the meetings of the Ethics Committee conducted in 2022, all the incidents reported, results of the compliance training, update on the gifts and entertainment policy, areas of continuous improvement, and the 2022 responsible business conduct dashboard. In addition, fraud risk assessments and litigation claims were reviewed by the Audit Committee during the year.

Nomination, Selection and Remuneration (NSR) Committee

The role of the NSR Committee is described in its Charter, which is available on the company's website. In general, the NSR Committee advises the Supervisory Board on matters relating to the selection and nomination for the appointment or reappointment of new or existing individual Management

Board and Supervisory Board members. It also includes the respective remuneration policies and Remuneration report, and the remuneration levels of the individual members of the Management Board and Supervisory Board.

The NSR Committee is chaired by Didier Lamouche. The other members are Pauline van der Meer Mohr and Adalio Sanchez. In addition to the NSR Committee members, the NSR Committee invites the CEO, and the Corporate Vice President Global People to attend (parts of) its meetings.
In 2022, the NSR Committee met four times in person (also, additional conference calls have been held on an ad hoc basis). All in-person meetings were held in the Netherlands. All NSR Committee members attended each of these meetings.

Topics discussed by the NSR in 2022 are based on the NSR's regular calendar (recurring topics) or are related to specific matters:
- Management Board remuneration outcome over previous performance year and planned actions for the new performance year 2023;
- LTI dilution;
- New remuneration policies (in preparation of the AGM, May 2022);
- Remuneration report 2021, final editing;
- Management Board evaluation;
- Management Board STI targets 2022 and outlook;
- Remuneration levels Executive Committee;
- Training program Supervisory Board;
- Management Board shareholding requirements status overview;
- LPE S.p.A. acquisition;
- NSR calendar 2023;
- Engagement Survey results 2022;
- Succession and Talent review ASM;
- Benchmark Management Board remuneration; and
- Remuneration report 2022 (in preparation of the Annual Report 2022).

At the end of 2021 and early 2022, the NSR Committee reviewed the proposal from the Management Board about updating ASM's governance operating model. The outcomes of this review resulted in the decision by the Supervisory Board to change the corporate governance structure of ASM as described above. For additional information, see chapter '13.1 Changes in ASM's governance structure in 2022', which is important in view of the growth ambitions for the coming years. In addition, the preparations for the decision were done to install an Executive Committee.

In line with the appointment of Mr. M'Saad as the third Management Board member, the decision was taken to adopt a new Remuneration Policy for the Management Board, and to propose this policy to the Annual General Meeting on May 16, 2022. Key differences that were proposed to the Annual General Meeting and approved after voting:
- A new remuneration policy (further to the new CTO position);
- Extended disclosure in the Remuneration report;
- Clarification of forfeiture rules of pay-out STI and LTI;
- New appointment provisions; and
- Deleting the previous provision to temporarily deviate from the remuneration policy in exceptional circumstances.

In line with the outcome of a benchmarking conducted by one of the large international advisory firms, a proposal was presented to the Annual General Meeting to adjust the compensation of the Supervisory Board members. This proposal and the subsequent renewal of the Supervisory Board Remuneration Policy was approved by the shareholders at the Annual General Meeting.

PERFORMANCE EVALUATION

Every year the Supervisory Board reviews and discusses the functioning of the Supervisory Board, its committees, and its individual members through an internal assessment, as conducted by the members of the Supervisory Board. The composition, competencies and functioning of the Supervisory Board, as also described in the Supervisory Board Profile (see above under Supervisory Board and its committees), are part of the assessment. Once the answers to the self-assessment forms are received by the Chair of the NSR Committee, he will review these, and facilitate a meeting with the entire Supervisory Board during which the outcomes – and particularly deviating answers – are discussed.

The Supervisory Board also annually assesses the composition and performance of the Management Board and their individual members. This is done in two ways:
a. through a self-assessment form. Based on the collected answers, the Chair of the NSR Committee will facilitate a meeting with the entire Supervisory Board around the evaluation of the Management Board; and
b. during the preparation of the performance appraisals of the Management Board when the NSR Committee assesses the Management Board members. Moreover, this is effectuated when determining the realization of the annual targets by the Management Board.

In addition to the evaluations referred to above, the Supervisory Board also annually assesses and discusses the relationship between the Supervisory Board and the Management Board. The conclusion in 2022 of such assessment – when evaluating the functioning in 2021 – was that the Supervisory Board, the Management Board, and their individual members function properly and effectively, and that the cooperation between the Supervisory Board and Management Board and Executive Board is functioning well. In 2023, the Supervisory Board will evaluate its functioning and that of the Management Board in 2022 and beyond with the assistance of an external expert.

CORPORATE GOVERNANCE

The Supervisory Board is responsible for overseeing the company's compliance with corporate governance standards and best practices. The Supervisory Board is of the opinion that the company complies with the Dutch Corporate Governance Code.

SHAREHOLDERS

The Annual General Meeting was held on May 16, 2022. This year the meeting was organized as a hybrid meeting. Therefore, the shareholders were invited to attend in person, and were also offered the possibility of joining the meeting virtually and participating via a webcast. Voting was possible by proxy before the meeting, as well as during the meeting – either via voting in the live Annual General Meeting at the location of the Annual General Meeting or through the virtual voting-application platform. Shareholders were also given the option to pose questions prior to and during the Annual General Meeting.

During the meeting, Mr. Hichem M'Saad was appointed as the third member of the Management Board, and Mr. Marc de Jong was reappointed as Supervisory Board member for a period of four years. The new remuneration policy of the Management Board and the Supervisory Board were approved. The regular dividend proposal of €2.50 per share was also approved.

On February 22, 2022, ASM announced the authorization of a new share buyback program of up to €100 million. The program has not yet commenced .

INDUCTION, EDUCATION AND TRAINING

ASM has a comprehensive induction program for newly appointed members of the Supervisory Board, designed to give a good view of the company. This includes the group's strategy, technical developments, commercial status and outlook, financial position and outlook, and relevant legal aspects and risks. The program includes meetings with other Supervisory Board members, Management Board members, Executive Committee members, KPU, and other leaders in the company. In 2022, no new Supervisory Board member was appointed.

In 2022, as is the case every year, the Supervisory Board discussed their education and training needs. The result was that a cybersecurity and IT-resilience training was prepared and given by outside experts to the Supervisor Board and Executive Committee. In addition, the Supervisory Board performed two site visits in 2022 – to Singapore and Phoenix in the US, as mentioned above.

INDEPENDENCE

The Supervisory Board has determined that its current members are all independent, as defined by the Dutch Corporate Governance Code. Neither the Chair nor any other member of the Supervisory Board is a former member of ASM's Management Board or has another relationship with ASM which can be judged 'not independent' of ASM.

Furthermore, the Supervisory Board reviews and discusses all of its members' other executive and non-executive positions on an annual basis. It approves any intended outside positions, to safeguard – among others – the level of engagement, conflicts of interest, compliance with laws, and the Corporate Governance Code.

FINANCIAL STATEMENTS

We present the ASM 2022 Annual Report in accordance with IFRS, as prepared by the Management Board and reviewed by the Supervisory Board. ASM's independent and external auditors, KPMG Accountants N.V., have audited these financial statements and issued an unqualified opinion. Their report appears on pages 193 to 200. All of the members of the Supervisory Board have signed the financial statements in respect of the financial year 2022.

SUPERVISORY BOARD

Pauline van der Meer Mohr - Chair
Marc de Jong
Stefanie Kahle-Galonske
Didier Lamouche
Adalio Sanchez
Monica de Virgiliis

Almere, the Netherlands
March 2, 2023

15. REMUNERATION REPORT

INTRODUCTION

ASM's Management Board remuneration policy was adopted by the AGM on May 16, 2022. This remuneration report complies with the best practice provisions of the Dutch Corporate Governance Code. It is aligned with the new Dutch legal requirements following the implementation of the EU Shareholders' Right Directive II.

The 2022 remuneration report refers to ASM's remuneration policy, which can be found on our website.

REMUNERATION PHILOSOPHY AND STRUCTURE

ASM's remuneration philosophy for the Management Board is to incentivize and reward performance, while ensuring retention, motivation, competitiveness and fairness. A key factor is also alignment with shareholder interests. This is why our remuneration structure is articulated around 3 key pay mix elements, plus benefits:

- Base salary (fixed gross annual salary)
- Short-term cash incentive (performance based)
- Long-term share incentive (performance based)

Our remuneration structure and competitiveness is regularly reviewed using a list of benchmark companies. All pay mix elements are reviewed in this benchmarking analysis.

BASE SALARY (FIXED)

Each member of the Management Board receives a fixed Base salary with a monthly pay out. The base salary of the members of the Management Board is set based upon the outcome of the benchmark analysis. The Supervisory Board reviews base salary on an annual basis and can, at their discretion, apply an annual increase to the base salary based on market movement as well as adjustments made by the peer group.

SHORT-TERM INCENTIVES (CASH BONUS)

Each year, a short-term incentive can be earned based on achieving specific challenging targets. These targets are based for 75% on company financial targets and 25% on non-financial targets (of which for 2022 two-thirds related to ESG in 2022). The on-target bonus percentage for the CEO is 100% of the annual base salary, with a maximum payout of 150% of the annual base salary in case of overachievement. The on-target bonus percentage for the CFO respectively the CTO is 75% and 80% of the annual base salary, with a maximum payout of 125% of the annual base salary. The targets for the short-term incentive are based on the financial budget approved by the Supervisory Board before the start of the fiscal year.

LONG-TERM INCENTIVES (PERFORMANCE SHARES)

Members of the Management Board are eligible to receive performance shares under the ASM International N.V. 2014 long-term incentive plan for members of the Management Board and ASM's remuneration policy to focus on the long-term interest of the company. Performance shares vest after three years, subject to meeting predetermined financial indicators and continued services. To show a longer-term commitment to ASM and align with shareholder interests, the members of the Management Board are required to hold the vested performance shares for an additional two years ('holding period') after the vesting date. However, they are allowed to sell a part of the unconditional shares after three years for tax purposes. Performance shares will next be granted in April 2023.

The Supervisory Board will determine the number of performance shares granted for on-target performance. When doing so, the board will consider two predetermined financial indicators (each with respectively 50% weight): revenue growth compared to market index (WFE) and average EBIT percentage measured over a three-year performance period. ASM applies a face-value approach to define the number of shares to be granted, which is calculated as follows: target level (calculated based on annual base salary) divided by the average share price of ASM on the Euronext Amsterdam stock exchange on the award date and the following four consecutive days. The award date is immediately following the date of the announcement of the first quarter financial results in April for the year the award takes place.

The target level of the long-term incentive is set at 165% of the annual base salary for the CEO and 125% respectively 450% for the CFO and CTO. The maximum number of shares granted in case of outperformance of the predetermined performance indicators is 150% of the number at on-target performance. The number of shares granted will be zero if both of the targets are below the threshold level.

For 2022, based on the remuneration policy, the Supervisory Board awarded the following on-target value to:

- Mr. Loh, CEO: €1,108,159 (3,631 shares)
- Mr. Verhagen, CFO: €672,750 (2,204 shares).

The newly appointed CTO, Mr. M'Saad, did receive RSU's in April 2022 as senior executive, preceding his appointment as Management Board member in May 2022. He will receive his first LTI grant as Management Board member in April 2023.

Outstanding performance shares

The following table shows the outstanding performance shares granted to members of the Management Board up till and including 2022 and held by members of the Management Board as at December 31, 2022:

Outstanding performance shares

The following table shows the outstanding performance shares granted to members of the Management Board up till and including 2022 and held by members of the Management Board as at December 31, 2022:

	Grant date	Status	Number of shares at grant date	Performance adjustment	Vested in 2022	Outstanding December 31, 2022	Fair value at grant date	Vesting date	End of holding period
G.L. Loh [1]	Jul 29, 2020	Conditional	8,087	—	—	**8,087**	€123.31	Jul 29, 2023	Jul 29, 2025
G.L. Loh [1]	Apr 21, 2021	Conditional	4,184	—	—	**4,184**	€245.40	Apr 21, 2024	Apr 21, 2026
G.L. Loh [1]	Apr 21, 2022	Conditional	3,631	—	—	**3,631**	€313.72	Apr 21, 2025	Apr 21, 2027
P.A.H. Verhagen [2]	Jul 28, 2021	Conditional	2,159	—	—	**2,159**	€291.97	Jul 28, 2024	Jul 28, 2026
P.A.H. Verhagen [2]	Apr 21, 2022	Conditional	2,204	—	—	**2,204**	€313.72	Apr 21, 2025	Apr 21, 2027
Total			**20,265**	**—**	**—**	**20,265**			

1 New CEO since May 18, 2020.
2 New CFO since June 1, 2021.

The shares will become unconditional after three years, depending on whether predetermined targets are achieved or not.

PENSION ARRANGEMENT

The members of the Management Board are given the opportunity to participate in a defined contribution plan for their salary up to €114,867. For salary above €114,867, the members of the Management Board are compensated with an amount equal to the employer pension contribution. The members of the Management Board have the option to participate in a net pension plan offered by the company or to have the compensation paid out in cash.

TOTAL REMUNERATION OF MANAGEMENT BOARD

The following table provides an overview of the 2022 remuneration elements in € thousands for the CEO, the CFO, respectively the CTO, as recognized by the company. The CTO was appointed on May 16, 2022.

	1				2				3		4		5	
	Fixed remuneration (K€)				Variable remuneration (K€)									
NAME OF DIRECTOR, POSITION	Base salary		Fringe benefits		Short-term cash incentive (STI)		Share-based payment expenses (LTI) [4]		Pension expense (K€)		Total remuneration (K€)		Proportion of fixed and variable remuneration [5]	
	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022
G.L. Loh	649	**666**	58	**60**	898	**883**	570	**1,020**	109	**109**	2,284	**2,738**	56%	**44%**
P.A.H. Verhagen [1]	303	**534**	25	**44**	594	**575**	165	**550**	41	**87**	1,128	**1,790**	49%	**59%**
H. M'Saad [2]	—	**366**	—	**122**	—	**395**	—	**—**	—	**18**	—	**901**	—%	**128%**
P.A.M. van Bommel [3]	171	**—**	16	**—**	142	**—**	656	**—**	40	**—**	1,025	**—**	28%	**—%**
Total	**1,123**	**1,566**	**99**	**226**	**1,634**	**1,853**	**1,391**	**1,570**	**190**	**214**	**4,437**	**5,429**		

1 New CFO since June 1, 2021.
2 New CTO since May 16, 2022. The amounts shown reflect his remuneration during his MB membership.
3 Former CFO till May 17, 2021.
4 The remuneration reported as part of the LTI (share awards) is based on costs incurred under accounting values EU-IFRS. The costs of share awards are charged to the consolidated statement of profit & loss over the three-year vesting period based on the number of awards expected to vest. For the first year we account at target, subsequently we apply the estimated number of share awards, and in the final performance year of the awards we update this estimate to the best estimated number of awards which are anticipated to vest.
5 The increase of the 'proportion of fixed and variable remuneration' percentage of P.A.H. Verhagen is related to his lower base salary in 2021 due to his start date June 1, 2021.

1. Fixed remuneration

Base salary. This is the fixed annual gross base salary. A salary increase of 3.5% has been implemented as of April 1, 2022, in line with the market movement in the Netherlands.

Fringe benefits. This represents the value of benefits and perquisites awarded, such as a company car, a representation and expense allowance, the premium for health and disability insurance, and social security contributions.

2. Variable remuneration

Short-term incentive (STI). Each year, a short-term incentive can be earned based on achieving specific challenging targets. The short-term incentive recognizes three levels: threshold, on-target, and stretch.

The target level is generally aligned with the budget as reviewed and approved by the Supervisory Board. Achievement at target level, results in a pay out of 100% of the STI value. The stretch level is set to promote extra-performance. If the performance does not meet the threshold level, the related part of the bonus will be zero.

If the actual realization is between threshold and on-target or between on-target and stretch, the payout will be based on the relative deviation against these levels. The targets are 75% based on company financial targets (equally divided between revenue, EBIT, and free cash flow) and 25% based on non-financial targets (of which 2 out of 3 related to ESG in 2022).

For 2022, the CEO, CFO respectively the CTO realized overall an over-achievement on STI (131% rounded – see table on next page).

STI TARGET SETTING

Targets set at the beginning of each financial year and aligned with the budget as approved by the Supervisory Board. The Non-financial, strategic, targets are aligned with ASM's most important strategic priorities in a performance year. For each performance indicator a target performance level is defined that represents the expected performance in a performance year (target). The threshold level defines the minimum level of performance, below which payout is 0%. The maximum or stretch level of performance is 150% of target level.

STI performance measures / STI realization 2022 performance year: (achievement rate)

Financials

Targets set per budget as approved by the Supervisory Board

STI performance measures		STI realization 2022 performance year: (achievement rate) (Threshold – Target – Stretch)
Sales	Revenue achievement at constant currencies (actual revenue recalculated at budget currency)	148%
EBIT	EBIT excluding one-off non-budgeted items (e.g. M&A and related PPA amortization)	141%
Free cash flow	Net cash flow from operating activities after investment activities excluding non-budgeted M&A and excluding ASMPT dividends	110%

Non-Financials

STI performance measures		STI realization 2022 performance year: (achievement rate) (Threshold – Target – Stretch)
ESG	Net Zero 2035 ambitions: 1.5°C Achievement Pathway as announced at ASM's Investor Day 2021 and through press release. All scopes measured, plans defined. MB to review Science Based Targets Initiative (SBTi). Strategy, plans and submission reviewed and validated by external expert review process before 2022 year end. Validated submission to the SBTi before end 2022	150%
Engineering & manufacturing global footprint	Conduct a strategic analysis of the global future footprint for engineering and manufacturing that supports ASM's long term growth ambitions, taking into account ASM's global footprint, and external conditions such as geopolitical environment,competition for skills etc	80%
Leadership development	Review and progress ASM's succession pipeline for executives: succession plan, gap analysis, talent assessment, development plans, including focus on future female leadership	150%

Share-based payment or long-term incentives. This is a multi-year variable payment of which the value is the value of a performance share award that has become unconditional after a performance period of three years. The unconditional award is the result of targets on revenue growth compared to market and average EBIT.

End 2022 the three-year performance period of the performance shares granted to the CEO on July 29, 2020 has been completed. Based on the achievement of the performance criteria, the vesting percentage of the performance shares on July 29, 2023 is 102% (rounded). The underachievement of the three-year revenue growth metric is being compensated by overachievement of the EBIT metric.

3. Pension

As of 2015, members of the Management Board no longer participate in the industry-wide pension fund. They have opted to participate in a defined contribution plan for their full-time salary up to €114,867. ASM reimburses an amount equal to the employer pension contribution for their full-time salary above €114,867. The CEO, CFO and CTO can opt either to participate in a net pension plan offered by the company or to have the cost for participating paid out directly. The pension contributions vary from 7.2% to 28.4% of the pensionable salary, depending on age. The members of the Management Board contribute 4.6% of their pensionable salary, and ASM pays the remaining part. There are no arrangements regarding early retirement. The CTO – being based in the US – continued his participation in the 401(k) retirement savings plan.

4. Total remuneration

Value equals sum of 1, 2, and 3 as described above.

5. Proportion of fixed and variable remuneration

The relative proportion of fixed remuneration: By dividing the sum of fixed components: column 1 and the fixed part of pension expense presented in column 3 by the amount of total remuneration (column 4), multiplied by 100%.

Relative proportion of variable remuneration: By dividing the sum of the variable components (columns 2 and the variable part of the pension expense in column 3, if any) by the amount of total remuneration (column 4), multiplied by 100%.

MANAGEMENT SERVICE AGREEMENTS

The CEO, CFO and CTO have a management services agreement with ASM or one of its related subsidiaries, in accordance with Dutch law, for four years:

- Mr. Loh started on May 18, 2020, and was appointed for a four-year term based on a management services agreement;
- Mr. Verhagen started on June 1, 2021, and was appointed for a four-year term based on a management services agreement; and
- Mr. M'Saad started on May 16, 2022, as MB member, and was appointed for a four-year term based on a management services agreement.

As mentioned in the management services agreements of the members of the Management Board, in the case of termination of the contract on behalf of the company, the members of the Management Board are eligible for a severance payment of a maximum one-year annual gross base salary.

CLAW BACK AND ULTIMUM REMEDIUM

In exceptional circumstances, the Supervisory Board will have the discretionary authority to recover any paid bonus and awarded shares if evidence shows payments and awards have been awarded based on incorrect financial or other data (claw back).

If a variable component conditionally awarded in a previous financial year would, in the opinion of the Supervisory Board, produce an unfair result due to extraordinary circumstances during the period in which the predetermined indicators have been or should have been achieved, the Supervisory Board has the authority to adjust the value of bonus and shares downwards or upwards (ultimum remedium).

The NSR Committee concluded for 2022 that no circumstances have been identified that result in any adjustments or claw back of variable remuneration.

COMPLIANCE TO REMUNERATION POLICY AND LONG-TERM PERFORMANCE

The Supervisory Board reviewed the remuneration policy in 2022 and the policy was presented to and approved by the AGM on May 16, 2022, including the appointment of the CTO.

The purpose of the remuneration policy for the members of the Management Board of ASM is to provide compensation that:

- Motivates and rewards executives in both the Management Board and Supervisory Board with a balanced and competitive remuneration, in line with their role and responsibilities;
- Allows ASM to attract, reward, and retain highly qualified executives with the required background, skills, and experience to implement ASM's strategy in a highly competitive global industry;
- Ensures that short-term operational results and long-term sustainable value creation are balanced; and
- Is transparent, fair and reasonable, and aligns with the interests of ASM, shareholders, and other stakeholders in the medium- and long-term to deliver sustainable performance in line with ASM's strategy, purpose, and values. The focus on long-term value creation is also reflected in the mix between short-term variable and long-term variable pay target value and the link to the two key longer-term financial objectives as long-term incentive performance measures.

COMPARATIVE INFORMATION ON THE CHANGE OF REMUNERATION AND COMPANY PERFORMANCE

The figures presented are indexed compared to the previous financial year.

Annual change	2018/2017	2019/2018	2020/2019	2021/2020	2022/2021	Information regarding 2022
Management Board remuneration						
G.L. Loh, CEO (as of May 18, 2020)	—%	—%	—%	210%	120%	
P.A.H. Verhagen, CFO (as of June 1, 2021)	—%	—%	—%	—%	159%	
H. M'Saad, CTO (as of May 16, 2022)	—%	—%	—%	—%	—%	
P.A.M. van Bommel, CFO (until May 17, 2021)	101%	123%	101%	66%	—%	Former CFO retired May 17, 2021
C.D. del Prado, CEO (until May 18, 2020)	105%	124%	64%	—%	—%	Former CEO retired May 18, 2020
Company performance						
Revenue	111%	157%	103%	130%	139%	
EBIT	119%	171%	142%	150%	128%	
Free cash flow	80%	418%	48%	222%	25%	
Qualitative/non-financial strategic objectives/targets	103%	128%	88%	98%	98%	
Average remuneration of employees (K€)						
	2018	**2019**	**2020**	**2021**	**2022**	
Average remuneration of employees	75	85	88	87	99	
CEO pay ratio	27	31	27	29	27	

The ratio of the CEO's remuneration and the average remuneration of all other employees (the pay ratio) is calculated by dividing the CEO's remuneration by the average remuneration of all employees. The CEO's remuneration is the total annualized base salary and bonus of the CEO as well as share-based payment (extrapolated to a full year LTI value based upon three consecutive yearly grants with each a 36-month vesting period). The average remuneration of all employees is calculated by dividing the total personnel costs (wages, salaries, and share-based payments), minus the CEO's remuneration, by the total number of employees (minus CEO). The pay ratio is in line with the anticipated internal development of pay levels and at the lower end compared to the AEX listed companies.

The 2022 ASM remuneration report considers the draft guidelines to specify the standardized presentation of the remuneration report as stated in Directive 2007/36EC of the European Parliament, and amended by Directive (EU) 2017/828, Article 9b (6).

This report is the remuneration report required in accordance with article 2:135b of the Dutch Civil Code and the Dutch Corporate Governance Code.

REMUNERATION OF THE SUPERVISORY BOARD

The 2022 remuneration report refers to the remuneration policy of ASM, which can be found here.

The following tables present information on the sole remuneration from the company (including its subsidiaries) for services in all capacities to all current and former members of the Supervisory Board:

	Year ended December 31,				
	Annual fee	Committee fee	Allowances [3]	Total remuneration	
	2022	2022	2022	2022	2021
Supervisory Board:					
P.F.M. van der Meer Mohr [1), 2)]	85.8	7.4	10.0	103.2	12.8
S. Kahle-Galonske	66.0	15.0	20.0	101.0	60.0
M.J.C. de Jong	66.0	10.0	10.0	86.0	61.2
D.R. Lamouche	66.0	11.0	20.0	97.0	57.6
M. de Virgiliis	66.0	10.0	20.0	96.0	57.5
A.T. Sanchez [1)]	66.0	17.4	22.5	105.9	12.8
TOTAL	**415.8**	**70.8**	**102.5**	**589.1**	**261.9**

1 Period as of September 29, 2021.
2 Appointed as Chair of the Supervisory Board as of May 16, 2022.
3 Consist of allowances for (inter)continental meetings.

	Year ended December 31,				
	Annual fee	Committee fee	Allowances [3]	Total remuneration	
	2022	2022	2022	2022	2021
Former Supervisory Board:					
J.C. Lobbezoo [1)]	—	—	—	—	31.6
M.C.J. van Pernis [2)]	37.5	2.8	1.0	41.3	69.3
TOTAL	**37.5**	**2.8**	**1.0**	**41.3**	**100.9**

1 Period to May 17, 2021.
2 Period to May 16, 2022.
3 Consist of allowances for (inter)continental meetings.

Annual Change	2018/2017	2019/2018	2020/2019	2021/2020	2022/2021
Supervisory Board remuneration					
P.F.M. van der Meer Mohr	—%	—%	—%	—%	806%
H.W. Kreutzer	41%	—%	—%	—%	—%
J.C. Lobbezoo	112%	106%	100%	38%	—%
M.C.J. van Pernis	107%	104%	100%	119%	60%
U.H.R. Schumacher	107%	105%	38%	—%	—%
S. Kahle-Galonske	183%	107%	100%	100%	168%
M.J.C. de Jong	—%	169%	100%	106%	141%
D.R. Lamouche	—%	—%	—%	166%	168%
M. de Virgiliis	—%	—%	—%	161%	167%
A.T. Sanchez	—%	—%	—%	—%	827%

Any recommended changes to the remuneration of members of the Supervisory Board will be submitted to the AGM for approval.

The remuneration of members of the Supervisory Board was most recently revised during the 2022 AGM. A new benchmark analysis was conducted in the fourth quarter of 2021, which did lead to a proposal to adjust the remuneration of members of the Supervisory Board, as approved by the AGM on May 16, 2022.

DEROGATIONS FROM REMUNERATION POLICY

The Supervisory Board has not derogated or deviated from the remuneration policy.

ASM does not provide any loans, advanced payments, deposits, or related guarantees to the CEO, CFO, CTO or Supervisory Board.

16. EXTERNAL AUDITOR

In accordance with Dutch law, ASM's external auditor is appointed by the Annual General Meeting of Shareholders and is nominated for appointment by the Supervisory Board upon advice from the Audit Committee and the Management Board. Our current external auditor, KPMG Accountants N.V. ('KPMG'), was reappointed as external auditor by the 2022 AGM for the reporting year 2022.

The external auditor is present at our AGM to respond to questions, if any, from the shareholders about the auditor's report on the financial statements.

The Audit Committee has determined that the provision of services by KPMG and its member firms is compatible with maintaining KPMG's independence. All audit and permitted audit-related services provided by KPMG and its member firms during 2022 were pre-approved by the Audit Committee.

AUDIT COMMITTEE POLICIES AND PROCEDURES

The Audit Committee has adopted the following policies and procedures for pre-approval of all audit and permitted non-audit services provided by our external auditor.

AUDIT SERVICES

Management submits to the Audit Committee for pre-approval the scope and estimated fees for specific services directly related to performing the independent audit of our statutory and consolidated financial statements for the current year.

AUDIT-RELATED SERVICES

The Audit Committee may preapprove expenditures up to a specified amount for services included in identified service categories that are related extensions of audit services and are logically performed by the auditors. Additional services exceeding the specified pre-approved limits require specific Audit Committee approval.

TAX SERVICES

The Audit Committee may preapprove expenditures up to a specified amount per engagement and in total for identified services related to tax matters. Additional services exceeding the specified preapproved limits, or involving service types not included in the preapproved list, require specific Audit Committee approval.

OTHER SERVICES

In the case of specified services for which utilizing our external auditor creates efficiencies, minimizes disruption or preserves confidentiality, or for which management has determined that our external auditor possesses unique or superior qualifications to provide such services, the Audit Committee may preapprove expenditures up to a specified amount per engagement and in total. Additional services exceeding the specified preapproved limits, or involving service types not included in the preapproved list, require specific Audit Committee approval.

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17. CONSOLIDATED FINANCIAL STATEMENTS

17.1 CONSOLIDATED STATEMENT OF PROFIT OR LOSS

		Year ended December 31,	
(€ thousand, except per share data)	Notes	2021	2022
Revenue	21	1,729,911	**2,410,927**
Cost of sales	23	(901,780)	**(1,268,046)**
Gross profit		**828,131**	**1,142,881**
Other income	3	4,071	**40**
Operating expenses:			
Selling, general and administrative	23	(189,547)	**(276,620)**
Research and development	23	(151,197)	**(233,866)**
Total operating expenses		**(340,744)**	**(510,486)**
Result from operations		**491,458**	**632,435**
Finance income	17	23	**2,246**
Finance expense	17	(2,012)	**(4,098)**
Foreign currency exchange gain (loss)	17	33,473	**25,011**
Net finance income (costs)		**31,484**	**23,159**
Share in income of investments in associates	7	74,382	**64,771**
Impairment of investments in associates, net	7	—	**(215,389)**
Result before income taxes		**597,324**	**504,976**
Income taxes	22	(102,615)	**(115,863)**
Net earnings from operations, attributable to common shareholders		**494,709**	**389,113**
Per share data	24		
Basic net earnings per share (€):			
From operations		**10.17**	**7.97**
Diluted net earnings per share (€):			
From operations		**10.11**	**7.93**
Weighted average number of shares (thousand):			
Basic		48,645	**48,820**
Diluted		48,909	**49,097**

The notes on the following pages are an integral part of these consolidated financial statements.

17.2 CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME

		Year ended December 31,	
(€ thousand)	Notes	2021	2022
Net earnings from operations, attributable to common shareholders		494,709	389,113
Other comprehensive income, net of income tax			
Items that will not be reclassified subsequently to profit or loss:			
Remeasurement of defined benefit obligation	13	181	615
Share in other comprehensive income (loss) of investments in associates	7	11,833	2,950
		12,014	3,565
Items that may be subsequently reclassified to profit or loss:			
Foreign currency translation effect		91,273	61,845
Other comprehensive income for the year, net of income tax		103,287	65,410
Total comprehensive income, attributable to common shareholders	12	597,996	454,523

The notes on the following pages are an integral part of these consolidated financial statements.

17.3 CONSOLIDATED STATEMENT OF FINANCIAL POSITION

(€ thousand)	Notes	December 31, 2021	2022
Assets			
Right-of-use assets	2	26,938	31,663
Property, plant and equipment	3	257,017	312,053
Evaluation tools at customers	4	63,717	68,676
Goodwill	5	11,270	318,465
Other intangible assets	6	274,833	646,104
Investments in associates	7	848,812	686,341
Other investments		—	5,814
Deferred tax assets	22	69	181
Other non-current assets		6,792	7,071
Employee benefits	13	1,982	2,556
Total non-current assets		**1,491,430**	**2,078,924**
Inventories	8	211,841	538,425
Accounts receivable	9	446,724	580,823
Income taxes receivable	22	18,614	18,778
Other current assets	10	50,972	114,524
Cash and cash equivalents	11	491,507	419,315
Total current assets		**1,219,658**	**1,671,865**
Total assets		**2,711,088**	**3,750,789**
Equity and liabilities			
Equity	12	**2,241,754**	**2,749,319**
Lease liabilities		15,886	18,604
Contingent consideration payable	1	—	78,649
Deferred tax liabilities	22	45,748	123,803
Total non-current liabilities		**61,634**	**221,056**
Accounts payable		175,436	243,499
Provision for warranty	14	27,181	34,219
Income taxes payable	22	14,519	43,785
Accrued expenses and other payables	15	190,564	458,911
Total current liabilities		**407,700**	**780,414**
Total liabilities		**469,334**	**1,001,470**
Total equity and liabilities		**2,711,088**	**3,750,789**

The notes on the following pages are an integral part of these consolidated financial statements.

17.4 CONSOLIDATED STATEMENT OF CHANGES IN EQUITY

(€ thousand except for share data)	Notes	Number of common shares outstanding	Common shares	Capital in excess of par value	Treasury shares at cost	Retained earnings	Other reserves	Total equity
Balance as of January 1, 2021		**48,714,682**	**1,992**	**34,502**	**(104,962)**	**1,897,007**	**26,185**	**1,854,724**
Net earnings		—	—	—	—	494,709	—	494,709
Other comprehensive income	12	—	—	—	—	—	103,287	103,287
Total comprehensive income		**—**	**—**	**—**	**—**	**494,709**	**103,287**	**597,996**
Dividend paid to common shareholders		—	—	—	—	(96,893)	—	(96,893)
Compensation expense share-based payments	13	—	—	17,242	—	—	—	17,242
Exercise stock options out of treasury shares	13	123,521	—	(7,344)	11,974	—	—	4,630
Vesting restricted shares out of treasury shares	13	193,462	—	(19,119)	19,119	—	—	—
Purchase of common shares	12	(462,988)	—	—	(139,150)	—	—	(139,150)
Cancellation of common shares out of treasury shares	12	—	(20)	—	57,622	(57,602)	—	—
Other movements of investments in associates:								
Dilution	7	—	—	—	—	3,205	—	3,205
Balance as of December 31, 2021		**48,568,677**	**1,972**	**25,281**	**(155,397)**	**2,240,426**	**129,472**	**2,241,754**
Net earnings		—	—	—	—	389,113	—	389,113
Other comprehensive income	12	—	—	—	—	—	65,410	65,410
Total comprehensive income		**—**	**—**	**—**	**—**	**389,113**	**65,410**	**454,523**
Dividend paid to common shareholders		—	—	—	—	(121,650)	—	(121,650)
Issue of common shares related to business combinations	13	51,154	2	11,730	—	—	—	11,732
Treasury shares transferred related to business combinations	13	580,000	—	8,046	124,977	—	—	133,023
Compensation expense share-based payments	13	—	—	29,877	—	—	—	29,877
Exercise stock options out of treasury shares	13	—	—	—	—	—	—	—
Vesting restricted shares out of treasury shares	13	126,488	—	(26,974)	26,974	—	—	—
Purchase of common shares	12	—	—	—	—	—	—	—
Cancellation of common shares out of treasury shares	12	—	—	—	—	—	—	—
Other movements in investments in associates:								
Dilution	7	—	—	—	—	60	—	60
Balance as of December 31, 2022		**49,326,319**	**1,974**	**47,960**	**(3,446)**	**2,507,949**	**194,882**	**2,749,319**

1) Other reserves consist of the currency translation reserve, remeasurement on net defined benefit and the reserve for proportionate share in other comprehensive income of investments in associates. See Note 12.

The notes on the following pages are an integral part of these consolidated financial statements.

17.5 CONSOLIDATED STATEMENT OF CASH FLOWS

		Year ended December 31,	
(€ thousand)	Notes	2021	2022
Cash flows from operating activities			
Net earnings from operations		494,709	**389,113**
Adjustments to reconcile net earnings to net cash from operating activities			
Depreciation, amortization and impairments	2,3,4,6	95,580	**122,434**
Net loss (gain) on sale of property, plant and equipment	3	(4,071)	**(40)**
Share-based compensation	13	17,242	**29,877**
Net finance (income) costs		(23,510)	**3,886**
Share in income of investments in associates	7	(74,382)	**(64,771)**
Impairment of investments in associates, net	7	—	**215,389**
Income tax	22	102,615	**115,863**
Changes in evaluation tools at customers	4	(7,980)	**(20,516)**
Changes in employee benefits pension plans		(339)	**198**
Income tax paid		(151,623)	**(90,481)**
Operating cash flows before changes in working capital [1)]		**448,241**	**700,952**
Decrease (increase) in working capital: [1)]			
Accounts receivable		(154,030)	**(125,068)**
Other current assets		15,350	**(53,273)**
Inventories		(39,148)	**(276,914)**
Provision for warranty		7,140	**5,097**
Accounts payable, accrued expenses and other payables		103,087	**290,694**
Net cash from operating activities		**380,640**	**541,488**
Cash flows from investing activities			
Capital expenditures	3	(72,199)	**(101,184)**
Proceeds from sale of property, plant and equipment	3	6,159	**940**
Capitalized development expenditures	6	(81,973)	**(102,627)**
Purchase of intangible assets	6	(2,680)	**(4,662)**
Dividend received from associates	7	36,297	**48,919**
Acquisition of subsidiaries, net of cash acquired	1	—	**(314,295)**
Other investments			**(1,971)**
Net cash used in investing activities		**(114,396)**	**(474,880)**
Cash flows from operating activities after investing activities [1)]		**266,244**	**66,608**
Cash flows from financing activities			
Payment of lease liabilities	2	(7,854)	**(10,289)**
Credit facility renewal fee paid		—	**(660)**
Purchase of treasury shares	12	(140,142)	**—**
Proceeds from issuance of treasury shares	13	4,630	**—**
Dividends to common shareholders		(96,893)	**(121,650)**
Net cash used in financing activities		**(240,259)**	**(132,599)**
Foreign currency translation effect on cash and cash equivalents		**30,294**	**(6,201)**
Net increase (decrease) in cash and cash equivalents		**56,279**	**(72,192)**
Cash and cash equivalents at beginning of year	11	435,228	**491,507**
Cash and cash equivalents at end of year	11	**491,507**	**419,315**

1) Non-IFRS financial performance measure. Please see '21. Non-IFRS peformance measures'.

The notes on the following pages are an integral part of these consolidated financial statements.

17.6 NOTES TO THE CONSOLIDATED FINANCIAL STATEMENTS

GENERAL INFORMATION/SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

GENERAL INFORMATION

ASM International N.V. (ASM, or the company) is a Dutch public liability company domiciled in the Netherlands with its principal operations in Europe, the United States of America, and Asia. The company dedicates its resources to the research, development, manufacturing, marketing and servicing of equipment and materials used to produce mainly semiconductor devices. The company is registered at Versterkerstraat 8, 1322 AP Almere, the Netherlands.

The company's shares are listed for trading on the Euronext Amsterdam Stock Exchange (symbol ASM).

The accompanying consolidated financial statements include the financial statements of ASM International N.V. and its consolidated subsidiaries (together also referred to as ASM, or the company). ASM's subsidiaries are listed in Note 28 and investments in associates are listed in Note 7.

BASIS FOR ACCOUNTING

The consolidated financial statements for the year ended December 31, 2022 have been prepared in accordance with International Financial Reporting Standards (IFRS) as adopted by the European Union and also comply with the financial reporting requirements included in Section 362(9) of Part 9, Book 2 of the Dutch Civil Code.

The consolidated financial statements have been prepared by the Management Board of the company and authorized for issue on March 2, 2023, and will be submitted for adoption to the Annual General Meeting of Shareholders (AGM) on May 15, 2023.

The consolidated financial statements will be filed with the AFM and at the Trade Register of the Chamber of Commerce in Almere, the Netherlands within eight days of adoption by the 2023 AGM.

FUNCTIONAL AND PRESENTATION CURRENCY

The consolidated financial statements are presented in Euros (€), which is the company's functional currency. All amounts have been rounded to the nearest thousand, unless otherwise indicated.

BASIS OF PREPARATION

The consolidated financial statements have been prepared under the historical cost convention, unless otherwise indicated. The company applies the going concern basis in preparing its consolidated financial statements.

Historical cost is generally based on the fair value of the consideration given in exchange for goods and services.

A number of the company's accounting policies and disclosures require the measurement of fair values, for both financial and non-financial assets and liabilities.

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, regardless of whether that price is directly observable or estimated using another valuation technique.

The company has an established approach with respect to the measurement of fair values. If third-party information, such as broker quotes or pricing services, is used to measure fair values, the company assesses and documents the evidence obtained from the third parties to support the conclusion that such valuations meet the requirements of IFRS, including the level in the fair-value hierarchy, in which such valuations should be classified.

Fair values are categorized into different levels in a fair-value hierarchy based on the inputs used in the valuation techniques as follows:
Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities.
Level 2: inputs other than quoted prices included in Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).
Level 3: inputs for the asset or liability that are not based on observable market data (unobservable inputs).

If the inputs used to measure the fair value of an asset or a liability fall into different levels of the fair-value hierarchy, then the fair-value measurement is categorized in its entirety in the same level of the fair-value hierarchy as the lowest level input that is significant to the entire measurement.

Further information about the assumptions made in measuring fair values is included in the following notes:

- Note 1 - Acquisition of subsidiaries;
- Note 7 - Investments in Associates
- Note 13 - Employee benefits; and
- Note 17 - Financial instruments and financial risk management.

USE OF ESTIMATES AND JUDGMENTS

In preparing these consolidated financial statements, management has made judgments, estimates and assumptions about the carrying amounts of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and other factors that are considered to be relevant. Actual results may differ from these estimates.

Estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to estimates are recognized prospectively.

Information about assumptions and estimation uncertainties that have a significant risk of resulting in a material adjustment to the carrying amounts of assets and liabilities within the year ended December 31, 2022 is included in the following notes:

- Note 1 - Acquisition of subsidiaries, fair value of the consideration transferred (including contingent consideration) and fair value of the assets acquired and liabilities assumed, measured on a provisional basis.
- Notes 3, 4, 5, 6 and 7 - Valuation of non-financial assets; and
- Note 8 - Valuation of allowance for obsolescence inventories.

CRITICAL ACCOUNTING POLICIES

A critical accounting policy is defined as one that is both material to the presentation of ASM's consolidated financial statements and that requires management to make difficult, subjective or complex judgments that could have a material effect on ASM's financial condition or results of operations. Specifically, these policies have the following attributes: (1) ASM is required to make assumptions about matters that are highly uncertain at the time of the estimate; and (2) different estimates ASM could reasonably have used, or changes in the estimate that are reasonably likely to occur, could have a material effect on ASM's financial condition or results of operations. Estimates and assumptions about future events and their effects cannot be determined with certainty. ASM bases its estimates on historical experience and various other assumptions believed to be applicable and reasonable under the circumstances. These estimates may change as new events occur, additional information is obtained, and as ASM's operating environment changes. These changes have historically been minor and have been included in the consolidated financial statements as soon as they became known. In addition, management is periodically faced with uncertainties, the outcomes of which are not within its control and will not be known for prolonged periods of time. Based on a critical assessment of its accounting policies and the underlying judgments and uncertainties affecting the application of those policies, management believes that ASM's consolidated financial statements are fairly stated in accordance with IFRS, and provide a meaningful presentation of ASM's financial condition and results of operations. An analysis of specific sensitivity to changes of estimates and assumptions is included in the notes to the (consolidated) financial statements.

Management believes that the following accounting policies are critical:

- business combinations;
- revenue recognition;
- inventories;
- evaluation of long-lived assets for impairment;
- evaluation of investments in associates for impairment; and
- intangible assets for capitalization and for impairment.

CHANGES IN ACCOUNTING POLICIES

Application of new and revised International Financial Reporting Standards (IFRS).

New and amended IFRS Standards that are effective for the current year

The accounting policies applied in the financial statements are the same as those applied in the last annual financial statements, except for the IFRS standards and interpretations effective on January 1, 2022. These include among others amendments to IAS 16, IAS 37 and IFRS 3. These changes have been assessed for their potential impact and do not have a material effect on ASM's (consolidated) financial statements.

ACCOUNTING POLICIES

The company has consistently applied the following accounting policies to all periods presented in these consolidated financial statements.

Business combinations

The company accounts for business combinations using the acquisition method when the acquired set of activities and assets meets the definition of a business and control is transferred to the company. In determining whether a particular set of activities and assets is a business, the company assesses whether the set of assets and activities acquired includes, at a minimum, an input and substantive process and whether the acquired set has the ability to produce outputs.
The company accounts for business combinations using the acquisition method when control is transferred to the company. The consideration transferred in the acquisition is generally measured at fair value, as are the identifiable net assets acquired.
Goodwill is capitalized as the excess of the costs of an acquired subsidiary, net of the amounts assigned to identifiable assets acquired and liabilities incurred or assumed. Acquisition-related costs are expensed when incurred in the period they arise or the service is received.

Any contingent consideration payable is measured at fair value at the acquisition date.
The contingent consideration is remeasured at fair value at each reporting date and subsequent changes in the fair value of the contingent consideration are recognised in profit or loss.

Consolidation

The consolidated financial statements include the accounts of ASM and all of its subsidiaries where ASM holds a controlling interest. Non-controlling interest is disclosed separately, where appropriate, in the consolidated financial statements.

Control is achieved when ASM has:

- the power over an investee;
- exposure, or rights, to variable returns from its involvement with the investee; and
- the ability to use its power over the investee to affect the amount of the investor's returns.

ASM reassesses whether or not it controls an investee if facts and circumstances indicate that there are changes to one or more of the three elements of control listed above.

As from the date these criteria are met, financial data of the relevant subsidiary are included in the consolidation and deconsolidated from the date on which ASM's control ceases.

Loss of control

Upon loss of control, ASM derecognizes the assets and liabilities of the subsidiary. Any surplus or deficit arising on the loss of control is recognized in profit or loss. If ASM retains any interest in this subsidiary, then such interest is measured at fair value at the date on which control is lost. Subsequently, it is accounted for as an equity-accounted investee or as an available-for-sale financial asset, depending on the level of influence retained.

Subsidiaries

Subsidiaries are entities controlled by the company. The financial statements of subsidiaries are included in the consolidated financial statements from the date on which control commences until the date on which control ceases.

Interests in equity-accounted investees

The company's interests in equity-accounted investees comprise investments in associates.

Associates are those entities in which the company has significant influence, but not control or joint control, over the financial and operating policies.

Interests in associates are accounted for using the equity method. They are initially recognized at cost, which includes transaction costs. Upon acquisition of the investment in an associate, any excess of the cost of the investment over the company's share of the net fair value of the identifiable assets and liabilities of the investee is recognized as goodwill, which is included in the carrying amount of the investment.

Subsequent to initial recognition, the consolidated financial statements include the company's share of the profit or loss and other comprehensive income (OCI) of equity-accounted investees, until the date on which significant influence ceases.

Transactions eliminated on consolidation

Intra-group balances and transactions, and any unrealized income and expenses arising from intra-group transactions, are eliminated. Unrealized gains arising from transactions with equity-accounted investees are eliminated against the investment to the extent of the company's interest in the investee. Unrealized losses are eliminated in the same way as unrealized gains, but only to the extent that there is no evidence of impairment.

Foreign currency translation

The individual financial statements of each group entity are presented in their local functional currency. For the purpose of the consolidated financial statements, the results and financial position of each entity is expressed in euros, which is ASM's functional currency and the presentation currency for the consolidated financial statements.

Foreign currency transactions

In preparing the financial statements of the individual entities, transactions in foreign currencies are recorded at the exchange rates on the date of the transactions. At each balance sheet date, monetary items denominated in foreign currencies are translated at the rates prevailing on the balance sheet date. Non-monetary items carried at fair value that are denominated in foreign currencies are translated at the rates prevailing on the date when the fair value was determined.

Exchange rate differences arising on the settlement of monetary items, and on the translation of monetary items, are recognized in the consolidated statement of profit or loss in the period in which they arise. Exchange rate differences arising on the translation of non-monetary items carried at fair value are recognized in the consolidated statement of profit or loss for the period except for differences arising on the translation of non-monetary items in respect of which gains and losses are recognized directly in equity.

Foreign operations

For the purpose of presenting consolidated financial statements, assets and liabilities of foreign operations are translated into euros at the exchange rates at the reporting date. The income and expenses of foreign operations are translated into euros at the exchange rates at the dates of the transactions.

Foreign currency differences are recognized in OCI and accumulated in the translation reserve, except to the extent that the translation difference is allocated to non-controlling interest.

When a foreign operation is disposed of in its entirety or partially such that control or significant influence is lost, the cumulative amount in the translation reserve related to that foreign operation is reclassified to profit or loss as part of the gain or loss on disposal. If the company disposes of part of its interest in a subsidiary but retains control, then the relevant proportion of the cumulative amount is reattributed to non-controlling interest. When the company disposes of only part of an associate while retaining significant influence, the relevant proportion of the cumulative amount is reclassified to profit or loss.

Segment reporting

ASM has one reportable segment, consistent with the internal reporting provided to the Chief Executive Officer (CEO), who is the Chief Operating Decision Maker (CODM).

The company manufactures and sells equipment used in wafer processing, encompassing the fabrication steps in which silicon wafers are layered with semiconductor devices. The operation is a product-driven organizational unit comprised of manufacturing, service, and sales operations in Asia, Europe and the United States. The performance of the individual product lines is reviewed by the CODM based on its revenues, gross margin and EBIT. The company operates under a uniform global operating strategy. The CODM alone makes operating decisions regarding strategic investments and resource allocation based on aggregated information of the overall company's operation. Therefore, the company's operation do not represent separate operating nor reportable segments.

Property, plant and equipment

Items of property, plant and equipment are measured at cost, less accumulated depreciation and any accumulated impairment losses.

If significant parts of an item of property, plant and equipment have different useful lives, then they are accounted for as separate items (major components) of property, plant and equipment.

Depreciation is calculated to write off the cost of items of property, plant and equipment less their estimated residual values using the straight-line method over their estimated useful lives, and is generally recognized in profit or loss. The estimated useful lives, residual values and depreciation method are reviewed at the end of each reporting period, with the effect of any changes in estimate accounted for on a prospective basis.

The estimated useful lives of property, plant and equipment for current and comparative periods are as follows:

Land	Infinite
Building and leasehold improvements	1-25 years
Machinery equipment	2-10 years
Furniture and fixtures and other equipment	2-10 years

An item of property, plant and equipment is derecognized upon disposal or when no future economic benefits are expected to arise from the continued use of the asset. Any gain on disposal of an item of property, plant and equipment is recognized in profit or loss and included in 'other income'. Any loss is recognized as part of impairment expenses.

Intangible assets

Goodwill

The company accounts for business combinations using the acquisition method when control is transferred to the company. The consideration transferred in the acquisition is generally measured at fair value, as are the identifiable net assets acquired. Any goodwill that arises is tested annually for impairment.

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 cash generating units (CGUs) for the purpose of impairment testing. The allocation is made to those CGUs that are expected to benefit from the business combination in which the goodwill arose. Goodwill is tested for impairment annually and whenever events or changes in circumstances indicate that the carrying amount of the goodwill may not be recoverable. If the recoverable amount of the CGU is less than the carrying amount of the unit, the impairment loss is recognized. An impairment loss recognized for goodwill is not reversed in a subsequent period. Goodwill is stated at cost less accumulated impairment losses.

The company's goodwill arising on the acquisitions of subsidiaries in the current year is described in Note 1 'Acquisition of subsidiaries''.

The company's goodwill arising on the acquisition of an associate is described in Note 7 'Investments in Associates'.

Other intangible assets

Other intangible assets include capitalized development expenses, software, purchased technology, and remaining other intangible assets. Other intangible assets that are acquired by the company with finite useful lives are measured at cost less accumulated amortization and any accumulated impairment losses.

Expenditure on research activities is recognized in profit or loss as incurred.

In determining the capitalization of development expenses, the company makes estimates and assumptions based on expected future economic benefits generated by products that are the result of these development expenses. Other important estimates and assumptions are the required internal rate of return, the distinction between research, development and high-volume manufacturing, and the estimated useful life.

Development expenses are capitalized when all of the following criteria are demonstrated by the entity:

- the technical feasibility of completing the intangible asset so that it will be available for use or sale;
- its intention to complete the intangible asset and use or sell it;
- its ability to use or sell the intangible asset;
- how the intangible asset will generate probable future economic benefits;
- the availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset; and
- its ability to reliably measure the expenditure attributable to the intangible asset during its development.

The company capitalizes development expenses that meet the above-mentioned criteria in its consolidated financial statements. Subsequent to initial recognition, internally-generated intangible assets are reported at cost less accumulated amortization and accumulated impairment losses, on the same basis as intangible assets that are acquired separately.

Amortization of capitalized development expenses is calculated using the straight-line method over the estimated useful lives of the developed product. Amortization starts when the developed product is ready for its intended use. In the development cycle, this is when the product is transferred from the validation (beta) phase to high-volume manufacturing.

Amortization method, useful life, and residual value are reviewed at each reporting date with the effect of any changes in estimate accounted for on a prospective basis.

The estimated useful lives of other intangible assets for current and comparative periods are as follows:

Development cost	5 years
Software	3 years
Purchased technology	5-15 years
Other intangibles	1-17 years

Investments in associates

Investments in associates are investments in entities in which ASM can exert significant influence but which ASM does not control, generally having between 20% and 50% of the voting rights. These entities are accounted for using the equity method and are initially recognized at cost. Dividend income from the company's associated companies is recognized when the right to receive payment is established. Their carrying value includes goodwill identified upon acquisition, net of any accumulated impairment.

When ASM's share of losses in an associate equals or exceeds its interest in the associate, including any other receivables for which settlement is neither planned nor likely to occur in the foreseeable future, ASM does not recognize further losses, unless ASM has obligations to or made payments on behalf of the associate.

At each reporting date, the company determines if there is any objective evidence that the associate is impaired. An impairment, being the difference between the recoverable amount of the associate and its carrying value, is recognized in the consolidated statement of profit or loss.

ASM does not separately test associates' underlying assets for impairment. However, ASM recognizes its share of any impairment charge recorded by an investee and considers the effect, if any, of the impairment on the basis difference in the assets giving rise to the investee's impairment charge. A loss in value of an investment which is significant or prolonged will be recognized. Significant is defined as at least 20% on the reporting date. Prolonged is defined as measured below cost for more than nine months.

Equity method investments are tested for prolonged decline in value. If the fair value of an investment is less than its carrying value, the company determines whether the decline in value is temporary or prolonged. A prolonged decline in value is measured as of a balance sheet date. If after a prior recognized impairment the fair value is more than its carrying value, this impairment is reversed to the extent that the recoverable amount of the net investment subsequently increases. The determination of whether an investment is impaired is made at the individual security level in each reporting period.

Evaluation tools at customers

Evaluation tools at customers are systems generally delivered to customers under evaluation and include substantial customization by our engineers and R&D staff in the field. Evaluation tools are recorded at cost and depreciated using the straight-line method over their estimated useful life of five years, or their shorter economic life. The depreciation expenses are reported as cost of sales.

On final written technical acceptance and purchase order from the customer, the purchase consideration is recognized as revenue at a point in time and the carrying value of the evaluation system is recognized as cost of sales. In the circumstance that the system is returned, at the end of the evaluation period, a detailed impairment review takes place, and future sales opportunities and additional costs are identified. It is only when the fair value is below the carrying value of the evaluation tool that an additional depreciation is recognized. The remaining carrying value is recognized as finished goods in inventories.

Inventories

Inventories are stated at the lower of cost or net realizable value. The cost of inventories is based on the first-in, first-out principle. Costs include net prices paid for materials purchased, charges for freight and custom duties, production labor costs and factory overhead. Allowances are made for slow-moving, obsolete or unsellable inventory.

Allowances for obsolescence of inventory are determined based on the expected demand as well as the expected market value of the inventory. The company regularly evaluate the value of our inventory of components and raw materials, work in progress, and finished goods, based on a combination of factors including the following: forecasted sales, historical usage, product end of lifecycle, estimated current and future market values, service inventory requirements, and new product introductions, as well as other factors. Purchasing requirements and alternative uses for the inventory are explored within these processes to mitigate inventory exposure. The company record write-downs for inventory based on the above factors and take into account worldwide quantities and demand into our analysis.

Financial instruments

The company classifies non-derivative financial assets into loans and receivables. The company classifies non-derivative financial liabilities into other financial liabilities.

Non-derivative financial assets and financial liabilities – Recognition and derecognition

The company initially recognizes receivables on the date when they are originated. Receivables comprise account (trade) and other receivables and cash and cash equivalents. Receivables are measured at amortized cost using the effective interest method, less any impairment. Financial assets and financial liabilities are initially recognized on the trade date when the entity becomes a party to the contractual provisions of the instrument.

The company derecognizes a financial asset when the contractual rights to the cash flows from the asset expire, or it transfers the rights to receive the contractual cash flows in a transaction in which substantially all of the risks and rewards of ownership of the financial asset are transferred, or it neither transfers nor retains substantially all of the risks and rewards of ownership and does not retain control over the transferred asset. Any interest in such derecognized financial asset that is created or retained by the company is recognized as a separate asset or liability.

The company derecognizes a financial liability when its contractual obligations are discharged or cancelled, or expired.

Financial assets and financial liabilities are offset and the net amount presented in the statement of financial position when, and only when, the company currently has a legally enforceable right to offset the amounts and intends either to settle them on a net basis or to realize the asset and settle the liability simultaneously.

Non-derivative financial assets – Measurement

Loans and receivables are initially measured at fair value plus any directly attributable transaction costs. Subsequent to initial recognition, they are measured at amortized cost using the effective interest method.

Accounts receivable

A significant percentage of our accounts receivable is derived from revenue to a limited number of large multinational semiconductor device manufacturers located throughout the world. In order to monitor potential credit losses, the company performs ongoing credit evaluations of our customers' financial condition. An allowance for doubtful accounts is maintained for potential credit losses based upon management's assessment of the expected collectability of all accounts receivable. The allowance for doubtful accounts is reviewed periodically to assess the adequacy of the allowance. In making this assessment, management takes into consideration any circumstances of which the company are aware regarding a customer's inability to meet its financial obligations, aging of the accounts receivable, expected lifetime losses; and our judgments as to potential prevailing economic conditions in the industry and their potential impact on the company's customers.

The expected credit loss allowance is based on historical experience, credit evaluations, specific customer-collection history, and any customer-specific issues ASM has identified. Changes in circumstances, such as an unexpected adverse material change in a major customer’s ability to meet its financial obligation to ASM or its payment trends, may require us to further adjust our estimates of the recoverability of amounts due to ASM. This could have an adverse material effect on ASM’s financial condition and results of operations.

Cash and cash equivalents

Cash and cash equivalents consist of bank deposits and investment in money market funds that invest in marketable debt obligations and securities of governments, corporates and financial institutions and other short-term highly liquid investments with original maturity of three months or less. Bank overdrafts are included in notes payable to banks in current liabilities.

Non-derivative financial liabilities – Measurement

Other non-derivative financial liabilities are initially measured at fair value less any directly attributable transaction costs. Subsequent to initial recognition, these liabilities are measured at amortized cost using the effective interest method.

Share capital

Common shares

Common shares are classified as equity. Incremental costs directly attributable to the issue of common shares are recognized as a deduction from equity, net of any tax effects.

Preference share capital

Preference share capital is classified as equity if it is non-redeemable, or redeemable only at the company's option, and any dividends are discretionary. Discretionary dividends thereon are recognized as distributions within equity upon approval by the company's shareholders.

Preference share capital is classified as a financial liability if it is redeemable on a specific date or at the option of the shareholders, or if dividend payments are not discretionary. Non-discretionary dividends thereon are recognized as interest expense in profit or loss as accrued.

Repurchase and reissue of common shares (treasury shares)

When shares recognized as equity are repurchased, the amount of the consideration paid, which includes directly attributable costs, is recognized as a deduction from equity. Repurchased shares are classified as treasury shares and are presented in the treasury share reserve. When treasury shares are sold or reissued subsequently, the amount received is recognized as an increase in equity and the resulting surplus or deficit on the transaction is accounted for at average cost and presented within capital in excess of par value.

Issuance of shares by an equity-accounted investee

The associate ASMPT yearly issues common shares pursuant to their employee share incentive scheme. The effect of these issuances is a dilution of the company's ownership in ASMPT. The company recognizes the impact of these issuances directly into equity.

Comprehensive income

Comprehensive income consists of net earnings (loss) and other comprehensive income. Other comprehensive income includes gains and losses that are not included in net earnings, but are recorded directly in equity.

Provisions

Provisions are recognized when the company has a present obligation (legal or constructive) as a result of a past event, it is probable that the company will be required to settle the obligation, and a reliable estimate can be made of the amount of the obligation.

Provisions are determined by discounting the expected future cash flows at a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. The unwinding of the discount is recognized as finance cost.

Impairment

Non-derivative financial assets

Financial assets, other than those at fair value through profit or loss, are assessed using an 'expected credit loss' (ECL) model. In accordance with the model the company allocate a probability of loss to each financial asset, based on data that is determined to be predictive of the risk of loss and applying experienced credit judgment.

ASM measures loss allowances at an amount equal to lifetime ECLs, except for the following, which are measured at 12-month ECLs:

- debt securities that are determined to have low credit risk at the reporting date; and
- other debt securities and bank balances for which credit risk (i.e. the risk of default occurring over the expected life of the financial instrument) has not increased significantly since initial recognition.

When determining whether the credit risk of a financial asset has increased significantly since initial recognition and when estimating ECLs, ASM considers reasonable and supportable information that is relevant and available without undue cost or effort. This includes both quantitative and qualitative information and analysis, based on ASM's historical experience and informed credit assessment, that includes forward-looking information. Lifetime ECLs are the ECLs that result from all possible default events over the expected life of a financial instrument.

12-month ECLs are the portion of ECLs that result from default events that are possible within the 12 months after the reporting date (or a shorter period if the expected life of the instrument is less than 12 months).

The maximum period considered when estimating ECLs is the maximum contractual period over which ASM is exposed to credit risk.

Measurement of ECLs

ECLs are a probability-weighted estimate of credit losses. Credit losses are measured as the present value of all cash shortfalls (i.e. the difference between the cash flows due to the entity in accordance with the contract and the cash flows that ASM expects to receive). ECLs are discounted at the effective interest rate of the financial asset.

Equity-accounted investees

An impairment loss in respect of an equity-accounted investee is measured by comparing the recoverable amount of the investment with its carrying amount. An impairment loss is recognized in profit or loss, and is reversed if there has been a favorable change in the estimates used to determine the recoverable amount.

Non-financial assets

At each reporting date, the company reviews the carrying amounts of its non-financial assets (other than inventories and deferred tax assets) to determine whether there is any indication of impairment. If any such indication exists, then the asset’s recoverable amount is estimated. Goodwill and assets not yet available for its intended use is tested annually for impairment.

For impairment testing, assets are grouped together into the smallest group of assets that generates cash inflows from continuing use that are largely independent of the cash inflows of other assets or CGUs. Goodwill arising from a business combination is allocated to CGUs or groups of CGUs that are expected to benefit from the synergies of the combination.

The recoverable amount of an asset or CGU is the greater of its value in use and its fair value less costs to sell. Value in use is based on the estimated future cash flows, discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset or CGU.

An impairment loss is recognized if the carrying amount of an asset or CGU exceeds its recoverable amount.

Impairment losses are recognized in profit or loss. They are allocated first to reduce the carrying amount of any goodwill allocated to the CGU, and then to reduce the carrying amounts of the other assets in the CGU on a pro rata basis.

An impairment loss in respect of goodwill is not reversed. For other assets, an impairment loss is reversed only to the extent that the asset’s carrying amount does not exceed the carrying amount that would have been determined, net of depreciation or amortization, if no impairment loss had been recognized.

Commitments and contingencies

The company has various contractual obligations such as purchase commitments and commitments for capital expenditure. These obligations are generally not recognized as liabilities on the company's statement of financial position but are disclosed in the notes to the consolidated financial statements.

Cash flow statement

The cash flow statement has been prepared using the indirect method.

Revenue recognition

Revenue is measured based on the consideration specified in a contract with a customer and excludes amounts collected on behalf of third parties. The company recognizes revenue when it transfers control over a product or service to a customer. Depending on the contract, the company obtain normally a right to payment for our equipment upon shipment and on completion of installation. Right to payment for our spares and services occurs upon shipment or completion of the service unless described otherwise.

Revenue streams

The company generates revenue primarily from the sales of equipment and sales of spares & services. The products & services described below by nature, can be part of both revenue streams. The revenue streams are disclosed in Note 21 Revenue.

Nature of goods and services

The following is a description of principal activities from which the group generates its revenue.

Products and services	Nature, timing of satisfaction of performance obligation and significant payment terms
Equipment	Revenue from equipment is recognized at a point in time when the performance obligation is satisfied, when control transfers. This is usually upon shipment depending on incoterms. The amount of revenue recognized is based on the amount of the transaction price that is allocated to the performance obligation. 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 mostly determined based on other stand-alone sales that are directly observable or based on the expected cost plus a margin approach. Any customer discounts and credits, within volume purchase agreements or bundled agreements, are considered as a reduction of the transaction price, unless this is/can be considered as consideration for a distinct good or service.
Installation	The customer simultaneously consumes and receives the benefits provided by the performance of the installation. As such, transfer of control takes place over the period of installation from delivery through customer acceptance, measured on a straight-line basis, as our performance is satisfied evenly over this period of time.
Spares	Revenue from spares is recognized at a point in time when the performance obligation is satisfied, when the control transfers. This is usually upon shipment depending on incoterms. The amount of revenue recognized is based on the amount of the transaction price that is allocated to the performance obligation. Any customer discounts and credits, within a volume purchase agreements, are considered as a reduction of the transaction price, unless this is/can be considered as consideration for a distinct good or service.
Revenue on royalties and licenses for technology included in equipment and/or spares	The fixed price royalty is a right to use the licenses and revenue is recognized at a point in time that the license is transferred to the customer. For the sales-based royalty, the performance obligation is satisfied when the license is transferred to the customer. Given this is earlier than when the sales occur, revenue should be recognized when the sales occur.
Support services	The customer simultaneously consumes and receives the benefits provided by the performance of the support. For the majority of support services transfer of control takes place over the period of support.

The company applied the practical expedient of IFRS 15.121 and therefore have not disclosed information on the remaining performance obligations of a contract (in aggregate) as the performance obligation is part of a contract that has an original expected duration of one year or less. Generally, the remaining performance obligations of a contract concern the tools to be shipped, unsatisfied promises as part of a bundled agreement or volume purchase agreement and installation and qualification services.

Cost of sales

Cost of sales comprises direct costs such as labor, materials, cost of warranty, depreciation, shipping and handling costs, and related overhead costs. Cost of sales also includes depreciation expenses of evaluation tools at customers, royalty payments, and costs relating to prototype and experimental products, which the company may subsequently sell to customers.

Warranty

The company provide maintenance on our systems during the warranty period, on average one year. Costs of warranty include the cost of labor and material necessary to repair a product during the warranty period. The company accrue for the estimated cost of the warranty on products shipped in a provision for warranty, upon recognition of the sale of the product. The costs are estimated based on historical expenses incurred and on estimated future expenses related to current revenue, and are updated periodically. Actual warranty costs are charged against the provision for warranty. The actual warranty costs may differ from estimated warranty costs, and adjusted our provision for warranty accordingly. Future warranty costs may exceed our estimates, which could result in an increase of our cost of sales.

Leases

The company leases many assets, including land, buildings, houses, motor vehicles, machinery and furniture. The company recognizes a right-of-use asset and a lease liability at the lease commencement date. At inception of a contract, ASM assesses whether a contract is, or contains, a lease. A contract is, or contains, a lease if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration.
The right-of-use asset is initially measured at cost, and subsequently at cost less any accumulated depreciation and impairment losses, and adjusted for certain remeasurement of the lease liability.

The lease liability is initially measured at the present value of the lease payments that are not paid at the commencement date, discounted using the company's incremental borrowing rate. The lease liability is subsequently increased by the interest cost on the lease liability and decreased by the lease payment made. It is remeasured when there is a change in future lease payments arising from a change in a rate or changes in the assessment of whether a purchase or extension option is reasonably certain to be exercised or a termination option is reasonably certain not to be exercised.

The company has applied judgment to determine the lease term for some of the lease contracts in which it is a lessee that includes renewal options. The assessment of whether the company is reasonably certain to exercise such options impacts the lease term, which significantly affects the amount of lease liabilities and right-of-use assets recognized.

The company has applied the exception not to recognize right-of-use assets and lease liabilities for short-term leases (lease term of 12 months or less) and leases of low-value assets (up to the amount of €5,000 new asset value, such as water purifiers and air cleaners). The company recognizes the lease payments associated with these leases as an expense on a straight-line basis over the lease term.

Income tax

Income tax expense comprises current and deferred tax. It is recognized in the statement of profit or loss except to the extent that it relates to a business combination, or items recognized directly in equity or in other comprehensive income.

Current tax

The current corporate income tax charge recognized in the consolidated statement of profit or loss is calculated in accordance with the prevailing tax regulations and rates, taking into account non-taxable income and non-deductible expenses. The current income tax expense reflects the amount for the current reporting period that the company expects to recover from or pay to the tax authorities. Current income tax related to items recognized directly in equity is recorded in equity and not in the consolidated statement of profit or loss. ASM's management periodically evaluates positions taken in the tax returns regarding situations in which applicable tax regulations are subject to interpretation, and establishes provisions when deemed appropriate. The amount of current tax payable or receivable is the best estimate of the tax amount expected to be paid or received that reflects uncertainty related to income tax, if any. Measurement of the tax payable or receivable for uncertain tax positions is based on management's best estimate of the amount of tax benefit that will be lost. Current tax also includes any tax arising from dividends and royalties. Current tax assets and liabilities are offset only if certain criteria are met (IAS 12).

Deferred tax

Deferred income tax positions are recognized for temporary differences between the tax basis of assets and liabilities and their carrying values in ASM's consolidated statement of financial position.

Deferred tax assets are recognized for deductible temporary differences, the carry forward of unused tax credits, and any unused tax losses. Deferred tax assets are recognized only to the extent that it is probable that future taxable profits will be available against which the temporary differences can be utilized. Both the recognized and unrecognized deferred tax assets are reassessed at each reporting date. Deferred tax assets are recorded for deductible temporary differences associated with investments in subsidiaries and are recorded only to the extent that it is probable that the temporary differences will reverse in the foreseeable future, and taxable profit will be available against which the temporary differences can be utilized.

Deferred tax liabilities are recognized for taxable temporary differences except when they affect neither the profit or loss reported in the consolidated statement of profit or loss nor the taxable profit or loss. Also, no deferred tax liabilities are recorded for taxable temporary differences associated with investments in subsidiaries when the timing of the reversal of the temporary differences can be controlled and it is probable that the temporary differences will not reverse in the foreseeable future.

Deferred tax positions are stated at nominal value and are measured at the corporate income tax rates the company expects to be applicable in the year when the asset is realized or liability is settled based on enacted or substantially enacted tax laws and reflects uncertainty related to income tax, if any.

Deferred income tax assets and liabilities are netted if there is a legally enforceable right to set off current tax assets against current tax liabilities, deferred income tax assets and deferred income tax liabilities related to income taxes levied by the same taxation authority on the same taxable entity, and there is an intention to settle on a net basis.

Retirement benefit costs

The company has retirement plans covering substantially all employees. The principal plans are defined contribution plans, except for the plans of the company's operations in the Netherlands and Japan. The company's employees in the Netherlands participate in a multi-employer defined benefit plan. Payments to defined contribution plans and the multi-employer plan are recognized as an expense in the consolidated statement of profit or loss as they fall due. The company accounts for the multi-employer plan as if it were a defined contribution plan, since the manager of the plan is not able to provide the company with the required company-specific information to enable the company to account for the plan as a defined benefit plan.

The company's employees in Japan participate in defined benefit plans. Pension costs in respect to this defined benefit plan are determined using the projected unit credit method. These costs primarily represent the increase in the actuarial present value of the obligation for pension benefits based on employee service during the year and the interest on this obligation in respect to employee service in previous years, net of the expected return on plan assets.

For the defined benefit plan, the company recognizes in its consolidated statement of financial position an asset or a liability for the plan's over funded status or underfunded status respectively. When the calculation results in a potential asset for the company, the recognised asset is limited to the present value of economic benefits available in the form of any future refunds from the plan or reductions in future contributions to the plan. To calculate the present value of economic benefits, consideration is given to any applicable minimum funding requirements. Actuarial gains and losses are recognized when incurred.

Obligations for contributions to defined contribution plans are expensed as the related service is provided. Prepaid contributions are recognized as an asset to the extent that a cash refund or a reduction in future payments is available.

Share-based payments

The costs relating to employee shares (compensation expense) are recognized based upon the grant date fair value of the shares. The estimated fair value at grant date of shares is based on the share price of the ASM share at grant date minus the discounted value of expected dividends during the vesting period.

The grant date fair value of the shares is expensed on a straight-line basis over the vesting period, based on the company's estimate of shares that will eventually vest. The impact of the true-up of the estimates is recognized in the consolidated statement of profit or loss in the period in which the revision is determined. The total estimated share-based compensation expense, determined under the fair value-based method is amortized proportionally over the option vesting periods.

NOTE 1. ACQUISITION OF SUBSIDIARIES

ACQUISITION OF RENO SUB-SYSTEMS

On March 11, 2022, ASM acquired 100% of the share capital of Reno Sub-Systems Inc. (Reno), a supplier of RF matching sub-systems for semiconductor manufacturing equipment.

Reno designs and sells innovative RF matching sub-systems and is based in New Jersey, the US. Reno's high-performance RF matching networks and RF generators will enhance ASM's plasma products and solutions.
ASM has paid an amount of €41.5 million, of which an amount of €21.0 million has been allocated to identified intangible assets and an amount of €17.8 million to goodwill.

Due to its limited size, the acquisition does not have a material impact on 2022 earnings.

ACQUISITION OF LPE

On October 3, 2022, ASM acquired 100% of the issued share capital of LPE S.p.A. ('LPE'), a manufacturer of epitaxial reactors for silicon carbide (SiC) and silicon (SI), based in Italy.

Since its incorporation in 1972, LPE has exclusively focused on designing, manufacturing, and selling advanced epitaxy tools for power applications. LPE is a recognized leader in SiC and Si epitaxy, and has published many patents to date. LPE has a sizeable worldwide installed base of SiC and Si epitaxy tools.

The acquisition provides ASM with access to the SiC market. For certain applications, SiC is a superior technology to Si, with applications such as EVs providing significant revenue-growth potential. LPE's revenue is projected to grow to more than €100 million in 2023, mainly driven by its SiC epitaxy equipment business. Based on ASM internal estimates, demand for SiC epitaxy equipment is forecasted to grow at a CAGR in excess of 25% from 2021 to 2025, driven by the rapidly expanding market for electric vehicles. LPE is profitable with margins in line with ASM's 2021-2025 target model. The acquisition of LPE qualifies as a business as defined in IFRS 3 Business Combinations.

LPE contributed €11 million to the Group's revenues and a loss of €6 million to the Group's net earnings for the period between the date of acquisition and the reporting date. These amounts have been calculated using the subsidiary's results and adjusting them for amortization of purchased technology (€3 million), other intangibles (€2 million) and other fair value step ups (€3 million), that has been charged considering the fair value adjustments to intangible assets and inventories, together with the consequential tax effects.

If the acquisition of LPE had been completed on the first day of the financial year 2022, Group revenues for the year would have been € 2,464 million and group net earnings would have been € 377 million.

These amounts have been calculated using the subsidiary's results and adjusting them for differences in the accounting policies between the group and the subsidiary, and the additional depreciation and amortization that would have been charged assuming the fair value adjustments to intangible assets, inventories and deferred revenues had applied from 1 January 2022, together with the consequential tax effects.

Consideration transferred

The following table summarizes the acquisition-date fair value of each class of consideration transferred.

€ (thousand)	notes	October 3, 2022
Cash consideration		324,175
Equity instruments (631,154 common shares)		144,756
Contingent consideration		76,143
Total consideration transferred [1)]		**545,074**

1 As of reporting date, the final cash settlement of the acquisition has not been finalized between management and the former shareholders of LPE. According to the signed sale and purchase agreement, the final settlement should be concluded in Q1 2023.

Equity instruments issued

The fair value of the common shares issued (a combination of 580,000 treasury shares and 51,154 newly issued shares) was based on the listed share price of the Company at 3 October, 2022 of €229.35 per share. The fair value of the 631,154 common shares issued as part of the consideration paid for the LPE acquisition (€145 million) was determined on the basis of on the published share price on 3 October, 2022 of €229.35 per share. Issue costs directly attributable to the issuance of the shares are immaterial and have been expensed as incurred.

Contingent consideration

In the event that certain predetermined sales targets (including specific targets for certain markets) are achieved by LPE over the period 2023-2024, an additional consideration of up to €100 million ("LPE earn out") may be payable in cash in Q2 2025.

The combined projected revenues over the performance period exceed the upper threshold of the predetermined sales targets. The fair value of the contingent consideration of €76 million represents the discounted value of the expected related €100 million cash payment. At 31 December, 2022, the contingent consideration had increased to €79 million.

Acquisition-related costs

Acquisition-related costs of €3 million that were not directly attributable to the issue of shares are included in administrative expenses (SG&A) in the statement of profit or loss and in operating cash flows in the statement of cash flows.

Identifiable assets acquired and liabilities assumed

The following table summarizes the recognized amounts of assets acquired and liabilities assumed at the acquisition date.

€ (thousand)	October 3, 2022
Intangible assets, net	278,504
Of which:	
Purchased technology	189,105
Other intangibles	89,399
Right of use assets	3,426
Property, plant & equipment, net	409
Cash & cash equivalents	53,988
Accounts receivable, net	18,671
Inventories, net	38,969
Other assets	10,118
Total assets	**404,085**

€ (thousand)	October 3, 2022
Deferred and other tax liabilities	83,014
Accrued and other liabilities	52,103
Trade payables	7,779
Other liabilities assumed	4,581
Liabilities assumed	**147,477**
Total net identifiable assets	**256,608**
Total consideration transferred	545,074
Goodwill on acquisition	**288,466**

Measurement of fair values

The valuation techniques used for measuring the fair value of material assets acquired were as follows.

Assets Acquired	Valuation technique
Technology	Multi-period excess earnings method and Relief-from-royalty method
Trade name	Relief-from-royalty method
Customer relationships	Multi-period excess earnings method
Order backlog	Multi-period excess earnings method
Inventory	Net realisable value method
Minority investments	Market approach

The fair value of acquired trade receivables is €18.7 million. The gross contractual amount for trade receivables due is €18.9 million, with a loss allowance of €0.2 million recognized on acquisition.

The goodwill is attributable to the workforce, expected entity specific synergies in relation to leveraging on ASM's worldwide network and production capacity, and the high profitability of the acquired business. None of the goodwill is expected to be deductible for income-tax purposes.

Estimated amortization and earn-out expenses

The estimated PPA amortization and earn-out expenses relating to the acquisitions of Reno and LPE are as follows:

(€ million)	2023	2024	2025	Years thereafter
Cost of sales	(26.9)	—	—	—
Research and development	(14.2)	(14.2)	**(14.2)**	(164.4)
Selling, general and administrative	(4.8)	(4.8)	**(4.8)**	(55.7)
Total Impact on operating results	**(45.8)**	**(18.9)**	**(18.9)**	**(220.1)**
Finance expense	(9.7)	(8.7)	**(2.8)**	—
Income taxes (realization of temporary differences)	12.7	5.2	**5.2**	60.3
Total impact on net earnings	**(42.8)**	**(22.5)**	**(16.6)**	**(159.8)**

The amortization of the fair value adjustments to the order backlog, and the realization of the fair value adjustments to inventories and deferred revenues are included under costs of sales. Amortization of purchased technology is allocated to research and development expenses. Amortization related to the trade name and customer relationship is recognized under selling, general and administrative expenses.

Finance expenses include the change in fair value of the contingent consideration ("LPE earn-out").

NOTE 2. RIGHT-OF-USE ASSETS

The company leases many assets, including land, buildings, houses, motor vehicles, machinery and equipment. Leases typically run up to a period of five years, some with an option to renew the lease after the end of the non-cancellable period. Lease payments are renegotiated on a periodic basis; timing is dependent on the region and type of lease. The company has not entered into any sublease arrangements.

Right-of-use assets

(€ thousand)	Land and buildings	Motor vehicles	Other machinery and equipment	Total
Balance January 1, 2021	**21,078**	**2,148**	**161**	**23,387**
Additions	2,060	879	323	**3,262**
Modifications and reassessments	6,812	(101)	619	**7,330**
Depreciation for the year	(6,563)	(1,210)	(416)	**(8,189)**
Foreign currency translation effect	1,065	53	30	**1,148**
Balance December 31, 2021	**24,452**	**1,769**	**717**	**26,938**
Additions through business combinations	3,426	—	—	**3,426**
Additions	4,512	664	44	**5,220**
Modifications and reassessments	4,614	117	466	**5,197**
Depreciation for the year	(8,273)	(1,102)	(505)	**(9,880)**
Foreign currency translation effect	745	(31)	48	**762**
Balance December 31, 2022	**29,476**	**1,417**	**770**	**31,663**

Amounts recognized in profit or loss

(€ thousand)	2021	2022
Leases under IFRS 16		
Interest on lease liabilities	523	**603**
Depreciation expenses	8,189	**9,880**
Expenses relating to short-term leases	48	**251**
Expenses relating to low-value leases	16	**—**
Total	**8,776**	**10,734**

Amounts recognized in statement of cash flows

(€ thousand)	2021	2022
Total cash outflow for leases	7,854	**10,290**

Extension options

The extension options held are exercisable only by the company and not by the lessors. The company assesses at lease commencement date whether it is reasonably certain to exercise the extension options. The company reassesses whether it is reasonably certain to exercise the options at year-end for material lease components, if there is a significant event or significant changes in circumstances within its control.

NOTE 3. PROPERTY, PLANT AND EQUIPMENT

The changes in the amount of property, plant and equipment are as follows:

	Land, buildings and leasehold improvements	Machinery and equipment	Furniture and fixtures and other equipment	Assets under construction	Total
At cost					
Balance January 1, 2021	134,678	235,135	33,591	25,872	**429,276**
Additions [1]	7,129	13,381	1,287	57,525	**79,322**
Disposals	(9,230)	(6,598)	(3,612)	—	**(19,440)**
Transfer from assets under construction	669	40,444	3,994	(45,107)	**—**
Transfer to intangible assets	—	—	—	—	**—**
Foreign currency translation effect	3,587	10,948	677	1,280	**16,492**
Balance December 31, 2021	**136,833**	**293,310**	**35,937**	**39,570**	**505,650**
Additions through business combinations	275	38	717	—	**1,030**
Additions	—	2,456	107	98,621	**101,184**
Disposals	(8)	(7,616)	(3,177)	—	**(10,801)**
Transfer from assets under construction	30,844	54,549	10,754	(96,147)	**—**
Foreign currency translation effect	3,506	7,241	17	1,052	**11,816**
Balance December 31, 2022	**171,450**	**349,978**	**44,355**	**43,096**	**608,879**
Accumulated depreciation and impairment					
Balance January 1, 2021	36,098	158,249	20,962	—	**215,309**
Depreciation for the year	6,559	31,530	3,849	—	**41,938**
Impairment charges	—	—	—	—	**—**
Disposals	(7,989)	(6,070)	(3,312)	—	**(17,371)**
Foreign currency translation effect	1,167	7,339	251	—	**8,757**
Balance December 31, 2021	**35,835**	**191,048**	**21,750**	**—**	**248,633**
Depreciation for the year	7,267	38,893	5,930	—	**52,090**
Impairment charges	—	—	—	—	**—**
Disposals	(8)	(7,034)	(2,858)	—	**(9,900)**
Foreign currency translation effect	1,328	4,800	(125)	—	**6,003**
Balance December 31, 2022	**44,422**	**227,707**	**24,697**	**—**	**296,826**
Carrying amounts					
December 31, 2021	100,998	102,262	14,187	39,570	**257,017**
December 31, 2022	**127,028**	**122,271**	**19,658**	**43,096**	**312,053**
Useful lives in years	1-25	2-10	2-10		

1 The €79 million additions in FY 2021 includes €7 million of prepaid capex with no cash flow impact during the year.

NOTE 4. EVALUATION TOOLS AT CUSTOMERS

The changes in the amount of evaluation tools are as follows:

	December 31, 2021	December 31, 2022
At cost		
Balance at beginning of year	100,774	98,352
Evaluation tools shipped	35,409	41,538
Evaluation tools sold and returns	(41,708)	(41,049)
Foreign currency translation effect	3,877	2,232
Balance at end of year	**98,352**	**101,073**
Accumulated depreciation		
Balance at beginning of year	31,300	34,635
Depreciation for the year	16,868	17,719
Evaluation tools sold and returns	(14,279)	(20,027)
Foreign currency translation effect	746	70
Balance at end of year	**34,635**	**32,397**
Carrying amount at beginning of year	**69,474**	**63,717**
Carrying amount at end of year	**63,717**	**68,676**

Useful lives in years:	5

Evaluation tools enable ASM to win new business and expand ASM's technological footprint by penetration at new customers and with new applications.

NOTE 5. GOODWILL

The carrying amount of the goodwill is related to acquisitions in the following cash-generating units:

	ALD	PEALD	SiC EPI	Total
Balance January 1, 2021	2,611	8,659	—	11,270
Foreign currency translation effect	—	—	—	—
Balance December 31, 2021	**2,611**	**8,659**	**—**	**11,270**
Acquisitions through business combinations	—	17,838	288,466	306,304
Foreign currency translation effect	—	891	—	891
Balance December 31, 2022	**2,611**	**27,388**	**288,466**	**318,465**

Reference is made to note 1 in relation to acquisitions through business combinations.

We perform an annual impairment test at the same moment of each year (fourth quarter) or if events or changes in circumstances indicate that the carrying amount of the assets at risk (goodwill, other non-current assets and liabilities, capitalized development, working capital) exceeds its recoverable amount. For our impairment test and the determination of the recoverable amount, a discounted future cash flow approach is used which makes use of our estimates of future revenues, driven by assumed market growth and estimated costs as well as appropriate discount rates.

The material assumptions used for the discounted future cash flows of the cash-generating units (CGUs) are:

- an average discount rate of 10.7% (2021: 7.6%) representing the pre-tax weighted average cost of capital. The increase in discount rate is mainly driven by a higher risk free rate (+2.3%);
- external market segment data, historical data and strategic plans to estimate cash flow growth per product line; and
- cash flow calculations are limited to four years of cash flow; after these four years, perpetuity growth rates are set based on the market maturity of the products. For a maturing product, the perpetuity growth rates used are 1% or less, and for enabling technology products the rate used is 3% or less.

These estimates are consistent with the plans and estimated costs we use to manage the underlying business. We expect the demand for these technologies to continue beyond a period of four years and therefore we have included perpetuity growth rates in our assumptions. Based on this analysis, management concluded that as per December 31, 2022 the recoverable amount of the CGUs exceeded the carrying value. Sensitivity analysis demonstrated that no reasonable possible change in estimated cash flows or the discount rate used in calculating the fair value would cause the carrying value of goodwill to exceed the fair value.

NOTE 6. OTHER INTANGIBLE ASSETS

Other intangible assets include capitalized development expenditure, software developed or purchased (including licenses) for internal use, and purchased technology from third parties. The changes in the amount of other intangible assets are as follows:

	Development costs	Software	Purchased technology	Other intangibles	Total
At cost					
Balance January 1, 2021	341,685	32,864	8,821	—	383,370
Additions	81,973	2,680	—	—	84,653
Transfer from property, plant and equipment	—	—	—	—	—
Disposals	—	(22)	—	—	(22)
Foreign currency translation effect	12,867	458	(32)		13,293
Balance December 31, 2021	**436,525**	**35,980**	**8,789**	**—**	**481,294**
Acquisitions through business combinations	—	—	211,817	89,400	301,217
Additions	102,627	4,532	130	—	107,289
Reclassification	—	(74)	—	—	(74)
Disposals	—	(322)	—	—	(322)
Foreign currency translation effect	6,013	512	126	—	6,651
Balance December 31, 2022	**545,165**	**40,628**	**220,862**	**89,400**	**896,055**
Accumulated amortization and impairment losses					
Balance January 1, 2021	**137,366**	**27,279**	**8,801**	**—**	**173,446**
Amortization for the year	25,184	1,424	10	—	26,618
Impairments	1,967	—	—	—	1,967
Disposals	—	(22)	—	—	(22)
Foreign currency translation effect	4,332	152	(32)	—	4,452
Balance December 31, 2021	**168,849**	**28,833**	**8,779**	**—**	**206,461**
Amortization for the year	34,869	1,820	4,483	1,568	42,740
Impairments	6	—	—	—	6
Disposals	—	(322)	—	—	(322)
Foreign currency translation effect	1,011	121	(66)	—	1,066
Balance December 31, 2022	**204,735**	**30,452**	**13,196**	**1,568**	**249,951**
Carrying amounts					
December 31, 2021	**267,676**	**7,147**	**10**	**—**	**274,833**
December 31, 2022	**340,430**	**10,176**	**207,666**	**87,832**	**646,104**

ASM completed the acquisition of Reno Sub-Systems and LPE, resulting in a total increase of €301.2 million of other intangible assets, of which €22.7 million related to the acquisition of Reno Sub-Systems and €278.5 relates to the acquisition of LPE.

As a result of the acquisition, ASM disaggregated the group 'Purchased technology and other intangibles' into two groups. Reference is made to note 1 for further disclosure on these acquisitions during 2022.

The carrying amount of other intangibles consists of customer relationships (€66.9 million), order backlog (€17.4 million), trade name (€3.1 million) and other (€0.4 million).

We perform an annual impairment test in the fourth quarter of each year or if events or changes in circumstances indicate that the carrying amount of development costs exceeds its recoverable amount. A discounted future cash flow approach is used which makes use of our estimates of future revenues, driven by assumed market growth and estimated costs as well as appropriate discount rates. For the impairment test, reference is made to Note 5.

Impairment charges on capitalized development costs are included in operating expenses under research and development. Impairment of capitalized development expenses primarily related to development of new hardware for which customer demand has shifted out in time, new process technologies that were not successful, and purchased technology which became obsolete. The impairment charges for 2021 and 2022 related to customer-specific projects.

Capitalized development costs are amortized over their estimated useful lives of five years. Amortization starts when the developed asset is ready for its intended use. For the company, this occurs when the application is transferred to high-volume manufacturing.

The company estimated a useful life of purchased technology of 15 years, other intangibles assets are amortized over their estimated useful lives of respectively one year (order backlog), four years (trade name) and 17 years (customer relationships).

The amortization of development costs and purchased technology is included in R&D; the amortization of the order backlog in cost of sales upon realization of respective sales; the amortization of customer relationships is included in SG&A.

Estimated amortization expenses relating to other intangible assets are as follows:

	Development costs	Software	Purchased technology	Other intangibles	Total
2023	40,256	4,106	14,156	21,258	**79,776**
2024	35,116	3,412	14,156	5,007	**57,691**
2025	26,651	2,655	14,156	5,007	**48,469**
2026	17,244	3	14,156	4,807	**36,210**
2027	8,040	—	14,033	4,007	**26,080**
Years thereafter	—	—	137,009	47,746	**184,755**
Amortization estimated	**127,307**	**10,176**	**207,666**	**87,832**	**432,981**
Amortization not yet started	213,123	—	—	—	**213,123**
Total carrying amounts	**340,430**	**10,176**	**207,666**	**87,832**	**646,104**

NOTE 7. INVESTMENTS IN ASSOCIATES

The location included below is the principal place of business of the specified associates. The principal place of business and country for ASMPT deviates from the place of incorporation (Cayman Islands).

		% Ownership December 31,	
		2021	2022
Name	**Location**		
Associates			
Levitech BV	Almere, the Netherlands	26.64%	**26.64%**
SiC systems AB	Lunds Kommun, Sweden	—%	**50.00%**
ASMPT Ltd	Singapore	24.96%	**24.95%**

Levitech BV is valued at nil (2021: nil).

The changes in the investment in associates are as follows:

On March 15, 2013, the company divested a controlling stake in its subsidiary ASMPT Ltd (ASMPT). After the initial accounting of the sale transaction and related gains, future income from ASMPT was adjusted for the fair value adjustments arising from the basis differences as if a business combination had occurred under IFRS 3R, Business Combinations, i.e. a purchase price allocation (PPA).

The purchase of the associate has been recognized at fair value, being the value of the ASMPT shares on the day of closing of the purchase transaction. The composition of this fair value was determined through a PPA. The PPA resulted in the recognition of intangible assets for customer relationship, technology, trade name, product names, and goodwill. For inventories and property, plant & equipment, a fair value adjustment was recognized.

The ASMPT investment is accounted for under the equity method on a go-forward basis. Equity method investments are tested for prolonged impairment. An investment is considered impaired if the fair value of the investment is less than its carrying value.

	Other	ASMPT						Total
	Net equity share	Net equity share	Other (in)tangible assets	Goodwill	Total ASMPT (before impairment)	Impairment, net	Total ASMPT (after impairment)	
Balance January 1, 2021	**—**	**347,088**	**30,016**	**365,610**	**742,714**	**—**	**742,714**	**742,714**
Share in net earnings of investments in associates	—	86,595	—	—	**86,595**	**—**	**86,595**	**86,595**
Other comprehensive income of investments in associates	—	11,833	—	—	**11,833**	**—**	**11,833**	**11,833**
Amortization recognized (in)tangible assets	—	—	(12,213)	—	**(12,213)**	**—**	**(12,213)**	**(12,213)**
Dividends	—	(36,297)	—	—	**(36,297)**	**—**	**(36,297)**	**(36,297)**
Dilution ASMPT share to 25.07%	—	3,205	—	—	**3,205**	**—**	**3,205**	**3,205**
Foreign currency translation effect	—	23,034	1,766	28,175	**52,975**	**—**	**52,975**	**52,975**
Balance December 31, 2021	**—**	**435,458**	**19,569**	**393,785**	**848,812**	**—**	**848,812**	**848,812**
Additions through business combinations	500							500
Impairments of investments in associates, net	—	—	—	—	**—**	(215,389)	(215,389)	(215,389)
Share in net earnings of investments in associates	—	78,413	—	—	**78,413**	**—**	**78,413**	**78,413**
Other comprehensive income of investments in associates	—	2,950	—	—	**2,950**	**—**	**2,950**	**2,950**
Amortization recognized intangible assets	—	—	(13,642)	—	**(13,642)**	**—**	**(13,642)**	**(13,642)**
Dividends	—	(48,919)	—	—	**(48,919)**	**—**	**(48,919)**	**(48,919)**
Dilution ASMPT share to 24.95%	—	60	—	—	**60**	**—**	**60**	**60**
Foreign currency translation effect	—	7,763	1,306	24,487	**33,556**	**—**	**33,556**	**33,556**
Balance December 31, 2022	**500**	**475,725**	**7,233**	**418,272**	**901,230**	**(215,389)**	**685,841**	**686,341**

If the fair value of an investment is less than its carrying value at the balance sheet date, the company determines whether the impairment is temporary or prolonged. Management concluded that there is objective evidence for impairment, both prolonged and significant. Following our accounting policy, ASM calculated the recoverable amount based on the fair value less cost of disposal. The company has impaired its investment in associates (ASMPT) as disclosed in the third quarter 2022 results press release to account for the reduced market valuation of the stake in ASMPT.

The impairment charge of €321 million is party recovered (€106 million) in the fourth quarter as a result of an increase in the recoverable amount. The fair value is determined based on the share price per December 31, 2022 (HK$ 55.65) multiplied by the number of shares in ASMPT, less estimated cost of disposal (0.5%).

The net impairment of investments in associates concerns a non-cash impairment charge of €215 million, deducted from the asset as a whole. The impairment charge will be subsequently reversed only to the extent that the recoverable amount of the investment increases.

The amount per share recognized as per December 31, 2022, under equity accounting excluding impairment amounts to HK$72.76, whereas the level 1 fair value per share (being the market price of a share on the Hong Kong Stock Exchange) was HK$55.65 as per December 31, 2022.

ASMPT announced on 21 July a Share Buy-back Plan ('SBP') pursuant to which the ASMPT will buy back the on-market shares of the company up to a maximum value of HK$420 million. As part of the SBP 2,466,100 shares were repurchased. In December 2022, 2,633,700 common shares of ASMPT were issued, for cash at par value of HK$0.10 per share, pursuant to the Employee Share Incentive Scheme of ASMPT. The shares issued under the plan in 2022 have diluted ASM's ownership in ASMPT to 24.95% as of December 31, 2022.

Per December 31, 2022, the book value of our equity method investment in ASMPT was €901.2 million. The historical cost basis of our 24.95% share of net assets on the books of ASMPT under IFRS was €475.7 million as of December 31, 2022, resulting in a basis difference of €425.5 million. €7.2 million of this basis difference has been allocated to intangible assets. The remaining amount was allocated to equity method goodwill. Each individual, identifiable asset will periodically be reviewed for any indicators of potential impairment. We amortize the basis differences allocated to the assets on a straight-line basis, and include the impact within the results of our equity method investments. Amortization and depreciation are adjusted for related deferred tax impacts. Included in net income attributable to ASM for 2022 was an after-tax expense of €13.6 million, representing the depreciation and amortization of the basis differences.

Summarized 100% earnings information for ASMPT equity method investment excluding basis adjustments (foreign currency exchange rate average 2022: 1 HK$: €0.12118, for December 31, 2021: 1 HK$: €0.10863).

(HK$ million)	2021	2022
Revenues	21,948	**19,363**
Income before income tax	4,092	**3,413**
Net earnings from continuing operations	3,175	**2,618**
Other comprehensive income	(171)	**(574)**
Total comprehensive income	**3,004**	**2,044**

Summarized 100% statement of financial position information for ASMPT equity method investment excluding basis adjustments (foreign currency exchange rate per December 31, 2022, was 1 HK$: €0.12025 for December 31, 2021: 1 HK$: €0.11321).

	December 31,	
(HK$ million)	2021	2022
Current assets	18,251	**16,515**
Non-current assets	8,250	**8,261**
Current liabilities	6,889	**5,246**
Non-current liabilities	4,200	**3,672**
Total equity	**15,412**	**15,858**

Shareholder's equity of ASMPT per December 31, 2022, translated into euros at a rate of 0.12025 was €1,907 million (our 24.95% share: €476 million).

The ASMPT Board is responsible for ongoing monitoring of the performance of ASMPT. The actual results of ASMPT are discussed with the ASMPT Audit Committee, which includes the representative of ASM. The ASM representative reports to the ASM Management Board and the Audit Committee of ASM on a quarterly basis.

The companies interests in Levitech and SIC systems AB are, individually and in aggregate, immaterial to the consolidated financial statements.

Our share of income taxes incurred directly by the associates is reported in income of investments in associates and as such is not included in income taxes in our consolidated financial statements.

NOTE 8. INVENTORIES

Inventories consist of the following:

	December 31, 2021	December 31, 2022
Components and raw materials	175,317	**356,353**
Work in progress	31,631	**113,631**
Finished goods	18,497	**84,827**
Total inventories, gross	**225,445**	**554,811**
Allowance for obsolescence	(13,604)	**(16,386)**
Total inventories, net	**211,841**	**538,425**

The changes in the allowance for obsolescence are as follows:

	December 31, 2021	December 31, 2022
Balance at beginning of year	**(14,477)**	**(13,604)**
Acquisitions through business combinations	—	**—**
Charged to cost of sales	(5,728)	**(8,173)**
Reversals	2,013	**4,028**
Utilization of the provision	5,383	**2,302**
Foreign currency translation effect	(795)	**(939)**
Balance at end of year	**(13,604)**	**(16,386)**

On December 31, 2022, our allowance for inventory obsolescence amounted to €16.4 million, which is 3.0% of total inventory. The major part of the allowance is related to components and raw materials. The additions for 2021 and 2022 mainly relate to inventory items which ceased to be used due to technological developments and design changes resulting in obsolescence of certain parts.

The cost of inventories recognized as costs and included in cost of sales amounted to €1,014.2 million (2021: €727.9 million).

NOTE 9. ACCOUNTS RECEIVABLE

A significant percentage of our accounts receivable is derived from sales to a limited number of large multinational semiconductor device manufacturers located throughout the world. In order to monitor potential expected credit losses, we perform ongoing credit evaluations of our customers' financial condition.

The carrying amount of accounts receivable is as follows:

	December 31, 2021	December 31, 2022
Current	418,195	**466,502**
Overdue <30 days	18,089	**58,370**
Overdue 31-60 days	2,166	**21,941**
Overdue 61-120 days	7,244	**19,789**
Overdue >120 days	1,030	**14,221**
Total	**446,724**	**580,823**

An allowance for doubtful accounts receivable is maintained for potential expected credit losses based upon management's assessment of the expected collectability of all accounts receivable. The allowance for doubtful accounts is reviewed periodically to assess the adequacy of the allowance. In making this assessment, management takes into consideration any circumstances of which we are aware regarding a customer's inability to meet its financial obligations, and our judgments as to potential prevailing economic conditions in the industry and their potential impact on the company's customers.

The changes in the allowance for doubtful accounts receivable are as follows:

	December 31, 2021	December 31, 2022
Balance at beginning of year	**(361)**	**(444)**
Charged to selling, general and administrative expenses	(83)	**(198)**
Utilization of the provision	—	**—**
Foreign currency translation effect	—	**—**
Balance at end of year	**(444)**	**(642)**

Accounts receivable are impaired and provided for on an individual basis. As of December 31, 2022, accounts receivable of €114 million were past due but not impaired. These balances are still considered to be recoverable because they relate to customers for whom there is neither recent history of default nor expectation that this will incur. For further information on credit risk see Note 17.

NOTE 10. OTHER CURRENT ASSETS

Other current assets consist of the following:

	December 31,	
	2021	2022
Prepayments	8,449	**17,977**
VAT receivable	12,114	**20,648**
Amounts to be invoiced	21,915	**59,928**
Others	8,494	**15,971**
Total	**50,972**	**114,524**

Amounts to be invoiced mainly relates to accrued revenue. For further information see Note 21 contract balances.

NOTE 11. CASH AND CASH EQUIVALENTS

Cash and cash equivalents at December 31, 2022 include bank deposits and investments in money market funds that invest in marketable debt obligations and securities of governments, corporates and financial institutions. The amount invested in deposits and money market funds at the end of 2022 was €11 million (2021: €83 million) and interest-bearing bank accounts of €408 million (2021: €409 million). Our cash and cash equivalents are predominantly denominated in US dollars, and partly in euros, Singapore dollars, Korean won, and Japanese yen.

Bank guarantees exist for an amount of €1.8 million at December 31, 2022 (€1.0 million as per December 31, 2021). These guarantees mainly relate to lease and tax payments.

Cash and cash equivalents have insignificant interest-rate risk and remaining maturities of maximum three months or can be converted into cash without no more than 30 days' notice. Except for an amount of €0.3 million (2021: €4.9 million), there are no restrictions on usage of cash and cash equivalents. The carrying amount of these financial assets approximates their fair value. The company has not recognized a provision for expected credit loss for cash and cash equivalents due to the insignificance of the amount.

NOTE 12. EQUITY

Our Management Board has the power to issue common shares and (financing) preferred shares insofar as the Management Board has been authorized to do so by the Annual General Meeting of Shareholders (AGM). The Management Board requires the approval of the Supervisory Board for such an issue. The authorization by the AGM can only be granted for a certain period. In the case that the AGM has not authorized the Management Board to issue shares, the AGM shall have the power to issue shares.

CAPITAL MANAGEMENT

The Board's policy is to maintain a strong capital base in order to retain investor, creditor and market confidence and to sustain future development of the business. Management strives to increase the cash balance to EUR 600 million to reflect the increased size of the company, while maintain a balance between investing in growth of the business and redistributing cash to shareholders by paying a sustainable dividend and through share buybacks. The Company's objective is to achieve a sound return on shareholders' equity. The Company is monitoring its capital ratio of net debt to total Shareholders' equity which should not exceed 1.5. There were no changes to the Board's approach to capital management during the year.

COMMON SHARES, PREFERRED AND FINANCING PREFERRED SHARES

Following the amendment of the articles of association on August 3, 2018, the authorized capital of the company amounts to 82,500,000 common shares of €0.04 par value, 88,500 preferred shares of €40 par value and 6,000 financing preferred shares of €40 par value.

As per December 31, 2022, 49,348,548 common shares with a nominal value of €0.04 each were issued and fully paid up, of which 22,229 common shares are held by us in treasury. All shares have one vote per €0.04 par value. Treasury shares held by the company cannot be voted on. Of our 49,326,319 outstanding common shares at December 31, 2022, 47,752,219 are registered with our transfer agent in the Netherlands, ABN AMRO Bank N.V., and 1,574,100 are registered with our transfer agent in the United States, Citibank, NA, New York.

Financing preferred shares are designed to allow ASM to finance equity with an instrument paying a preferred dividend, linked to EURIBOR loans and government loans, without the dilutive effects of issuing additional common shares.

Preferred and financing preferred shares are issued in registered form only and are subject to transfer restrictions. Essentially, a preferred or financing preferred shareholder must obtain the approval of the company's Supervisory Board to transfer shares. If approval is denied, the Supervisory Board will provide a list of acceptable prospective buyers who are willing to purchase the shares at a cash price to be fixed by consent of the Supervisory Board and seller within two months after the approval is denied. If the transfer is approved, the shareholder must complete the transfer within three months, at which time the approval expires.

Preferred shares are entitled to a cumulative preferred dividend based on the amount paid up on such shares. Financing preferred shares are entitled to a cumulative dividend based on the par value and share premium paid on such shares.

As per December 31, 2022, no preferred shares and no financing preferred shares are issued.

PURCHASES OF COMMON SHARES BY THE ISSUER AND AFFILIATED PURCHASERS

On May 16, 2022, the AGM authorized the company, for an 18-month period, to be calculated from the date of the AGM, to repurchase its own shares up to 10% of the issued capital, at a price at least equal to the shares' nominal value and at most a price equal to 110% of the shares' average closing price according to the listing on the Euronext Amsterdam stock exchange during the five trading days preceding the purchase date.

On February 25, 2020, ASM announced a share buyback program to purchase up to an amount of €100 million of its own shares within the 2020-2021 time frame. The 2020-2021 program started on June 2, 2020, and was completed on March 2, 2021.

Period	Total number of shares purchased	Average price paid per share (€)	Cumulative number of shares purchased
Share buyback program 2020-2021:			
June, 2020	**57,700**	€119.16	57,700
July, 2020	**21,648**	€144.31	79,348
August, 2020	**66,086**	€127.15	145,434
September, 2020	**140,736**	€121.74	286,170
October, 2020	**34,118**	€130.83	320,288
November, 2020	**102,020**	€135.72	422,308
December, 2020	**58,500**	€169.64	480,808
January, 2021	**78,389**	€207.04	559,197
February, 2021	**73,587**	€231.18	632,784
March, 2021	**13,396**	€223.07	646,180
Total	**646,180**	**€154.76**	

On April 20, 2021, ASM announced a share buyback program to purchase up to an amount of €100 million of its own shares within the 2021 time frame. The 2021 program started on July 28, 2021, and was completed on December 17, 2021.

Period	Total number of shares purchased	Average price paid per share (€)	Cumulative number of shares purchased
Share buyback program 2021:			
July, 2021	**10,093**	€295.48	10,093
August, 2021	**74,680**	€314.22	84,773
September, 2021	**87,223**	€343.70	171,996
October, 2021	**43,292**	€318.51	215,288
November, 2021	**33,531**	€404.89	248,819
December, 2021	**43,297**	€374.34	292,116
Total	**292,116**	**€342.33**	

On February 22, 2022, ASM announced a share buyback program to purchase up to an amount of €100 million of its own shares within the 2022/2023 time frame. This share buyback program has not started in 2022.

The following table shows the change in number of treasury shares and outstanding shares:

Number of shares	Treasury shares	Outstanding shares
Balance at beginning of year	**728,717**	**48,568,677**
Purchase common shares	—	**—**
Issue of common shares related to the acquisition of business combinations	—	**51,154**
Treasury shares transferred related to the acquisition of business combinations	(580,000)	**580,000**
Exercise stock options out of treasury shares	—	**—**
Vesting restricted shares out of treasury shares	(126,488)	**126,488**
Cancellation treasury shares	—	**—**
Balance at end of year	**22,229**	**49,326,319**

ASM intends to use part of the shares for commitments under the employee share-based compensation schemes and the performance shares and option program for the Management Board.

The share buyback programs were executed by intermediaries through on-exchange purchases or through off-exchange trades. ASM updated the markets on the progress of the share buyback programs on a weekly basis.

The repurchase programs are part of ASM's commitment to use excess cash for the benefit of its shareholders.

TREASURY SHARES

On December 31, 2022, we had 49,326,319 outstanding common shares excluding 22,229 treasury shares. This compared to 48,568,677 outstanding common shares and 728,717 treasury shares at December 31, 2021. Besides the transfer of 580,000 treasury shares for the acquisition of LPE on October 3, 2022 (note 1. Acquisition of subsidiaries), the change in the number of treasury shares in 2022 was the result of 126,488 treasury shares that were used as part of share-based payments.

	2021	2022
As per January 1:		
Issued shares	49,797,394	**49,297,394**
Treasury shares	1,082,712	**728,717**
Outstanding shares	48,714,682	**48,568,677**
Changes during the year:		
Issue of common shares related to the acquisition of business combinations	—	**51,154**
Treasury shares transferred related to the acquisition of business combinations	—	**580,000**
Cancellation of treasury shares	500,000	**—**
Share buybacks	462,988	**—**
Treasury shares used for share-based performance programs	316,983	**126,488**
As per December 31:		
Issued shares	49,297,394	**49,348,548**
Treasury shares	728,717	**22,229**
Outstanding shares	**48,568,677**	**49,326,319**

RETAINED EARNINGS

Distributions to common shareholders are limited to the extent the total amount of shareholders' equity exceeds the amounts of nominal paid-in share capital (exclusive any share premium) and any reserves to be formed pursuant to law or the company's Articles of Association. The amounts are derived from the company financial statements of ASM.

ASM aims to pay a sustainable annual dividend. The Supervisory Board, upon proposal of the Management Board, will annually assess the amount of dividend that will be proposed to the AGM. The decision that a dividend be proposed to the AGM will be subject to the availability of distributable profits as well as retained earnings and may be affected by our potential future funding requirements. Accordingly, dividend payments may fluctuate and could decline or be omitted in any year.

Over 2021, we paid in total a dividend of €2.50 per common share as regular dividend, and was paid after the 2022 AGM in May 2022. We will propose to the forthcoming 2023 AGM to declare a regular dividend of €2.50 per share over 2022.

Results on dilution of investments in associates are accounted for directly in equity. For 2022 and 2021, these dilution results were €60 and €3,205, respectively.

OTHER RESERVES

The changes in the amounts of other reserves are as follows:

	Proportionate share in other comprehensive income of investments in associates	Remeasurement on net defined benefit	Foreign currency translation reserve	Total other reserves
Balance January 1, 2021	**(12,504)**	**261**	**38,428**	**26,185**
Proportionate share in other comprehensive income of investments in associates	11,833	—	—	**11,833**
Remeasurement on net defined benefit	—	181	—	**181**
Foreign currency translation effect on foreign operations	—	—	91,273	**91,273**
Balance December 31, 2021	**(671)**	**442**	**129,701**	**129,472**
Proportionate share in other comprehensive income of investments in associates	2,950	—	—	**2,950**
Remeasurement on net defined benefit	—	615	—	**615**
Foreign currency translation effect on foreign operations	—	—	61,845	**61,845**
Balance December 31, 2022	**2,279**	**1,057**	**191,546**	**194,882**

NOTE 13. EMPLOYEE BENEFITS

PENSION PLANS

The company has retirement plans covering substantially all employees. The principal plans are defined contribution plans, except for the plans of the company's operations in the Netherlands and Japan.

Multi-employer plan

There are 209 eligible employees in the Netherlands. These employees participate in a multi-employer union plan (pension fund Metalektro PME) determined in accordance with the collective bargaining agreements effective for the industry in which we operate. This multi-employer union plan, accounted for as a defined contribution plan, covers approximately 1,466 companies and approximately 168,600 contributing members. Our contribution to the multi-employer union plan was less than 5% of the total contribution to the plan. 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. As of January 1, 2015, new pension legislation has been enacted. This legislation results in, amongst others, an increase of legally required coverage levels. 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, 2022, of 110.4% (December 31, 2021: 107.9%) is calculated giving consideration to the pension legislation. We have no obligation to pay off any deficits the pension fund may incur, nor do we have any claim to any potential surpluses.

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. The premium can fluctuate yearly based on the coverage ratio of the multi-employer union plan. For 2022, the contribution percentage was 27.98%. The pension rights of each employee are based upon the employee's average salary during employment.

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 minus the employee contribution.

Defined benefit plan

The company's employees in Japan participate in a defined benefit plan. The company makes contributions to defined benefit plans in Japan that provide pension benefits for employees upon retirement. These are average-pay plans, based on the employees' years of service and compensation near retirement.

The most recent actuarial valuations of plan assets and the present value of the defined benefit obligation were carried out on December 31, 2022. The present value of the defined benefit obligation and the related current service cost and past service cost were measured using the projected unit credit method. Significant actuarial assumptions for the determination of the defined obligation are discount rate, future general salary increases, and future pension increases.

The net liability (asset) of the plan developed as follows:

	December 31, 2021	December 31, 2022
Defined benefit obligations	11,925	**10,227**
Fair value of plan assets	13,907	**12,783**
Net liability (asset) for defined benefit plans	**(1,982)**	**(2,556)**

The changes in defined benefit obligations and fair value of plan assets are as follows:

	December 31, 2021	December 31, 2022
Defined benefit obligations		
Balance January 1	**11,083**	**11,925**
Current service cost	842	**980**
Interest on obligation	53	**54**
Remeasurement result	463	**(891)**
Benefits paid	(181)	**(989)**
Foreign currency translation effect	(335)	**(852)**
Balance December 31	**11,925**	**10,227**
Fair value of plan assets		
Balance January 1	**12,514**	**13,907**
Interest income	63	**65**
Return on plan assets	720	**41**
Company contribution	1,170	**773**
Benefits paid	(181)	**(989)**
Foreign currency translation effect	(379)	**(1,014)**
Balance December 31	**13,907**	**12,783**

The defined benefit cost consists of the following:

	December 31, 2021	December 31, 2022
Current service cost	842	**980**
Net interest cost	(10)	**(11)**
Net defined benefit cost	**832**	**969**
Remeasurement on net defined benefit for the year	(257)	**(932)**
Remeasurement on net defined benefit	**(257)**	**(932)**
Total defined benefit cost	**575**	**37**

The assumptions in calculating the actuarial present value of benefit obligations and net periodic benefit cost are as follows:

	2021	2022
Discount rate for defined benefit obligations	0.50%	**1.20%**
Discount rate for defined benefit cost	0.50%	**0.50%**

Assumptions regarding life expectancy are based on mortality tables published in 2020 by the Ministry of Health, Labour and Welfare of Japan.

The main risk concerning the pension plan relates to the discount rate. The defined benefit obligation is sensitive to a change in discount rates. A relative change of the discount rate of 25 basis points would have resulted in a change in the defined benefit obligation of -2.5% to 2.6%.

The allocation of plan assets is as follows:

	December 31, 2021		December 31, 2022	
Cash and cash equivalent	265	2%	**173**	**1%**
Equity instruments	2,482	18%	**2,318**	**18%**
Debt instruments	1,346	10%	**1,125**	**9%**
Assets held by insurance company	9,814	70%	**9,167**	**72%**
Total	**13,907**	**100%**	**12,783**	**100%**

The investment strategy is determined based on an asset-liability study in consultation with investment advisors and within the boundaries given by the regulatory bodies for pension funds.

Equity instruments consist primarily of publicly traded Japanese companies and common collective funds. Publicly traded equities are valued at the closing prices reported in the active market in which the individual securities are traded (level 1). Common collective funds are valued at the published price (level 1) per share multiplied by the number of shares held as of the measurement date. Debt instruments consist of government bonds and are valued at the closing prices in the active markets for identical assets (level 1). Assets held by the insurance company consist of bonds and loans, government securities and common collective funds. Corporate and government securities are valued by third-party pricing sources (level 2). Common collective funds are valued at the net asset value per share (level 2) multiplied by the number of shares held as of the measurement date.

The plan assets do not include any of the company's shares.

Retirement plan costs

ASM contributed €773 to the defined benefit plan in 2022 (€1,170 in 2021). The company expects to pay benefits for years subsequent to December 31, 2022 as follows:

	Expected contribution defined benefit plan
2023	1,139
2024	341
2025	196
2026	540
2027	796
Aggregate for the years 2028-2032	4,890
Total	**7,902**

The company does not provide for any significant post-retirement benefits other than pensions.

MANAGEMENT BOARD AND EMPLOYEE AND LONG-TERM INCENTIVE PLAN

The company has adopted various share plans (e.g. a restricted share plan, and a performance share plan) and has entered into share agreements with the Management Board and various employees. Under the stock option plans, the Management Board and employees may purchase per the vesting date a specific number of shares of the company's common stock at a certain price. Options are priced at market value in euros on the date of grant. Under the restricted share plan, employees receive per the vesting date a specific number of shares of the company's common stock. Under the performance share plan, the Management Board receives per the vesting date, and provided the performance criteria have been met, a specific number of shares of the company's common stock.

Authority to issue options and shares

By resolution of the Annual General Meeting of Shareholders (AGM) of May 16, 2022, the formal authority to issue options and shares was allocated to the Management Board subject to the approval of the Supervisory Board. This authority is valid for 18 months and needs to be refreshed by the 2023 AGM to allow the continued application of the long-term incentive (LTI) plans beyond November 17, 2022. The company hasn't granted new options since its last grant date per April 2017.

The ASM 2014 long-term incentive plan for employees (ELTI) is principally administered by the Management Board and the ASM 2014 long-term incentive plan for members of the Management Board (MLTI) is principally administered by the Supervisory Board. This complies with applicable corporate governance standards. However, the Supervisory Board has no power to represent the company. For external purposes, the Management Board remains the competent body under both LTI plans. The LTI plans envisage that the Supervisory Board, or in the case of the ELTI the Management Board with the approval of the Supervisory Board, will determine the number of options and shares to be granted to the Management Board members and to employees.

2014 long-term incentive plan

In 2014, a new long-term incentive plan was adopted. In the new plan to limit potential dilution, the amount of outstanding (vested and non-vested) options and shares granted to the Management Board and to other employees will not exceed 5% of the issued ordinary share capital of ASM. The new long-term incentive plan 2014 consists of two sub-plans: the ELTI and the MLTI.

Options and performance shares are issued to Management Board members and restricted shares are issued to employees once per annum on the date following the publication of the first-quarter results of the relevant year. Possible grant to newly hired employees can be issued once a quarter, on the date following the publication of the financial results of the relevant quarter. The number of options and shares outstanding under the long-term incentive plans or under any other plan or arrangement in aggregate may never exceed 5% of ASM's share capital.

Performance and restricted shares outstanding

The following table is a summary of changes in performance shares and restricted shares outstanding under the 2014 long-term incentive plan.

	Number of performance shares	Number of restricted shares	Status	Fair value at grant date (weighted average)
Balance January 1, 2021	**29,997**	**325,811**		
Shares granted, employees	—	86,357	Unconditional	€260.77
Shares granted, Management Board	6,343	—	Conditional	€261.25
Shares granted, Management Board	4,504	—	Unconditional	€49.78
Shares vested	(26,414)	(167,048)		
Shares forfeited	—	(10,708)		
Balance December 31, 2021	**14,430**	**234,412**		
Shares granted, employees	—	167,836	Unconditional	€297.27
Shares granted, Management Board	9,726	—	Conditional	€313.72
Shares granted, Management Board	—	—	Unconditional	€0.00
Shares vested	—	(126,488)		
Shares forfeited	(1,087)	(36,050)		
Balance December 31, 2022	**23,069**	**239,710**		

In 2022, treasury shares were sold for the vesting of 126,488 restricted shares.

Options outstanding

The following table is a summary of changes in options outstanding under the 2014 long-term incentive plan.

	Number of options	Exercise price in €	Fair value at grant date
Balance January 1, 2015	**—**		
Options granted, April 24, 2015	42,659	44.24	€17.33
Balance December 31, 2015	**42,659**		
Options granted, April 22, 2016	62,555	37.09	€12.64
Balance December 31, 2016	**105,214**		
Options granted, April 21, 2017	24,963	51.55	€14.57
Balance December 31, 2017	**130,177**		
Adjustment following capital repayment	11,593	—	—
Balance December 31, 2018	**141,770**		
Options exercised, 2021	(123,521)	—	—
Balance December 31, 2021	**18,249**		
Options exercised, 2022	—	—	—
Balance December 31, 2022	**18,249**		

In 2022, no options were granted.

At December 31, 2022, the aggregate intrinsic value of all options outstanding under the 2014 long-term incentive plan is €4,300 (2021: €7,093).

Share-based payments expenses

The grant date fair value of the restricted shares and the performance shares is expensed on a straight-line basis over the vesting period, based on the company's estimate of restricted shares, and performance shares that will eventually vest. The impact of the true-up of the estimates is recognized in the consolidated statement of profit or loss in the period in which the revision is determined. We recorded compensation expenses of €29,811 for 2022 (2021: €17,242).

NOTE 14. PROVISION FOR WARRANTY

The changes in the amount of provision for warranty are as follows:

	December 31,	
	2021	2022
Balance January 1	18,987	27,181
Acquisitions through business combinations	—	1,300
Charged to cost of sales	24,911	33,738
Deductions	(11,660)	(14,797)
Releases of expired warranty	(6,112)	(13,843)
Foreign currency translation effect	1,055	640
Balance December 31	**27,181**	**34,219**

Provision is made for estimated warranty claims in respect of products sold which are still under warranty at the end of the reporting period. Costs of warranty include the cost of labor and materials to repair a product during the warranty period. The main term of the warranty period is one year. The company accrues for the estimated cost of the warranty on its products shipped in the provision for warranty, upon recognition of the sale of the product. The costs are estimated based on actual historical expenses incurred and on estimated future expenses related to current revenue, and are updated periodically. Actual warranty costs are charged against the provision for warranty. The assumptions made in relation to the current period are consistent with those in the prior year. Factors that could impact the estimated claim information include the success of the group's productivity and quality initiatives, as well as parts and labor costs. The main part of the claims is expected to be settled in the next financial year.

NOTE 15. ACCRUED EXPENSES AND OTHER PAYABLES

Accrued expenses and other payables consist of the following:

	December 31,	
	2021	2022
Personnel-related items	72,252	100,717
Deferred revenue	68,723	197,617
Current portion lease liabilities	7,574	9,520
Advanced payments from customers	14,837	97,563
Supplier-related items	9,627	20,232
Marketing-related items	1,575	1,634
R&D projects	—	5,570
Other	15,976	26,058
Total accrued expenses and other payables	**190,564**	**458,911**

Personnel-related items comprise accrued management bonuses, accrued vacation days, accrued wage tax, social securities, and pension premiums. Deferred revenue consists of the revenue relating to the undelivered elements of the arrangements, see Note 21 for more information. This part of revenue is deferred at their relative selling prices until delivery of these elements. Other includes accruals for VAT, other taxes, and invoices to be received for services.

NOTE 16. CREDIT FACILITY

As per December 31, 2022, ASM was debt-free. ASM may borrow under separate short-term lines of credit with banks under an unsecured €150 million standby credit facility with a consortium of banks.

The amount outstanding as at December 31, 2022 was nil, so the undrawn portion totaled €150 million. The undrawn portion represents the company's standby revolving credit facility of €150 million with a consortium of banks. The company has a new RCF as per end of May 2022 and the new facility has a tenor of five years with an option to extend up to two years. The facility amount is €150 million with an accordion option increase the facility amount by €100 million.

The credit facility of €150 million includes one financial covenant:

- Consolidated total net debt/total shareholders' equity ratio.

This financial covenant is measured twice each year: on June 30 and December 31.

The net debt/total shareholders' equity ratio should not exceed 1.5. For the year ended December 31, 2022, the company has no net debt, cash and cash equivalents amount to €419 million, and total equity equals the amount of consolidated tangible net worth.

The company is in compliance with these financial covenants as of December 31, 2022.

The RCF agreement stipulates that in the event of a change of control of ASM, the amounts outstanding under the arrangement may become immediately due.

NOTE 17. FINANCIAL INSTRUMENTS AND FINANCIAL RISK MANAGEMENT

FINANCIAL INSTRUMENTS

Financial instruments include:

	December 31,	
	2021	2022
Financial assets:		
Cash and cash equivalents	491,507	**419,315**
Accounts receivable	446,724	**580,823**
Financial liabilities:		
Lease liabilities	15,886	**18,604**
Contingent consideration payable	—	**78,649**
Accounts payable	175,436	**243,499**

The carrying amounts of cash and cash equivalents, accounts receivable and accounts payable equal their fair values because of the short-term nature of these instruments.

Gains or losses related to financial instruments are as follows:

	2021	2022
Interest income	23	**2,246**
Interest expense	(2,012)	**(1,523)**
Change in fair value of contingent consideration	—	**(2,575)**
Result from foreign currency exchange	33,473	**25,011**
Addition to allowance for doubtful accounts receivable	(83)	**(198)**

FINANCIAL RISK FACTORS

ASM is exposed to a number of risk factors: market risks, credit risk, liquidity risk, and equity price risk. The company may use forward exchange contracts to hedge its foreign exchange risk. The company does not enter into financial instrument transactions for trading or speculative purposes.

Market risk

Market risk includes changes in market prices, foreign exchange rates and interest rates, which will affect the group's income or the value of its holdings of financial instruments. The objective of market-risk management is to manage and control market risk exposures within acceptable parameters, while optimizing the return.

Foreign exchange risk

ASM and its subsidiaries conduct business in a number of foreign countries, with certain transactions denominated in currencies other than the functional currency of the company (euro) or one of its subsidiaries conducting the business. The purpose of the company's foreign currency management is to manage the effect of exchange-rate fluctuations on income, expenses, cash flows, and assets and liabilities denominated in selected foreign currencies, in particular denominated in US dollars.

We may use forward exchange contracts to hedge our foreign exchange risk of anticipated sales or purchase transactions in the normal course of business which occur within the next twelve months, for which we have a firm commitment from a customer or to a supplier. The terms of these contracts are consistent with the timing of the transactions being hedged. There is no hedge accounting applied on the hedges therefore change in fair value (gain or loss) on the hedges will be recognized in profit or loss.

Changes in the fair value of derivatives that do not qualify for hedge treatment, as well as the ineffective portion of any hedges, are recognized in earnings. We record all derivatives, including forward exchange contracts, on the statement of financial position at fair value in accrued expenses and payables. Should contracts extend beyond one year, these are classified as long-term.

Furthermore, we may manage the currency exposure of certain receivables and payables using derivative instruments, such as forward exchange contracts (fair value hedges) and currency swaps, and non-derivative instruments, such as debt borrowings in foreign currencies. The gains or losses on these instruments provide an offset to the gains or losses recorded on receivables and payables denominated in foreign currencies. The derivative instruments are recorded at fair value and changes in fair value are recorded in earnings under foreign currency exchange gains (losses) in the consolidated statement of profit or loss. Receivables and payables denominated in foreign currencies are recorded at the exchange rate at the balance sheet date, and gains and losses as a result of changes in exchange rates are recorded in earnings under foreign currency exchange gains (losses) in the consolidated statement of profit or loss.

We do not use forward exchange contracts for trading or speculative purposes. Financial assets and financial liabilities are recognized on the company's consolidated statement of financial position when the company becomes a party to the contractual provisions of the instrument.

To the extent that exchange rate fluctuations impact the value of the company's investments in its foreign subsidiaries, they are not hedged. The cumulative effect of these fluctuations is separately reported in consolidated equity. Reference is made to Note 12.

Per December 31, 2021 one FX option was outstanding with a fair value of €37,000.
Per December 31, 2022, there were no forward exchange contracts outstanding.

The foreign currency exchange results in 2022 related only to translation gain of €25.0 million, compared to translation gain of €33.5 million in 2021. A substantial part of ASM's cash position is denominated in US dollar, which is the key driver of the exchange gain in 2021 and 2022.

The following table analyzes the company's exposure to currency risk in our major currencies.

	December 31,							
	2021				2022			
(thousand)	USD	JPY	KRW	SGD	USD	JPY	KRW	SGD
Accounts receivable	394,915	6,890,314	9,091,916	395	490,051	5,836,919	14,503,184	458
Cash and cash equivalents	417,704	1,864,776	29,215,789	27,003	308,977	2,209,145	16,405,166	32,370
Accounts payable	(97,705)	(4,057,736)	(23,626,477)	(41,541)	(117,040)	(3,429,196)	(31,297,765)	(78,164)
Total	**714,914**	**4,697,354**	**14,681,228**	**(14,143)**	**681,988**	**4,616,868**	**(389,415)**	**(45,336)**

The following table analyzes the company's sensitivity to a hypothetical 10% strengthening and 10% weakening of the US dollar, Singapore dollar, Korean won and Japanese yen against the euro as of December 31, 2021, and December 31, 2022. This analysis includes foreign currency-denominated monetary items and adjusts their translation at year-end for a 10% increase and 10% decrease against the euro.

	Impact on financial instruments	
(€ thousand)	2021	2022
10% increase of US dollar versus euro	63,121	**63,940**
10% decrease of US dollar versus euro	(63,121)	**(63,940)**
10% increase of Singapore dollar versus euro	(926)	**(3,170)**
10% decrease of Singapore dollar versus euro	926	**3,170**
10% increase of Korean won versus euro	1,086	**(29)**
10% decrease of Korean won versus euro	(1,086)	**29**
10% increase of Japanese yen versus euro	3,603	**3,283**
10% decrease of Japanese yen versus euro	(3,603)	**(3,283)**

A hypothetical 10% strengthening or 10% weakening of any other currency against the euro as of December 31, 2021, and December 31, 2022, could have a material impact on net earnings for certain currencies.

Interest risk

We are exposed to interest rate risk through our cash deposits. The company does not enter into financial instrument transactions for trading or speculative purposes, or to manage interest-rate exposure. As per December 31, 2022, the company had no debt and was not exposed to interest rate risk on borrowings.

Credit risk

Financial instruments that potentially subject the company to concentrations of credit risk consist primarily of cash and cash equivalents, accounts receivable, and derivative instruments. These instruments contain a risk of counterparties failing to discharge their obligations. We monitor credit risk and manage credit risk exposure by type of financial instrument by assessing the creditworthiness of counterparties. We do not anticipate non-performance by counterparties, given their high creditworthiness.

Our customers are semiconductor device manufacturers located throughout the world. We perform ongoing credit evaluations of our customers' financial condition. We take additional measures to mitigate credit risk when considered appropriate by means of down payments or letters of credit. We generally do not require collateral or other security to support financial instruments with credit risk.

Concentrations of credit risk (whether on- or off-balance sheet) that arise from financial instruments exist for groups of customers or counterparties when they have similar economic characteristics that would cause their ability to meet contractual obligations to be similarly affected by changes in economic or other conditions.

We derive a significant percentage of our revenue from a small number of large customers. The 10 largest customers accounted for approximately 77.8% of revenue in 2022 (2021: 78.9%). The three largest customers accounted for approximately 57.6% of revenue in 2022 (2021: 59.4%). In 2022, we had two customers (2021: three customers) who contributed more than 10% of total revenue. Revenue to these large customers may also fluctuate significantly from time to time, depending on the timing and level of purchases by these customers. Significant orders from such customers may expose the company to a concentration of credit risk, and difficulties in collecting amounts due, which could harm the company's financial results. However, given the creditworthiness of our customers and historical experience, we have not accounted for an expected credit loss over the outstanding balances in general, for further details we refer to Note 9.

We invest our cash and cash equivalents in short-term deposits, money-market funds, and derivative instruments with high-rated financial institutions. We only enter into transactions with a limited number of major financial institutions that have high credit ratings, and we closely monitor the creditworthiness of our counterparties. Concentration risk is mitigated by not limiting the exposure to a single counterparty.

The maximum credit exposure is equal to the carrying values of cash and cash equivalents and accounts receivable.

Liquidity risk

Our policy is to maintain a strong capital base so as to maintain investor-, creditor-, and market confidence, and to sustain future development of the business.

Our liquidity needs are affected by many factors, some of which are based on the normal ongoing 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 principal sources of liquidity, are sufficient to satisfy our current requirements, including our expected capital expenditures in 2022.

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.

The following table summarizes the company's contractual and other obligations as at December 31, 2022.

	Total	Less than 1 year	1-5 years	More than 5 years
Accounts payable	**243,499**	243,499	—	—
Income tax payable	**43,785**	43,785	—	—
Accrued expenses and other payables	**458,911**	458,911	—	—
Non-current lease liabilities	**18,604**	—	16,530	2,074
Pension liabilities	**7,902**	1,139	1,873	4,890
Purchase obligations:				
Purchase commitments to suppliers	**1,075,376**	1,046,024	29,352	—
Capital expenditure and other commitments	**30,754**	30,754	—	—
Total contractual obligations	**1,878,831**	**1,824,112**	**47,755**	**6,964**

Total short-term lines of credit amounted to €150 million at December 31, 2022. The amount outstanding at December 31, 2022 was nil and the undrawn portion totaled €150 million. The standby revolving credit facility of €150 million with a consortium of banks will be available through May 31, 2027.

For the majority of purchase commitments, the company has flexible delivery schedules depending on the market conditions, which allows the company, to a certain extent, to delay delivery beyond originally planned delivery schedules.

NOTE 18. COMMITMENTS AND CONTINGENCIES

Per December 31, 2022, the company entered into purchase commitments with suppliers in the amount of €843,661 (2021: €650,775) for purchases within the next 12 months and €149,473 (2021: €7,986) after 12 months. Commitments for capital expenditures and other commitments per December 31, 2022 were €23,588 (2021: €6,965) within the next 12 months and €162 (2021: €568) after 12 months. The increase in commitments to suppliers is mainly caused by an overall increase in business volume and due to issuance of purchase orders to ensure continuity of supply.

NOTE 19. LITIGATION

ASM is, and may become, a party to various legal proceedings incidental to its business. As is the case with other companies in similar industries, the company faces exposure from actual or potential claims and legal proceedings. Although the ultimate result of legal proceedings cannot be predicted and may have material effects, and in many events cannot be reasonably estimated, it is the opinion of the company's management that the outcome of any claim which is currently pending, either individually or on a combined basis, will not have a material effect on the financial position of the company, its cash flows and result of operations.

NOTE 20. SEGMENT DISCLOSURE

Operating segments are reported in a manner consistent with the internal reporting provided to the Chief Executive Officer (CEO), who is the Chief Operating Decision Maker (CODM).

The accounting policies used to measure the net earnings and total assets in each segment are consistent with those used in the consolidated financial statements. The measurement methods used to determine reported segment earnings are consistently applied for all periods presented. There were no asymmetrical allocations to segments.

Geographical information is summarized as follows:

	Year ended December 31,			
	2021		2022	
(€ thousand)	Revenue	Non-current assets 1)	Revenue	Non-current assets 1)
United States	454,148	276,414	**561,848**	**383,846**
Europe	172,442	74,377	**264,324**	**653,152**
Asia	1,103,321	289,776	**1,584,755**	**346,451**
Total	**1,729,911**	**640,567**	**2,410,927**	**1,383,449**

1 Other than financial instruments, deferred tax assets and post-employment benefit assets

We refer to Note 17. Financial instruments and financial risk management for information on the extent of reliance on major customers.

NOTE 21. REVENUE

Geographical information is summarized as follows:

	Year ended December 31,	
	2021	2022
(€ thousand)	Revenue	Revenue
United States	454,148	561,848
Europe	172,442	264,324
Asia	1,103,321	1,584,755
Total	**1,729,911**	**2,410,927**

For geographical reporting, the revenue is attributed to the geographical location in which the customer's facilities are located.

Revenue stream

The company generates revenue primarily from the sales of equipment and spares and services. The products and services are described by nature in the summary of significant accounting policies, and are recognized within these revenue streams as follows:

- **Equipment revenue:** This revenue stream captures the sale of equipment and installation services. Revenues from royalties and licenses are included to the extent that these licenses relate to equipment.
- **Spares and services revenue:** The revenues included under this line relate to the sale of spares and support services. Revenues from royalties and licenses are included to the extent that these licenses relate to spares.

	Year ended December 31,	
(€ thousand)	2021	2022
Equipment revenue	1,408,102	**2,033,669**
Spares & services revenue	321,809	**377,258**
Total	**1,729,911**	**2,410,927**

Total revenue increased by 39%, driven by solid increases in our ALD business

Contract balances

	2021	2022
Accrued revenue	21,915	**59,928**
Deferred revenue	68,723	**197,617**
Advanced payments from customers	14,837	**97,563**

The increase in the contract balances is the result of the higher activity level of the company, the additions as a result of the acquisitions and because we are still experiencing certain supply chain challenges, leading to an increased number of incomplete tool shipments for which revenues are deferred. The impact of the acquisitions are mainly on deferred revenues (€20 million) and advance payments from customers (€39 million).

The accrued revenue included in the 'Amounts to be invoiced' primarily relate to the company’s right to consideration for work completed and revenue recognized but not billed at the reporting date. The accrued revenue is transferred to accounts receivables when the rights become unconditional. This usually occurs when the company issues an invoice to the customer.

Deferred revenue relates to the advance consideration received from customers for which revenue is not yet recognized because the performance obligation has not been satisfied yet. Deferred revenue consists of the revenue relating to undelivered elements of the arrangement with customers. This part of the revenue is deferred at the transaction price allocated to the performance obligations until shipment. An amount of €36 million included in the deferred revenue at December 31, 2021, has been recognized in 2022.

NOTE 22. INCOME TAXES

Amounts recognized in profit or loss

The components of the result before income taxes consist of:

	Year ended December 31, 2021	Year ended December 31, 2022
The Netherlands	358,039	157,738
Other countries	239,285	347,238
Result before income taxes	**597,324**	**504,976**

The income tax expense consists of:

	Year ended December 31, 2021	Year ended December 31, 2022
Current:		
The Netherlands	(72,032)	(78,738)
Other countries	(7,718)	(36,430)
	(79,750)	**(115,168)**
Deferred:		
The Netherlands	(5,948)	(1,875)
Other countries	(16,917)	1,180
Income tax expense	**(102,615)**	**(115,863)**

Reconciliation of effective tax rate

The provisions for income taxes as shown in the consolidated statements of profit or loss differ from the amounts computed by applying the Dutch statutory income tax rate to earnings before taxes. A reconciliation of the provisions for income taxes and the amounts that would be computed using the Dutch statutory income tax rate is set forth as follows:

	Year ended December 31, 2021		2022	
Result before income taxes from continuing operations	**597,324**	**100.0%**	**504,976**	**100.0%**
Income tax provision based on Dutch statutory income tax rate	(149,331)	25.0%	(130,284)	25.8%
Non-deductible expenses	(2,098)	0.4%	(1,639)	0.3%
Foreign taxes at a rate other than the Dutch statutory rate	8,484	(1.4)%	18,182	(3.6)%
Tax incentives [1] and non-taxable income [2]	37,708	(6.3)%	54,942	(10.9)%
Adjustments in respect of prior years' current taxes	3,818	(0.6)%	(49)	—%
Non-deductible impairment charge on investments in associates [2]	—	—%	(55,570)	11.0%
Other [3]	(1,196)	0.2%	(1,445)	0.3%
Tax income (expense)	**(102,615)**	**17.2%**	**(115,863)**	**22.9%**

1 Tax incentives relate to the Netherlands (Innovation Box), Singapore (Pioneer Certificate) and South Korea (FIZ).
2 Non-taxable income consists of revenues deriving from the share in income of investments in associates which are exempted under the Dutch participation exemption. The participation exemption also applies to the impairment charge on investments in associates.
3 Other mainly consists of tax credits, withholding taxes, changes in (enacted) tax laws and revaluation of certain assets.

The consolidated group effective tax rate for 2022 is higher compared to previous years due to an incidental non-deductible impairment charge on ASMPT. The effective tax rate, excluding the impairment on, and net income of our investment in ASMPT, for 2022 is 17.7% (2021: 19.6%).

The Dutch statutory tax rate is 25.8%. Taxation for other jurisdictions is calculated at the rates prevailing in the relevant jurisdictions. During 2022, there was no significant change in the statutory tax rates of the relevant jurisdictions. The company's deferred tax assets and liabilities have been determined in accordance with these statutory income tax rates.

Movement in deferred tax balances

	Net balance at January 1, 2021	Changes through business combinations	Consolidated statement of profit and loss	Equity	Exchange differences	Net balance at December 31, 2021	Deferred tax assets at December 31, 2021	Deferred tax liabilities at December 31, 2021
Right-of-use assets & lease liabilities	91	—	109	—	12	212	—	212
Property plant and equipment	553	—	(3,370)	—	(11)	(2,828)	—	(2,828)
Other intangible assets	(42,627)	—	(16,471)	—	(1,687)	(60,785)	—	(60,785)
Evaluation tools	5,200	—	(1,097)	—	(154)	3,949	—	3,949
Employee benefits	(549)	—	(69)	(79)	17	(680)	—	(680)
Inventories	1,001	—	203	—	74	1,278	—	1,278
Provision for warranty	3,834	—	1,593	—	224	5,651	—	5,651
Accrued expenses	3,248	—	2,845	—	204	6,297	69	6,228
Tax losses carried forward	—	—	—	—	—	—	—	—
R&D tax credits	7,553	—	(6,608)	—	282	1,227	—	1,227
Total deferred tax	**(21,696)**	**—**	**(22,865)**	**(79)**	**(1,039)**	**(45,679)**	**69**	**(45,748)**

	Net balance at January 1, 2022	Changes through business combinations	Consolidated statement of profit and loss	Equity	Exchange differences	Net balance at December 31, 2022	Deferred tax assets at December 31, 2022	Deferred tax liabilities at December 31, 2022
Right-of-use assets & lease liabilities	212	—	40	—	10	262	—	262
Property plant and equipment	(2,828)	—	662	—	(37)	(2,203)	—	(2,203)
Other intangible assets	(60,785)	(82,429)	(3,213)	—	(1,236)	(147,663)	—	(147,663)
Evaluation tools	3,949	—	(1,719)	—	(296)	1,934	—	1,934
Employee benefits	(680)	—	(152)	(277)	48	(1,061)	—	(1,061)
Inventories	1,278	451	1,800	—	40	3,569	140	3,429
Provision for warranty	5,651	191	994	—	105	6,941	—	6,941
Accrued expenses	6,297	(257)	4,088	—	182	10,310	41	10,269
Tax losses carried forward	—	6,816	(2,049)	—	(115)	4,652	—	4,652
R&D tax credits	1,227	(567)	(1,146)	—	123	(363)	—	(363)
Total deferred tax	**(45,679)**	**(75,795)**	**(695)**	**(277)**	**(1,176)**	**(123,622)**	**181**	**(123,803)**

Deferred tax assets and/or liabilities for temporary differences are mainly recognized in the Netherlands, United States, Japan, South Korea and Singapore.

Income tax receivable and income tax payable

During 2022, the company paid income taxes of €90.5 million (2021: €151.6 million) for tax assessments relating to 2022. The amount in 2021 included paid income taxes for the years 2019, 2020 and 2021.

Unrecognized deferred tax assets

The credits concern R&D credits generated in the US, in the state of Arizona. However, ASM does not recognize these credits stemming from prior years due to the fact that utilization of prior-year credits is only possible if and when the credits generated in the current year are fully utilized. Given the level of R&D activity in the US, the company does not expect it could fully utilize the credits generated in the current year and, hence, does not expect to benefit from the available credits generated in prior years.

	2022	
	Gross amount	**Tax effect**
Credits	21,622,199	21,622,199
Unrecognized deferred tax assets	**21,622,199**	**21,622,199**

Summary of open tax years

A summary of open tax years by major jurisdiction is as follows:

Jurisdiction	
Japan	2017-2022
The Netherlands	2020-2022
Singapore	2018-2022
United States of America	2018-2022
South Korea	2022

The calculation of the company's tax liabilities involves dealing with uncertainties in the application of complex tax laws. The company's estimate for the potential outcome of any unrecognized tax benefits is highly judgmental. Settlement of unrecognized tax benefits in a manner inconsistent with the company's expectations could have a material impact on the company's financial position, net earnings and cash flows. The company is subject to tax audits in its major tax jurisdictions, and local tax authorities may challenge the positions taken by the company.

Other taxes

The company has not provided for deferred foreign withholding taxes, if any, on undistributed earnings of its foreign subsidiaries. At December 31, 2022, the undistributed earnings of subsidiaries, subject to withholding taxes, were approximately €147,492. These earnings could become subject to foreign withholding taxes if they were remitted as dividends and/or if the company should sell its interest in the subsidiaries.

NOTE 23. EXPENSES BY NATURE

Expenses by nature were as follows:

	Year ended December 31,	
	2021	**2022**
Materials and supplies	727,910	**1,014,196**
Personnel expenses	322,226	**471,464**
Depreciation and amortization	93,614	**122,434**
Impairments	1,967	**6**
Other personnel-related expenses	63,938	**103,754**
Professional fees	27,520	**44,718**
Other 1)	5,349	**21,960**
Total cost of sales, selling, general and administrative and research and development expenses	**1,242,524**	**1,778,532**

1 Other relates to facility expenses, IT expenses and other expenses minus capitalized expenses

Research and development consists of the following:

	Year ended December 31,	
	2021	**2022**
Gross research and development expenses	206,019	**301,618**
Capitalization of development expenses	(81,973)	**(102,627)**
Amortization of capitalized development expenses	25,184	**34,869**
Research and development grants and credits	—	**—**
Total research and development expenses	**149,230**	**233,860**
Impairment of capitalized development expenses	1,967	**6**
Net research and development expenses	**151,197**	**233,866**

The impairment expenses in 2021 and 2022 are related to customer-specific projects.

Personnel expenses for employees were as follows:

	December 31,	
	2021	2022
Wages and salaries	273,394	396,164
Social security	20,333	26,961
Pension expenses	11,257	18,528
Share-based payment expenses	17,242	29,811
Total	**322,226**	**471,464**

Personnel expenses are included in cost of sales and in operating expenses in the consolidated statement of profit or loss.

The number of employees, exclusive of temporary workers, by geographical area at year-end was as follows:

	December 31,	
Geographical location	2021	2022
Europe:		
- the Netherlands	161	211
- EMEA	240	364
United States	814	1,034
Japan	295	350
South Korea	392	462
Singapore	854	1,091
Asia, other	556	746
Total	**3,312**	**4,258**

The number of employees, exclusive of temporary workers, by function at year-end was as follows:

	December 31,	
Per function	2021	2022
Research and development	649	965
Manufacturing	879	1,197
Marketing and sales	396	445
Customer service	1,090	1,271
Corporate and support functions	298	380
Total	**3,312**	**4,258**

NOTE 24. EARNINGS PER SHARE

Basic net earnings per common share is calculated by dividing net income attributable to common shareholders by the weighted average number of common shares outstanding for that period. The dilutive effect is calculated using the treasury stock method. The calculation of diluted net income per 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 basic and diluted net income per share attributable to common shareholders is based on the following data:

	December 31,	
	2021	2022
Net earnings used for purposes of calculating net income per common share		
Net earnings from operations	**494,709**	**389,113**
Basic weighted average number of shares outstanding during the year	48,645	48,820
Effect of dilutive potential common shares from stock options and restricted shares	264	278
Dilutive weighted average number of shares outstanding	**48,909**	**49,097**
Basic net earnings per share:		
from operations	10.17	7.97
Diluted net earnings per share:		
from operations	10.11	7.93

NOTE 25. BOARD REMUNERATION

During 2022, the company considered the members of the Management Board, the Executive Committee (as from effective date of February 1, 2022) and the Supervisory Board to be the key management personnel. Total remuneration for key management personnel in 2022 amounts to €11,431 (2021: €4,800). ASM does not provide any loans, deposits or related guarantees to the members of the Management Board, the Executive Committee or the Supervisory Board.

MANAGEMENT BOARD

The remuneration of members of the Management Board has been determined by the Supervisory Board according to the following table that sets out information concerning all remuneration from the company (including its subsidiaries) for services in all capacities to all current members of the Management Board of the company. The remuneration of the Management Board consists of the remuneration of current and former managing directors. In addition to the CEO and CFO a third Management Board member was appointed on May 16, 2022

	December 31,	
	2021	2022 2)
Short-term employee benefits	2,856	3,645
Post-employment benefits	190	214
Other long-term benefits	—	—
Termination benefits	—	—
Share-based payment 1)	1,391	1,570
Total Management Board remuneration	**4,437**	**5,429**

1 The remuneration reported as part of the LTI (share awards) is based on costs incurred under accounting values EU-IFRS. The costs of share awards are charged to the consolidated statement of profit & loss over the three-year vesting period based on the number of awards expected to vest. For the first year we account at target, subsequently we apply the estimated number of share awards, and in the final performance year of the awards we update this estimate to the best estimated number of awards which are anticipated to vest.
2 Mr. H. M'Saad has been appointed as CTO in 2022. His remuneration has been reported in the overview above as from AGM (May 16, 2022). Prior to his appointment he was member of the Executive Committee.

EXECUTIVE COMMITTEE (EXCLUDING MANAGEMENT BOARD)

The remuneration of members of the Executive Committee has been determined by the Management Board according to the following table that sets out information concerning all remuneration from the company as of February 1, 2022 (including its subsidiaries) for services in all capacities to all current members of the Executive Committee of the company. The remuneration of the Executive Committee consists of the remuneration of current and former members.

	December 31,	
	2021	2022
Short-term employee benefits	—	3,449
Post-employment benefits	—	83
Other long-term benefits	—	—
Termination benefits	—	—
Share-based payment 1)	—	1,840
Total Executive Committee remuneration 2)	**—**	**5,372**

1 The amounts included for share-based payment in the total remuneration represent the vesting expenses related to the financial year.
2 Effective per February 1, 2022, the Executive Committee was installed. And therefore remuneration is only included in the above table as from this effective date. During 2021 the Executive Committee was not in place, and therefore comparable figures are not included in this overview.

SUPERVISORY BOARD

The total remuneration (base compensation, no bonuses or pensions were paid) from the company (including its subsidiaries) for services in all capacities to all current and former members of the Supervisory Board of the company in 2022 amounts to €630 (2021: €363). Based upon a market benchmark analysis conducted end 2021 a proposal to adjust the remuneration of members of the Supervisory Board was approved by the AGM on May 16, 2022. No stock options or performance shares have been granted to members of the Supervisory Board.

NOTE 26. SHARE OWNERSHIP AND RELATED PARTY TRANSACTIONS

The ownership or controlling interest of outstanding common shares of ASM by members of the Management Board and Supervisory Board or members of their immediate family are as follows:

	December 31, 2021		December 31, 2022	
	Shares owned	Percentage of common shares outstanding	Shares owned	Percentage of common shares outstanding
P.F.M. van der Meer Mohr (member of the Supervisory Board)	200	0.00%	**200**	**0.00%**
D. Lamouche (member of the Supervisory Board)	390	0.00%	**390**	**0.00%**
M.J.C. de Jong (member of the Supervisory Board)	4,050	0.01%	**4,050**	**0.01%**

The company has a related party relationship with its subsidiaries, equity-accounted investees, and members of the Supervisory Board and the Management Board. Related party transactions, if any, are conducted on an arm's-length basis with terms comparable to transactions with third parties.

NOTE 27. PRINCIPLE AUDITOR'S FEES AND SERVICES

KPMG Accountants N.V. has served as our external auditor for the years 2022 and 2021. The table sets out the aggregate fees for professional audit services and other services rendered by the external auditors and its member firms and/or affiliates in 2022 and 2021. The fees mentioned in the table for the audit of the financial statements 2022 (2021) relate to the total fees for the audit of the financial statements 2022 (2021), irrespective of whether the activities were performed during the financial year 2022 (2021). Other audit-related fees are related to assurance services on non-financial information. The following fees were charged by KPMG Accountants N.V. to the company, its subsidiaries and other consolidated companies, as referred to in Section 2:382a(1) and (2) of the Dutch Civil Code.

	2021			2022		
	KPMG Accountants NV	KPMG network	KPMG Total	KPMG Accountants NV	KPMG network	KPMG Total
Audit fees	676	264	940	**1,035**	**278**	**1,313**
Audit-related fees	50	—	50	**75**	**—**	**75**
Tax fees	—	—	—	**—**	**—**	**—**
Other fees	—	—	—	**—**	**—**	**—**
Total	**726**	**264**	**990**	**1,110**	**278**	**1,388**

AUDIT COMMITTEE PREAPPROVAL POLICIES

The Audit Committee has determined that the provision of services by KPMG described in the preceding paragraphs is compatible with maintaining KPMG's independence. All audit and permitted non-audit services provided by KPMG during 2022 were preapproved by the Audit Committee.

The Audit Committee has adopted the following policies and procedures for preapproval of all audit and permitted non-audit services provided by our external auditor:

Audit services

Management submits to the Audit Committee for preapproval the scope and estimated fees for specific services directly related to performing the independent audit of our consolidated financial statements for the current year.

Audit-related services

The Audit Committee may preapprove expenditures up to a specified amount for services included in identified service categories that are related extensions of audit services and are logically performed by the auditors. Additional services exceeding the specified pre-approved limits require specific Audit Committee approval.

Tax services

The Audit Committee may pre-approve expenditures up to a specified amount per engagement and in total for identified services related to tax matters. Additional services exceeding the specified pre-approved limits, or involving service types not included in the pre-approved list, require specific Audit Committee approval.

Other services

Any permitted other services that the external auditor provides are subject to preapproval by the Audit Committee. The Audit Committee monitors compliance with the Dutch and EU regulation on non-audit services provided by an external auditor, which outlines strict separation of audit and advisory services for Dutch public interest entities.

NOTE 28. SUBSIDIARIES

Unless otherwise indicated, these are, directly or indirectly, wholly-owned subsidiaries.

The location included below is the principal place of business of the specified subsidiaries. There is no difference between the principal place of business and country of incorporation.

		% Ownership December 31,	
		2021	2022
Name	**Location**		
Subsidiaries (consolidated)			
ASM Europe BV [1]	Almere, the Netherlands	100%	**100%**
ASM IP Holding BV [1]	Almere, the Netherlands	100%	**100%**
ASM Pacific Holding BV [1] [2]	Almere, the Netherlands	100%	**100%**
ASM Netherlands Holding BV [1]	Almere, the Netherlands	100%	**100%**
ASM United Kingdom Sales BV [1]	Almere, the Netherlands	100%	**100%**
ASM Germany Sales BV [1]	Almere, the Netherlands	100%	**100%**
LPE S.p.A [3]	Baranzate, Italy	n/a	**100%**
Pilegrowth Tech S.r.l.	Cernobbio, Italy	n/a	**100%**
LPE Shanghai Int. Trading Co.	Shanghai, China	n/a	**100%**
ASM France SARL	Crolles, France	100%	**100%**
ASM Italia Srl	Milano, Italy	100%	**100%**
ASM Belgium NV	Leuven, Belgium	100%	**100%**
ASM Services and Support Ireland Ltd	Dublin, Ireland	100%	**100%**
ASM Services and Support Israel Ltd	Kiryat Gat, Israel	100%	**100%**
ASM Microchemistry Oy	Helsinki, Finland	100%	**100%**
ASM America Inc	Phoenix, Arizona, United States of America	100%	**100%**
ASM NuTool Inc	Phoenix, Arizona, United States of America	100%	**100%**
Reno Sub-Systems, Inc	New Jersey, Delaware, United States of America	n/a	**100%**
Reno Technologies, Inc.	New Jersey, Delaware, United States of America	n/a	**100%**
ASM Japan KK	Tokyo, Japan	100%	**100%**
ASM Wafer Process Equipment Singapore Pte Ltd	Singapore	100%	**100%**
ASM Front-End Manufacturing Singapore Pte Ltd	Singapore	100%	**100%**
ASM Services & Support Malaysia SDN BHD	Kulim, Malaysia	100%	**100%**
ASM Korea Ltd	Dongtan, South Korea	100%	**100%**
ASM Front-End Sales & Services Taiwan Co Ltd	Hsin-Chu, Taiwan	100%	**100%**
ASM Semiconductor Equipment India Private Limited	Bangalore, India	n/a	**100%**
ASM China Ltd	Shanghai, People's Republic of China	100%	**100%**

1 For these subsidiaries, ASM International N.V. has filed statements at the Dutch Chamber of Commerce assuming joint and several liability in accordance with Article 403, Part 9 of Book 2 of the Dutch Civil Code.
2 ASM Pacific Holding BV holds 24.95% of the shares in ASMPT Ltd.
3 LPE S.p.A. holds 4.32%, 2.16%, 12.46% and 50% of the shares in Anvil semiconductors Ltd., Kubo's, Kiselkarbid AB and SiC systems AB respectively.

NOTE 29. SUBSEQUENT EVENTS

Subsequent events were evaluated up to March 2, 2023, which is the issuance date of this Annual Report 2022.

There are no subsequent events to report.

SIGNING

Almere, the Netherlands
March 2, 2023

SUPERVISORY BOARD

Pauline van der Meer Mohr, Chair
Stefanie Kahle-Galonske
Didier Lamouche
Marc de Jong
Adalio Sanchez
Monica de Virgiliis

MANAGEMENT BOARD

Benjamin Loh
Paul Verhagen
Hichem M'Saad

18. ASM INTERNATIONAL NV FINANCIAL STATEMENTS

18.1 COMPANY BALANCE SHEET

(before proposed appropriation of net earnings for the year)

(€ thousand)	Notes	December 31, 2021	2022
Non-current assets			
Right-of-use assets		402	299
Property, plant and equipment		70	—
Goodwill	2	11,270	299,736
Other intangible assets		29	—
Investments in subsidiaries and associates	3	2,433,956	3,161,858
Loans to subsidiaries	3	40,518	1,759
Other non-current assets		5,977	6,561
Total non-current assets		2,492,222	3,470,213
Current assets			
Loans to subsidiaries	3	2,180	500
Amounts due from subsidiaries	6	104,032	375,220
Income tax receivable		18,098	17,291
Other current assets		929	6,150
Cash and cash equivalents	4	89,527	18,708
Total current assets		214,766	417,869
Total assets		2,706,988	3,888,082
Equity			
Common shares		1,972	1,974
Capital in excess of par value		25,281	47,960
Treasury shares		(155,397)	(3,446)
Legal reserves			
Translation reserve		129,472	191,317
Other legal reserves		1,051,972	1,197,963
Accumulated net earnings		693,745	924,438
Net earnings current year		494,709	389,113
Total equity	5	2,241,754	2,749,319
Non-current liabilities			
Lease liabilities		261	171
Contingent consideration payable		—	78,649
Total non-current liabilities		261	78,820
Current liabilities			
Accounts payable		1,503	875
Amounts due to subsidiaries	6	458,756	1,032,472
Income tax payable		—	18,540
Accrued expenses and other payables		4,714	8,056
Total current liabilities		464,973	1,059,943
Total liabilities		465,234	1,138,763
Total equity and liabilities		2,706,988	3,888,082

The notes on the following pages are an integral part of these company financial statements.

18.2 COMPANY STATEMENT OF PROFIT OR LOSS

		Year ended December 31,	
(€ thousand)	**Notes**	**2021**	**2022**
Operating expenses:			
Selling, general and administrative		(29,987)	**(43,670)**
Research and development		(672)	**(766)**
Total operating expenses	**7**	**(30,659)**	**(44,436)**
Result from operations		**(30,659)**	**(44,436)**
Finance income		2,124	**5,089**
Finance expense		(1,483)	**(3,370)**
Foreign currency exchange gain (loss)		(28,493)	**(18,036)**
Result before income taxes		**(58,511)**	**(60,753)**
Income taxes		16,727	**13,839**
Net earnings from holding activities		**(41,784)**	**(46,914)**
Net earnings from subsidiaries and associates		536,493	**436,027**
Total net earnings		**494,709**	**389,113**

The notes on the following pages are an integral part of these company financial statements.

18.3 NOTES TO THE COMPANY FINANCIAL STATEMENTS

NOTE 1. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

ASM International N.V. (ASM or the company) is a Dutch public liability company. Statutory seat: Versterkerstraat 8, 1322 AP Almere, the Netherlands.

The description of our activities and our structure, as included in the notes to the consolidated financial statements, also apply to the company financial statements.

The accompanying company financial statements are stated in thousands of euros unless otherwise indicated.

ACCOUNTING POLICIES APPLIED

The financial statements of the company included in this section are prepared in accordance with Part 9 of Book 2 of the Dutch Civil Code. For setting the principles for the recognition and measurement of assets and liabilities and determination of results for the company financial statements, the company makes use of the option provided in section 2:362(8) of the Dutch Civil Code. This means that the principles for the recognition and measurement of assets and liabilities and determination of the result (hereinafter referred to as principles for recognition and measurement) of the company financial statements of the company are the same as those applied for the consolidated EU-IFRS financial statements. These principles also include the classification and presentation of financial instruments, being equity instruments or financial liabilities. In case no other principles are mentioned, refer to the accounting principles as described in the consolidated financial statements. For an appropriate interpretation of these statutory financial statements, the company financial statements should be read in conjunction with the consolidated financial statements.

Information on the use of financial instruments and on related risks for the group is provided in the notes to the consolidated financial statements of the group.

Corporate income tax

The company is the head of the Dutch fiscal unity. The company recognizes the portion of corporate income tax that it would owe as an independent taxpayer, taking into account the allocation of the advantages of the fiscal unity.

Settlement within the fiscal unity between the company and its subsidiaries takes place through current account positions.

Participating interests in group companies

Group companies are all entities in which the company has directly or indirectly control. The company controls an entity when it is exposed, or has rights, to variable returns from its involvement with the group company and has the ability to affect those returns through its power over the group company. Group companies are recognized from the date on which control is obtained by the company and derecognized from the date that control by the company over the group company ceases. Participating interests in group companies are accounted for in the company financial statements according to the net equity value, with the principles for the recognition and measurement of assets and liabilities and determination of results as set out in the notes to the consolidated financial statements.

Participating interests with a negative net equity value are valued at nil. This measurement also covers any receivables provided to the participating interests that are, in substance, an extension of the net investment. In particular, this relates to loans for which settlement is neither planned nor likely to occur in the foreseeable future. A share in the profits of the participating interest in subsequent years will only be recognized if and to the extent that the cumulative unrecognized share of loss has been absorbed. If the company fully or partially guarantees the debts of the relevant participating interest, or if has the constructive obligation to enable the participating interest to pay its debts (for its share therein), then a provision is recognized accordingly to the amount of the estimated payments by the company on behalf of the participating interest.

Share of result of participating interests

The share in the result of participating interests consists of the share of the company in the result of these participating interests. Results on transactions involving the transfer of assets and liabilities between the company and its participating interests and mutually between participating interests themselves, are eliminated to the extent that they can be considered as not realized.

NOTE 2. GOODWILL

The carrying amount of the goodwill is related to acquisitions in the following cash-generating units:

	ALD	PEALD	SiC EPI	Total
Balance January 1, 2021	2,611	8,659	—	11,270
Foreign currency translation effect	—	—	—	—
Balance December 31, 2021	**2,611**	**8,659**	**—**	**11,270**
Acquisitions through business combinations	—	—	288,466	288,466
Foreign currency translation effect	—	—	—	—
Balance December 31, 2022	**2,611**	**8,659**	**288,466**	**299,736**

Reference is made to Note 5 of the consolidated financial statements for further disclosure on the accounting and valuation of goodwill.

NOTE 3. INVESTMENTS AND LOANS TO SUBSIDIARIES

	Investments in subsidiaries	Loans to subsidiaries	Total
Balance January 1, 2021	**1,831,446**	**41,760**	**1,873,206**
Net result of subsidiaries and associates	536,493	—	536,493
Other comprehensive income investments	12,015	—	12,015
Dividend received	(38,140)	—	(38,140)
Repayment of loans	—	(2,272)	(2,272)
Dilution	3,205	—	3,205
Foreign currency translation effect	88,937	3,210	92,147
Balance December 31, 2021	**2,433,956**	**42,698**	**2,476,654**
Net result of subsidiaries and associates	436,027	—	436,027
Acquisition of investments in subsidiaries	256,668	—	256,668
Other comprehensive income investments	3,565	—	3,565
Dividend received	(68,414)	—	(68,414)
Repayment of loans	—	(2,370)	(2,370)
Settlement through capital contribution	41,731	(41,731)	—
Dilution	60	—	60
Foreign currency translation effect	58,265	3,662	61,927
Balance December 31, 2022	**3,161,858**	**2,259**	**3,164,117**

	December 31, 2021	December 31, 2022
Loans due from subsidiaries – non-current portion	40,518	1,759
Loans due from subsidiaries – current portion	2,180	500
Total	**42,698**	**2,259**

The interest on the loans due from subsidiaries is based on the Bank of America's prime rate plus two percent points. The repayment schedule of the loan is as follows: 24 annual installments of US$2 million, started December 31, 2018, followed by a final installment of US$5.3 million on December 31, 2043. The company decided to settle the US$ loan through a capital contribution.

NOTE 4. CASH AND CASH EQUIVALENTS

The amounts of cash and cash equivalents are mainly related to the cash pool and in-house bank operated by the company. At December 31, 2022, the cash pool and in-house bank arrangement resulted in a liability which is recorded in amounts due to subsidiaries.

The amount presented as cash and cash equivalents at December 31, 2022 include bank deposits and investments in money market funds that invest in marketable debt obligations and securities of governments, corporate and financial institutions. The amount invested in deposits and money market funds at the end of 2022 was €11 million and interest-bearing bank accounts of €8 million. Our cash and cash equivalents are predominantly denominated in US dollars and partly in euros.

Bank guarantees exist for an amount of €1.5 million at December 31, 2022. These guarantees mainly relate to lease and tax payments.

Cash and cash equivalents have insignificant interest-rate risk and remaining maturities of maximum three months or can be converted into cash without no more than 30 days' notice.The carrying amount of these financial assets approximates their fair value. The company has not recognized a provision for expected credit loss for cash and cash equivalents due to the insignificance of the amount.

NOTE 5. EQUITY

The changes in equity are as follows:

						Legal reserves		
(€ thousand)	Common shares	Capital in excess of par value	Treasury shares	Accumulated net earnings	Net earnings current year	Translation reserve	Other legal reserves	Total equity
Balance as of January 1, 2021	**1,992**	**34,502**	**(104,962)**	**702,701**	**285,396**	**26,185**	**908,910**	**1,854,724**
Appropriation of net earnings:	—	—	—	285,396	(285,396)	—	—	**—**
Components of comprehensive income								
Net earnings	—	—	—	—	494,709	—	—	**494,709**
Other comprehensive income	—	—	—	—	—	103,287	—	**103,287**
Total comprehensive income (loss)	—	—	—	—	494,709	103,287	—	**597,996**
Dividend paid to common shareholders	—	—	—	(96,893)	—	—	—	**(96,893)**
Compensation expense share-based payments	—	17,242	—	—	—	—	—	**17,242**
Exercise stock options out of treasury shares	—	(7,344)	11,974	—	—	—	—	**4,630**
Vesting restricted shares out of treasury shares	—	(19,119)	19,119	—	—	—	—	**—**
Purchase of common shares	—	—	(139,150)	—	—	—	—	**(139,150)**
Cancellation of common shares out of treasury shares	(20)	—	57,622	(57,602)	—	—	—	**—**
Change in retained earnings subsidiaries	—	—	—	(61,998)	—	—	61,998	**—**
Fair value accounting investments	—	—	—	(17,728)	—	—	17,728	**—**
Capitalized development expenses subsidiaries	—	—	—	(63,336)	—	—	63,336	**—**
Other movements in investments in associates:								
Dilution	—	—	—	3,205	—	—	—	**3,205**
Balance as of December 31, 2021	**1,972**	**25,281**	**(155,397)**	**693,745**	**494,709**	**129,472**	**1,051,972**	**2,241,754**
Appropriation of net earnings	—	—	—	494,709	(494,709)	—	—	**—**
Components of comprehensive income:								
Net earnings	—	—	—	—	389,113	—	—	**389,113**
Other comprehensive income	—	—	—	—	—	61,845	3,565	**65,410**
Total comprehensive income (loss)	**—**	**—**	**—**	**—**	**389,113**	**61,845**	**3,565**	**454,523**
Dividend paid to common shareholders	—	—	—	(121,650)	—	—	—	**(121,650)**
Issue of common shares related to business combinations	2	11,730	—	—	—	—	—	**11,732**
Treasury shares transferred related to business combinations	—	8,046	124,977	—	—	—	—	**133,023**
Compensation expense share-based payments	—	29,877	—	—	—	—	—	**29,877**
Exercise stock options out of treasury shares	—	—	—	—	—	—	—	**—**
Vesting restricted shares out of treasury shares	—	(26,974)	26,974	—	—	—	—	**—**
Purchase of common shares	—	—	—	—	—	—	—	**—**
Cancellation of common shares out of treasury shares	—	—	—	—	—	—	—	**—**
Change in retained earnings subsidiaries	—	—	—	(57,520)	—	—	57,520	**—**
Fair value accounting investments	—	—	—	(12,152)	—	—	12,152	**—**
Capitalized development expenses subsidiaries	—	—	—	(72,754)	—	—	72,754	**—**
Other movements in investments in associates:								
Dilution	—	—	—	60	—	—	—	**60**
Balance as of December 31, 2022	**1,974**	**47,960**	**(3,446)**	**924,438**	**389,113**	**191,317**	**1,197,963**	**2,749,319**

COMMON SHARES, PREFERRED AND FINANCING PREFERRED SHARES

Following the amendment of the articles of association on August 3, 2018, the authorized capital of the company amounts to 82,500,000 common shares of €0.04 par value, 88,500 preferred shares of €40 par value, and 6,000 financing preferred shares of €40 par value.

The AGM of May 17, 2021, approved the cancellation of 500,000 treasury shares. This became effective as per July 21, 2021.

As per December 31, 2022, 49,348,548 common shares with a nominal value of €0.04 each were issued and fully paid up, of which 22,229 common shares are held by us in treasury. All shares have one vote per €0.04 par value. Treasury shares held by the company cannot be voted on. Of our 49,326,319 outstanding common shares at December 31, 2022, 47,752,219 are registered with our transfer agent in the Netherlands, ABN AMRO Bank N.V., and 1,574,100 are registered with our transfer agent in the United States, Citibank, NA, New York.

As at December 31, 2022, no preferred shares and no financing preferred shares are issued.

TREASURY SHARES

With respect to treasury shares, reference is made to Note 12 to the consolidated financial statements.

OTHER LEGAL RESERVES

The other legal reserve for participating interests regarding retained earnings and OCI, which amounts to €857,533 (2021: €784,296), pertains to participating interests that are accounted for according to the equity accounting method. The reserve represents the difference between the participating interest retained earnings and direct changes in equity, as determined on the basis of the company's accounting policies, and the share thereof that the company may distribute. As to the latter share, this takes into account any profits that may not be distributed by participating interests that are Dutch limited companies based on the distribution tests to be performed by the management of those companies. The legal reserve is determined on an individual basis.

In accordance with applicable legal provisions, a legal reserve for the carrying amount of €340,430 (2021: €267,676) has been recognized for capitalized development costs.

Changes in other legal reserves in 2021 and 2022 were as follows:

	Reserve for participating interests, regarding retained earnings and OCI	Reserve for participating interests, regarding capitalized development expenses	Total other legal reserves
Balance as of January 1, 2021	**704,570**	**204,340**	**908,910**
Retained earnings subsidiaries and investments	61,998	—	61,998
Fair value accounting investments	17,728	—	17,728
Development expenditures	—	63,336	63,336
Balance as of December 31, 2021	**784,296**	**267,676**	**1,051,972**
Other comprehensive income	3,565	—	3,565
Retained earnings subsidiaries and investments	57,520	—	57,520
Fair value accounting investments	12,152	—	12,152
Development expenditures	—	72,754	72,754
Balance as of December 31, 2022	**857,533**	**340,430**	**1,197,963**

For more detailed information, reference is made to Note 12 to the consolidated financial statements.

EMPLOYEE STOCK PLAN, OPTION PLAN AND EMPLOYEE RESTRICTED SHARES PLAN

The company has adopted various stock option plans and restricted share plans, and has entered into related agreements with various employees. For detailed information, reference is made to Note 13 to the consolidated financial statements.

APPROPRIATION OF RESULT

Appropriation of net earnings of 2021

The financial statements for the reporting year 2021 have been adopted by the General Meeting on May 2022. The General Meeting has adopted the appropriation of net earnings for the reporting year 2021 as proposed by the Board of Management.

Proposal for net earnings appropriation 2022

It is proposed that net earnings for the year 2022 are carried to the accumulated net earnings.

NOTE 6. AMOUNTS DUE FROM / TO SUBSIDIARIES

The amounts due from, and to subsidiaries, are mainly related to the cash pool and in-house bank operated by the company. The amounts due to subsidiaries increased as a result of cash generated by higher activities.

NOTE 7. EXPENSES BY NATURE

Expenses by nature were as follows:

	Year ended December 31,	
	2021	2022
Personnel expenses	12,588	15,787
Depreciation and amortization	413	259
Other personnel-related expenses	2,994	4,366
Professional fees	10,039	17,464
Other	4,625	6,560
Total operating expenses	**30,659**	**44,436**

NOTE 8. PERSONNEL EXPENSES

The average number of employees of ASM during 2022 was 37 (2021: 29). All employees have corporate and support functions and were based in the Netherlands.

	Year ended December 31,	
	2021	2022
Salaries	9,097	10,981
Social security charges	346	443
Pension expenses	786	972
Share-based payment expenses	2,359	3,391
Total	**12,588**	**15,787**

Further information concerning the number of employees can be found in Note 23 to the consolidated financial statements.

For information on the parent company's defined benefit pension plan, the remuneration of the Management Board and the Supervisory Board, and the parent company's share-based compensation plans, see Notes 13 and 25 to the consolidated financial statements.

NOTE 9. COMMITMENTS AND CONTINGENCIES

With respect to certain Dutch subsidiaries, ASM has assumed joint and several liability in accordance with Article 403, Part 9 of Book 2 of the Dutch Civil Code. These Dutch subsidiaries are disclosed in Note 28 of the consolidated financial statements.

ASM forms a fiscal unity (tax group for corporate income tax purposes) together with its Dutch subsidiaries for purposes of Dutch tax laws and is as such jointly and severally liable for the tax debts of the unity. The tax unity consists of ASM International N.V. and the following subsidiaries:

- ASM Europe BV;
- ASM IP Holding BV;
- ASM Pacific Holding BV;
- ASM Netherlands Holding BV;
- ASM United Kingdom Sales BV; and
- ASM Germany Sales BV.

For VAT purposes in the Netherlands, ASM forms a fiscal unity together with ASM Europe BV and ASM IP Holding BV.

NOTE 10. SHARE OWNERSHIP OF THE MANAGEMENT BOARD AND SUPERVISORY BOARD

With respect to share ownership of the Management Board and Supervisory Board, reference is made to Note 26 to the consolidated financial statements.

NOTE 11. AUDITOR'S FEES AND SERVICES

For information regarding auditor's fees and services we refer to Note 27 to the consolidated financial statements.

NOTE 12. SUBSEQUENT EVENTS

Subsequent events were evaluated up to March 2, 2023, which is the issuance date of this Annual Report 2022. There are no subsequent events to report.

SIGNING

Almere, the Netherlands
March 2, 2023

SUPERVISORY BOARD

Pauline van der Meer Mohr, Chair
Stefanie Kahle-Galonske
Didier Lamouche
Marc de Jong
Adalio Sanchez
Monica de Virgiliis

MANAGEMENT BOARD

Benjamin Loh
Paul Verhagen
Hichem M'Saad

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19. INDEPENDENT AUDITOR'S REPORT

To: the General Meeting of Shareholders and the Supervisory Board of ASM International N.V.

Report on the audit of the financial statements 2022 included in the annual report

Our opinion

In our opinion:

- the accompanying consolidated financial statements give a true and fair view of the financial position of ASM International N.V. as at December 31, 2022 and of its result and its cash flows for the year then ended, in accordance with International Financial Reporting Standards as adopted by the European Union (EU-IFRS) and with Part 9 of Book 2 of the Dutch Civil Code.
- the accompanying company financial statements give a true and fair view of the financial position of ASM International N.V. as at December 31, 2022 and of its result for the year then ended in accordance with Part 9 of Book 2 of the Dutch Civil Code.

What we have audited

We have audited the financial statements 2022 of ASM International N.V. (the Company) based in Almere. The financial statements include the consolidated financial statements and the company financial statements.

The consolidated financial statements comprise:

1. the consolidated statement of financial position as at December 31, 2022;
2. the following consolidated statements for 2022: the statement of profit or loss, the statements of comprehensive income, changes in equity and cash flows; and
3. the notes comprising a summary of the significant accounting policies and other explanatory information.

The company financial statements comprise:

1. the company balance sheet as at December 31, 2022;
2. the company statement of profit or loss for 2022; and
3. the notes comprising a summary of the accounting policies and other explanatory information.

Basis for our opinion

We conducted our audit in accordance with Dutch law, including the Dutch Standards on Auditing. Our responsibilities under those standards are further described in the 'Our responsibilities for the audit of the financial statements' section of our report.

We are independent of ASM International 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 designed our audit procedures in the context of our audit of the financial statements as a whole and in forming our opinion thereon. The information in respect of going concern, fraud and non-compliance with laws and regulations, climate and the key audit matters was addressed in this context, and we do not provide a separate opinion or conclusion on these matters.

We believe the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Information in support of our opinion

Summary

Materiality

- Materiality of EUR 35 million
- 4.9% of normalized result before income taxes

Group audit

- Audit coverage of 93% of total assets
- Audit coverage of 89% of revenue

Fraud/Noclar, Going concern and Climate-related risks

- Fraud & Non-compliance with laws and regulations (Noclar) related risks: presumed risks of management override of controls and revenue recognition identified
- Going concern related risks: no going concern risks identified
- Climate-related risks: We have considered the impact of climate-related risks on the financial statements and described our approach and observations in the section 'Audit response to climate-related risks'.

Key audit matters

- Revenue recognition
- Accounting for capitalized development costs
- Accounting for acquisition of LPE S.p.A. (purchase price allocation)

Opinion

Unqualified

Materiality

Based on our professional judgement we determined the materiality for the financial statements as a whole at EUR 35 million (2021: EUR 25 million). The materiality is determined with reference to result before income taxes, normalized for impairment of investments in associates, resulting in a percentage of 4.9%. We consider this normalized result before income taxes as the most appropriate benchmark because the company is a profit oriented company and the key users of the financial statements are primarily focused on result before income taxes. We have also taken into account misstatements and/or possible misstatements that in our opinion are material for the users of the financial statements for qualitative reasons.

We agreed with the Supervisory Board that misstatements identified during our audit in excess of EUR 1.75 million would be reported to them, as well as smaller misstatements that in our view must be reported on qualitative grounds.

Scope of the group audit

ASM International N.V. is at the head of a group of components. The financial information of this group is included in the financial statements of ASM International N.V.

Our group audit mainly focused on significant components where account balances are of significant size, have significant risks of material misstatement to the group associated with them or are considered significant for other reasons.

We have:

- selected components for which an audit of the complete reporting package is performed and components for which an audit of specific items is performed. Furthermore, we have determined the nature and extent of the audit procedures that we perform at the group level and at the company's Shared Service Center ("SSC");
- performed procedures that cover the significant operations in Singapore, the United States of America, Japan, Korea and the Netherlands, all mainly through our audit procedures at the SSC, supplemented with local audits by KPMG member firms of specific items. In addition, we have made use of the work of the non-KPMG member firm auditor of ASMPT Ltd. ("ASMPT") as part of our procedures that cover the (results from) investments in associates. The remaining balances are covered by additional procedures at group level;
- sent detailed instructions to the component auditor of ASMPT, including the significant areas that should be covered (which included the relevant risks of material misstatement detailed below) and set out the information required to be reported to the group auditor. In addition we have performed a file review of the component auditor and held various telephone calls to discuss the group audit, significant risks, audit approach and instructions, as well as the audit findings and observations reported to us as the group auditor.

For the residual population not in scope we performed analytical procedures in order to corroborate that our scoping remained appropriate throughout the audit.

By performing the procedures mentioned above at group components, together with additional procedures at group level, we have been able to obtain sufficient and appropriate audit evidence about the group's financial information to provide an opinion about the financial statements.

The audit coverage as stated in the section summary can be further specified as follows:

Total assets

71%	22%	7%
Audit of the complete reporting package	Audit of specific items	Covered by analytical procedures at group level

Revenue

89%	0%	11%
Audit of the complete reporting package	Audit of specific items	Covered by analytical procedures at group level

Audit response to the risk of fraud and non-compliance with laws and regulations

In the risk management chapter of the annual report, the Management Board describes its procedures in respect of the risk of fraud and non-compliance with laws and regulations. As part of our audit, we have gained insights into the Company and its business environment, and assessed the design and implementation of the Company's risk management in relation to fraud and non-compliance with laws and regulations. Our procedures included, among other things, assessing the Company's code of conduct, whistleblowing procedures, incidents register and its procedures to investigate indications of possible fraud and non-compliance. Furthermore, we performed relevant inquiries with management, those charged with governance and other relevant functions, such as Internal Audit and Legal Counsel. As part of our audit procedures, we:

- obtained an understanding of how the company uses information technology (IT) and the impact of IT on the financial statements, including the potential for cybersecurity incidents to have a material impact on the financial statements;
- evaluated the Ethics committee reports on indications of possible fraud and non-compliance;
- evaluated correspondence with supervisory authorities and regulators as well as legal confirmation letters.

In addition, we performed procedures to obtain an understanding of the legal and regulatory frameworks that are applicable to the Company and identified the following areas as those most likely could have a material effect on the financial statements:

- Trade sanctions and export controls laws and regulations (reflecting the company's exposure to international trading restrictions); and
- Anti-bribery and corruption laws and regulations (reflecting the company's significant and geographically diverse operations).

We, together with our forensics specialists, evaluated the fraud and non-compliance risk factors to consider whether those factors indicate a risk of material misstatement in the financial statements.

Based on the above and on the auditing standards, we identified the following fraud risks that are relevant to our audit, including the relevant presumed risks laid down in the auditing standards, and responded as follows:

- ***Management override of controls (a presumed risk)***

  Risk:
  - Management is in a unique position to manipulate accounting records and prepare fraudulent financial statements by overriding controls that otherwise appear to be operating effectively.

  Responses:
  - We evaluated the design and the implementation of internal controls that mitigate fraud risks, such as processes related to journal entries.
  - We performed a data analysis of high-risk journal entries and evaluated journal entries debiting revenue with an unexpected associated credit, and evaluated key estimates and judgments for bias by the Company's management. Where we identified instances of unexpected journal entries or other risks through our data analytics, we performed additional audit procedures to address each identified risk, including testing of transactions back to source information.
  - We incorporated elements of unpredictability in our audit, by among others, 1) modifying the timing and extent of audit procedures on sales cut-off 2) modifying the extent of inventory count procedures.
- ***Revenue recognition (a presumed risk)***

  Risk:
  - We identified a cut-off fraud risk in relation to completeness of equipment sales as a result of recognition in the incorrect period. This risk inherently includes the fraud risk that management deliberately understates revenue, as management may feel pressure to achieve planned results for the next year.

  Responses:
  - We refer to key audit matter 'Revenue recognition'.

Other than the above matter, our evaluation of procedures performed related to fraud did not result in an additional key audit matter.

We communicated our risk assessment, audit responses and results to management and the Audit Committee of the Supervisory Board.

Our audit procedures did not reveal indications and/or reasonable suspicion of fraud and non-compliance that are considered material for our audit.

Audit response to going concern — no significant going concern risks identified

The management board has performed its going concern assessment and has not identified any going concern risks. To assess the management board's assessment, we have performed, inter alia, the following procedures:

- we considered whether the management board's assessment of the going concern risks includes all relevant information of which we are aware as a result of our audit;
- we considered whether the developments in energy prices indicate a going concern risk; and
- we analyzed the company's financial position as at year-end and compared it to the previous financial year in terms of indicators that could identify going concern risks.

The outcome of our risk assessment procedures did not give reason to perform additional audit procedures on management's going concern assessment.

Audit response to climate-related risks

Audit response to climate-related risks

The Company has set out its commitments relating to climate change in the chapter "Planet" of the annual report. The Company's key ambition is to achieve Net Zero emissions in its operations and its value chain (Scope 1, 2 and 3) by 2035.

Management, supported by its external advisor, has performed thorough scenario analyses, based on the recommendations of the Task Force on Climate-Related Financial Disclosure (TCFD), against the background of the Company's business and operations, how climate-related risks and opportunities and the Company's own ambitions could have a significant impact on its business or could impose the need to adapt its strategy and operations. These analyses include both physical and transition risks. Management considers these scenarios to represent stress scenarios that provide a reasonable range of potential impacts applicable to the Company. Management's analysis resulted in their conclusion that there is no material financial impact on the Company's financial performance in the near to mid-term horizon, and therefore management did also not identify such risk in the preparation of the 2022 financial statements.

As part of our audit we performed a risk assessment of the impact of climate-related risks and the commitments of the Company in respect of climate change on the financial statements and our audit approach. In doing this we performed the following:

- To understand management's processes and procedures with regards to climate-related risks, including management's risk assessment we:
  1) performed inquiries with relevant functions in the Company including the Management Board, the Corporate VP of Sustainability, the Company's legal counsel and the Audit Committee of the Supervisory Board;
  2) inspected relevant supporting documentation, such as management's climate-related risk analysis, the climate-scenario analysis and the corresponding financial impact assessment.
- We evaluated climate-related fraud risk factors and identified the following fraud risk factor "Management's remuneration is linked to ESG and/or sustainability performance". We have assessed whether this results in a risk of material misstatement of the financial statements due to fraud.
- We have made use of KPMG climate-related risk experts to:
  1) obtain an understanding of managements' processes and procedures with regards to climate-related risks;
  2) inspect the Company's climate-related risk scenario analysis (including climate change strategy), and
  3) obtain insights into potential business implications of the identified climate-related risks and opportunities on the Company. These insights provided us with a better understanding how climate-related risks and opportunities may affect the Company and the preparation of the 2022 financial statements.

Based on these risk assessment procedures performed we considered whether there is a risk of material misstatement specific to climate relative to the valuation of non-current assets. Based on the procedures performed we found climate-related risks have no material impact on the current financial statements under the requirements of IFRS and no material impact on our key audit matters.

Furthermore we have read the 'Other information' with respect to climate-related risks as included in the annual report and considered the material consistency with the financial statements, our knowledge obtained through the audit, in particular as described above and our knowledge obtained otherwise.

Our key audit matters

Key audit matters are those matters that, in our professional judgement, were of most significance in our audit of the financial statements. We have communicated the key audit matters to the Supervisory Board. The key audit matters are not a comprehensive reflection of all matters discussed.

Revenue recognition

Description

As disclosed in the notes to the consolidated financial statements, equipment sales are measured taking into account multiple element arrangements as contracts with customers typically include separately identifiable performance obligations that are recognized based on their relative selling price. Typically, this includes a single sales transaction that combines the delivery of goods and rendering of (installation) services. Furthermore, equipment sales is recognized when the customer obtains control of the products and services, often coinciding with shipment or delivery of goods.
We identified a cut-off risk that equipment sales could be misstated as a result of recognition in the incorrect period. This risk inherently includes the fraud risk that management deliberately understates revenue, as management may feel pressure to achieve planned results for the next year (risk of fraud).
We consider revenue recognition a key audit matter, due to the thereto related risk of management override of controls, as well as the fraud risk concerning the completeness of equipment sales in the cut-off period of the financial year.

Our response

Our audit procedures to address this key audit matter included, among others:

- assessing the appropriateness of the company's accounting policies relating to revenue recognition and assessing compliance with IFRS 15;
- evaluating the design and implementation of the company's internal control in the sales process that would identify a misstatement as a result of revenue recognition in the incorrect accounting period;
- assessing the completeness of sales by selecting samples during the cut-off period, with specific focus on the equipment sales recorded from January 1, 2023 through January 14, 2023, to agree the timing of revenue recognition to underlying supporting documents such as shipping documents;
- assessing the completeness of sales by selecting samples from the shipments carried out prior to December 31, 2022 for which management concluded it was not able to record revenue due to shipments being incomplete, by vouching to underlying supporting documents such as shipping documents and assessments on the nature of missing parts.;
- inquiring with management and those who have responsibilities for initiating, preparing or authorizing journal entries at period end whether there was inappropriate or unusual activity relating

to the processing of journal entries and other adjustments during the period, identifying high-risk journal entries (such as journal entries debiting revenue with an unexpected associated credit) from the population of journal entries from the ERP system with the involvement of our IT auditors and verifying the appropriateness of the identified high risk journal entries through verification with supporting documentation; and
- assessing the adequacy of the revenue disclosures included in note 21 of the financial statements.

Our observation

The results of our procedures related to the revenue recognition of equipment sales are satisfactory. We consider the disclosure in note 21 of the financial statements as adequate.

Accounting for capitalized development costs

Description

Capitalized development costs are deemed to be significant to our audit, given the significance of the capitalized balance of EUR 340 million including additions of EUR 103 million in 2022, as well as the specific criteria that have to be met for capitalization. This involves management judgment on capitalized development costs not in use including the additions for the year, with respect to technical feasibility, intention and ability to complete the intangible asset, the ability to use or sell the asset, the generation of future economic benefits and the ability to measure the costs reliably.

Our response

Our audit procedures to address this key audit matter included, among others:

- assessing the appropriateness of the company's accounting policies relating to internal and external cost capitalization and assess compliance with IFRS;
- evaluating the design and implementation of the company's internal control in the R&D process that would identify a misstatement as an incorrect capitalization of development expense;
- challenging the key assumptions used, or judgments made, in capitalizing development costs, such as the technical feasibility, intention and ability to complete the intangible asset, the ability to use or sell the asset and generation of future economic benefits, the accuracy of costs included and the useful economic life attributed to the asset based on development plans, pre-orders and customer communications; and
- assessing the adequacy of the Other intangible assets disclosures included in note 6 of the financial statements.

Our observation

The results of our procedures related to the accounting for capitalized development costs are satisfactory. We consider the disclosure in note 6 of the financial statements as adequate.

Accounting for acquisition of LPE S.p.A. (purchase price allocation)

Description

On October 3, 2022, the Company acquired 100% of the issued share capital of LPE S.p.A., a manufacturer of epitaxial reactors for silicon carbide (SiC) and silicon (Si), based in Italy. The transaction was financed through a combination of cash (EUR 324 million) and shares (EUR 145 million). In addition to the base consideration, the maximum earn-out (EUR 100 million) is expected to be paid in 2025, the present value of which is recognized as contingent consideration (EUR 79 million). The Company has applied purchase price allocation accounting in accordance with IFRS 3 Business Combinations and has involved an external advisor in the identification and valuation of assets acquired and liabilities assumed as part of the transaction. This includes amongst others the recognition and valuation of technology (EUR 189 million) and customer relationships (EUR 68 million) intangible assets. A significant portion of the purchase price was allocated to goodwill (EUR 288 million).

The valuation models prepared by management include significant assumptions regarding the expected future cash flows of the acquired business. Changes in the assumptions used in the valuation models could have a significant impact on the value of goodwill and intangible assets recognized as a result of the acquisition. Additionally, the underlying calculations and valuation methods are inherently more complex which increases the risk of misstatement as a result of the application of the underlying valuation models, assumptions and data.

Our response

Our audit procedures to address this key audit matter included, among others:

- evaluating the design and implementation of the Company's internal control in the IFRS 3 business combination process that would identify a misstatement as a result of the purchase price allocation;
- inspecting the relevant share purchase agreement to understand the terms and structure of the transaction;
- inspecting management's accounting position paper and reconciling the assumptions and conclusions reached to the relevant supporting documentation;
- inspecting management's valuation report, and inquiring management and the external valuation specialist to understand the models, assumptions and data used in the valuation report;

- involving our own valuation specialists to assist in evaluating the appropriateness of the valuation models used and assumptions applied such as forecasted revenue growth rates and discount rate assumptions, including comparing these inputs to externally derived data as well as our own assessment based on our knowledge of the Company and the industry;
- performing our own sensitivity analysis to assess management's assumptions, which includes assessing the effect of reasonably possible increases or decreases in the key assumptions and the impact of changes to the purchase price allocation outcomes; and
- evaluating the adequacy of the disclosures in the financial statements in accordance with IFRS 3 Business Combinations.

Our observation

The results of our procedures related to the accounting for the acquisition of LPE S.p.A. (purchase price allocation) are satisfactory. We consider the disclosure in note 1 of the financial statements as adequate.

Report on the other information included in the annual report

In addition to the financial statements and our auditor's report thereon, the annual report contains other information.

Based on the following procedures performed, we conclude that the other information:

- is consistent with the financial statements and does not contain material misstatements; and
- contains the information as required by Part 9 of Book 2 of the Dutch Civil Code for the management report and other information.

We have read the other information. Based on our knowledge and understanding obtained through our audit of the financial statements or otherwise, we have considered whether the other information contains material misstatements.

By performing these procedures, we comply with the requirements of Part 9 of Book 2 of the Dutch Civil Code and the Dutch Standard 720. The scope of the procedures performed is less than the scope of those performed in our audit of the financial statements.

The Management Board of the Company is responsible for the preparation of the other information, including the information as required by Part 9 of Book 2 of the Dutch Civil Code.

Report on other legal and regulatory requirements and ESEF

Engagement

We were engaged by the Annual General Meeting of Shareholders as auditor of ASM International N.V. on May 21, 2014, as of the audit for the year 2015 and have operated as statutory auditor ever since that financial year.

No prohibited non-audit services

We have not provided prohibited non-audit services as referred to in Article 5(1) of the EU Regulation on specific requirements regarding statutory audits of public-interest entities.

European Single Electronic Format (ESEF)

ASM International N.V. has prepared its annual report in ESEF. The requirements for this are set out in the Delegated Regulation (EU) 2019/815 with regard to regulatory technical standards on the specification of a single electronic reporting format (hereinafter: the RTS on ESEF).
In our opinion the annual report prepared in XHTML format, including the (partly) marked-up consolidated financial statements as included in the reporting package by ASM International N.V., complies in all material respects with the RTS on ESEF.

The Management Board is responsible for preparing the annual report including the financial statements in accordance with the RTS on ESEF, whereby The Management Board combines the various components into one single reporting package.

Our responsibility is to obtain reasonable assurance for our opinion whether the annual report in this reporting package complies with the RTS on ESEF. We performed our examination in accordance with Dutch law, including Dutch Standard 3950N 'Assurance-opdrachten inzake het voldoen aan de criteria voor het opstellen van een digitaal verantwoordingsdocument' (assurance engagements relating to compliance with criteria for digital reporting). Our examination included among others:

- Obtaining an understanding of the entity's financial reporting process, including the preparation of the reporting package;
- Identifying and assessing the risks that the annual report does not comply in all material respects with the RTS on ESEF and designing and performing further assurance procedures responsive to those risks to provide a basis for our opinion, including:
- Obtaining the reporting package and performing validations to determine whether the reporting package containing the Inline XBRL instance document and the XBRL extension taxonomy files have been prepared in accordance with the technical specifications as included in the RTS on ESEF;
- Examining the information related to the consolidated financial statements in the reporting package to determine whether all required mark-ups have been applied and whether these are in accordance with the RTS on ESEF.

Description of responsibilities regarding the financial statements

Responsibilities of the Management Board and the Supervisory Board of the Company for the financial statements

The Management Board is responsible for the preparation and fair presentation of the financial statements in accordance with EU-IFRS and Part 9 of Book 2 of the Dutch Civil Code. Furthermore, the Management Board is responsible for such internal control as management determines is necessary to enable the preparation of the financial statements that are free from material misstatement, whether due to fraud or error. In that respect the Management Board, under supervision of the Supervisory Board, is responsible for the prevention and detection of fraud and non-compliance with laws and regulations, including determining measures to resolve the consequences of it and to prevent recurrence.

As part of the preparation of the financial statements, the Management Board is responsible for assessing the Company's ability to continue as a going concern. Based on the financial reporting frameworks mentioned, the Management Board should prepare the financial statements using the going concern basis of accounting unless the Management Board either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

The Management Board should disclose events and circumstances that may cast significant doubt on the company's ability to continue as a going concern in the financial statements.

The Supervisory Board of the Company is responsible for overseeing the Company's financial reporting process.

Our responsibilities for the audit of the financial statements

Our objective is to plan and perform the audit engagement in a manner that allows us to obtain sufficient and appropriate audit evidence for our opinion.

Our audit has been performed with a high, but not absolute, level of assurance, which means we may not detect all material errors and fraud during our audit.

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements. The materiality affects the nature, timing and extent of our audit procedures and the evaluation of the effect of identified misstatements on our opinion.

A further description of our responsibilities for the audit of the financial statements is located at the website of de 'Koninklijke Nederlandse Beroepsorganisatie van Accountants' (NBA, Royal Netherlands Institute of Chartered Accountants) at http://www.nba.nl/ENG_oob_01. This description forms part of our auditor's report.

Amstelveen, March 2, 2023

KPMG Accountants N.V.

F.A.M. Croiset van Uchelen RA

20. HISTORY

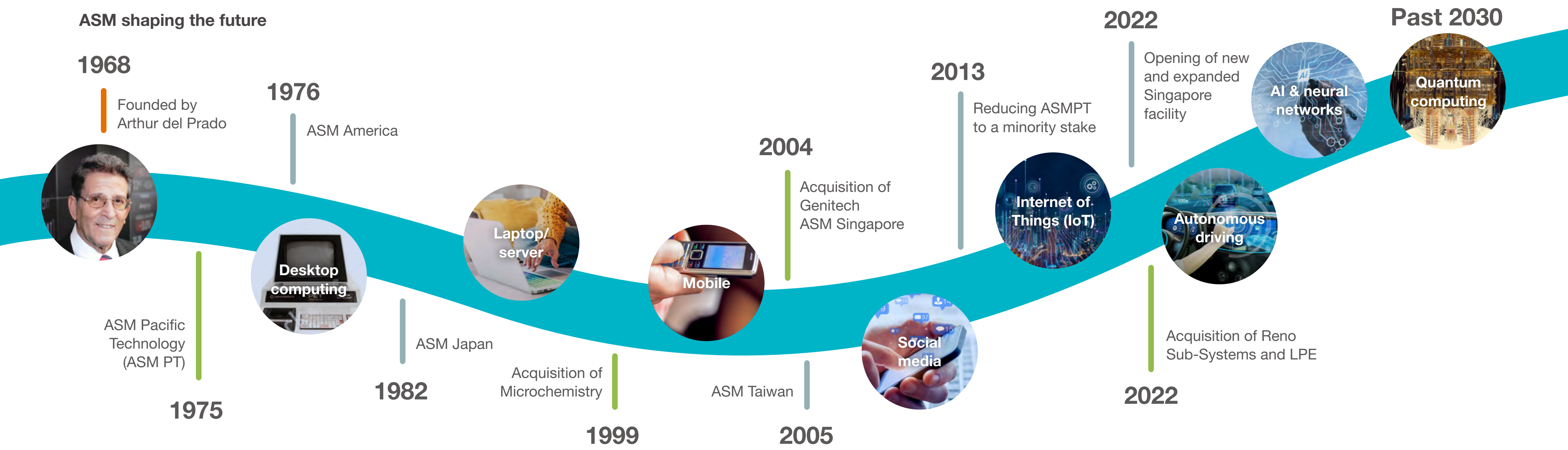
ASM was founded in the Netherlands in 1968, at the very start of the semiconductor industry. Founder Arthur del Prado (1931-2016) was our CEO until 2008. He was succeeded by his son, Chuck del Prado, who was CEO until 2020. In May 2020, Benjamin Loh, our current CEO, took over. ASM initially entered the furnace deposition market, and started producing these systems in the Netherlands in the early 1970s. As a pioneer of technology advancement and globalization, the company also began launching new companies around the world.

In the mid 1970s, ASMPT was founded in Hong Kong, becoming a market leader in back-end semiconductor assembly and packaging equipment. ASM divested its majority share in ASMPT in 2013, but maintains a minority share today. ASM America was also founded in the 1970s, laying the foundation of our current epitaxy technology. In the early 1980s, ASM Japan was started, the basis for today's plasma CVD products. This was followed by ASM's participation in a joint venture with Philips in the mid-1980s to develop lithography technology, known today as ASML. ASM sold its share in ASML in 1988.

Since the early 1990s, ASM has focused its efforts on deposition. This includes investing in the novel technique of ALD (atomic layer deposition), leading to acquisitions of ASM Microchemistry in 1999, and ASM Genitech Korea in 2004. In 2007, our Pulsar ALD tool became the first system used in the high-volume manufacturing of devices using a new hafnium-based high-k gate dielectric material. Since that breakthrough, ASM has continued to strengthen its footprint with leading edge customers. We have brought novel deposition processes to the market to realize 3D device architectures that can only be enabled by ALD. Over the past five years, we have also been growing our position in the Epi market. In 2022 we acquired LPE, located in Italy and a solid player in the relatively small but fast-growing silicon carbide epitaxy equipment market, driven by the rapidly expanding market for electric vehicles.

The combination of ASM's continuous focus on innovation with its global entrepreneurship has led to ASM's unique structure, with centers of excellence close to customers around the world, and centralized manufacturing in Singapore.

ASM shaping the future



21. NON-IFRS FINANCIAL PERFORMANCE MEASURES

Certain parts of this Annual Report contain non-IFRS financial performance measures, which are not recognized measures of financial performance or liquidity under IFRS. These are commonly referred to as non-IFRS financial measures.

ASM uses items such as working capital and free cash flow as internal measures of financial performance. ASM's definition of these measures may not be comparable with similarly titled financial performance measures and disclosures by other entities.

These measures may not be indicative of the company's historical operating results nor are such measures meant to be predictive of the company's future results.

The presentation of the non-IFRS measures and non-financial operating data in this report should not be construed as an implication that ASM's future results will be unaffected by exceptional or non-recurring items.

ASM presents non-IFRS financial measures in this Annual Report because it monitors these performance measures at a consolidated level and it believes that these measures are relevant to an understanding of the group's financial performance.

NON-IFRS FINANCIAL PERFORMANCE MEASURES

Financial performance measures	Definitions
Cash flows from operating activities after investing activities	Cash flows from operating activities after investing is also referred to as free cash flow.
Operating cash flows before changes in working capital	Cash flows from operating activities excluding the impact of movements in working capital during the period.
Working capital	The sum of accounts receivable, other current assets, inventories, provision for warranty, accounts payable, accrued expenses and other payables.

22. FIVE-YEAR FINANCIAL TABLES

CONSOLIDATED STATEMENT OF PROFIT OR LOSS

(€ thousand, except per share data)	2018	2019	2020	2021	2022
Revenue	818,081	1,283,860	1,328,122	1,729,911	**2,410,927**
Cost of sales	(483,784)	(645,396)	(704,553)	(901,780)	**(1,268,046)**
Gross profit	**334,297**	**638,464**	**623,569**	**828,131**	**1,142,881**
Other income	(1,179)	14	(621)	4,071	**40**
Operating expenses:					
Selling, general and administrative	(120,262)	(148,943)	(156,802)	(189,547)	**(276,620)**
Research and development	(88,588)	(110,846)	(139,002)	(151,197)	**(233,866)**
Total operating expenses	**(208,850)**	**(259,789)**	**(295,804)**	**(340,744)**	**(510,486)**
Result from operations	**124,268**	**378,689**	**327,144**	**491,458**	**632,435**
Finance income	1,056	1,639	141	23	**2,246**
Finance expense	(2,467)	(1,766)	(2,304)	(2,012)	**(4,098)**
Foreign currency exchange gain (loss)	1,276	(146)	(22,862)	33,473	**25,011**
Net finance income (costs)	**(135)**	**(273)**	**(25,025)**	**31,484**	**23,159**
Share in income of investments in associates	48,436	4,247	31,950	74,382	**64,771**
Impairment of investments in associates, net	—	—	—	—	**(215,389)**
Result before income taxes	**172,569**	**382,663**	**334,069**	**597,324**	**504,976**
Income taxes	(15,436)	(53,650)	(48,673)	(102,615)	**(115,863)**
Net earnings from operations, attributable to common shareholders	**157,133**	**329,013**	**285,396**	**494,709**	**389,113**
Per share data					
Basic net earnings per share (€):					
From operations	**3.00**	**6.66**	**5.84**	**10.17**	**7.97**
Diluted net earnings per share (€):					
From operations	**2.96**	**6.58**	**5.78**	**10.11**	**7.93**
Weighted average number of shares (thousand):					
Basic	52,432	49,418	48,907	48,645	**48,820**
Diluted	53,110	49,999	49,359	48,909	**49,097**

CONSOLIDATED STATEMENT OF FINANCIAL POSITION

(€ thousand)	2018	2019	2020	2021	2022
Assets					
Right-of-use assets	—	27,547	23,387	26,938	**31,663**
Property, plant and equipment	148,749	164,863	213,967	257,017	**312,053**
Evaluation tools at customers	44,634	47,247	69,474	63,717	**68,676**
Goodwill	11,270	11,270	11,270	11,270	**318,465**
Other intangible assets	149,927	189,224	209,924	274,833	**646,104**
Investments in associates	789,588	778,268	742,714	848,812	**686,341**
Other investments	—	—	—	—	**5,814**
Deferred tax assets	11,316	3,064	196	69	**181**
Other non-current assets	11,641	7,780	6,590	6,792	**7,071**
Employee benefits	224	579	1,431	1,982	**2,556**
Total non-current assets	**1,167,349**	**1,229,842**	**1,278,953**	**1,491,430**	**2,078,924**
Inventories	171,826	173,189	162,199	211,841	**538,425**
Accounts receivable	173,451	199,535	280,061	446,724	**580,823**
Income taxes receivable	4,439	1,220	553	18,614	**18,778**
Other current assets	45,000	73,479	72,945	50,972	**114,524**
Cash and cash equivalents	285,907	497,874	435,228	491,507	**419,315**
Total current assets	**680,623**	**945,297**	**950,986**	**1,219,658**	**1,671,865**
Total assets	**1,847,972**	**2,175,139**	**2,229,939**	**2,711,088**	**3,750,789**
Equity and liabilities					
Equity	**1,641,551**	**1,818,651**	**1,854,724**	**2,241,754**	**2,749,319**
Lease liabilities	—	15,774	13,045	15,886	**18,604**
Contingent consideration payable	—	—	—	—	**78,649**
Deferred tax liabilities	12,171	20,136	21,892	45,748	**123,803**
Total non-current liabilities	**12,171**	**35,910**	**34,937**	**61,634**	**221,056**
Accounts payable	80,640	119,712	124,507	175,436	**243,499**
Provision for warranty	7,955	16,424	18,987	27,181	**34,219**
Income taxes payable	6,663	34,599	67,857	14,519	**43,785**
Accrued expenses and other payables	98,992	149,843	128,927	190,564	**458,911**
Total current liabilities	**194,250**	**320,578**	**340,278**	**407,700**	**780,414**
Total liabilities	**206,421**	**356,488**	**375,215**	**469,334**	**1,001,470**
Total equity and liabilities	**1,847,972**	**2,175,139**	**2,229,939**	**2,711,088**	**3,750,789**

CONSOLIDATED STATEMENT OF CASH FLOWS

(€ thousand)	Year ended December 31, 2018	Year ended December 31, 2019	Year ended December 31, 2020	Year ended December 31, 2021	2022
Cash flows from operating activities					
Net earnings from operations	157,133	329,013	285,396	494,709	**389,113**
Adjustments to reconcile net earnings to net cash from operating activities					
Depreciation, amortization and impairments	62,991	78,321	89,029	95,580	**122,434**
Net loss (gain) on sale of property, plant and equipment	—	—	—	(4,071)	**(40)**
Share-based compensation	8,215	10,538	12,792	17,242	**29,877**
Net finance (income) costs	(886)	718	11,974	(23,510)	**3,886**
Share in income of investments in associates	(48,436)	(4,247)	(31,950)	(74,382)	**(64,771)**
Impairment of investments in associates, net	—	—	—	—	**215,389**
Income tax	15,437	53,650	48,673	102,615	**115,863**
Changes in evaluation tools at customers	(22,965)	(13,670)	(39,710)	(7,980)	**(20,516)**
Changes in employee benefits pension plans	(222)	(445)	(407)	(339)	**198**
Income tax paid	(19,459)	(6,186)	(8,055)	(151,623)	**(90,481)**
Operating cash flows before changes in working capital [1]	**151,808**	**447,692**	**367,742**	**448,241**	**700,952**
Decrease (increase) in working capital: [1]					
Accounts receivable	(9,189)	(23,937)	(93,000)	(154,030)	**(125,068)**
Other current assets	(24,053)	(27,461)	(2,006)	15,350	**(53,273)**
Inventories	(22,977)	3,058	498	(39,148)	**(276,914)**
Provision for warranty	1,209	8,385	3,814	7,140	**5,097**
Accounts payable, accrued expenses and other payables	47,839	81,134	(12,695)	103,087	**290,694**
Net cash from operating activities	**144,637**	**488,871**	**264,353**	**380,640**	**541,488**
Cash flows from investing activities					
Capital expenditures	(67,062)	(48,707)	(95,441)	(72,199)	**(101,184)**
Proceeds from sale of property, plant and equipment	3,758	28	2,348	6,159	**940**
Capitalized development expenditures	(49,688)	(60,202)	(64,126)	(81,973)	**(102,627)**
Purchase of intangible assets	(1,058)	(2,320)	(3,230)	(2,680)	**(4,662)**
Dividend received from associates	29,120	31,960	16,142	36,297	**48,919**
Acquisition of subsidiaries, net of cash acquired	—	—	—	—	**(314,295)**
Other investments	—	—	—	—	**(1,971)**
Net cash used in investing activities	**(84,930)**	**(79,241)**	**(144,307)**	**(114,396)**	**(474,880)**
Cash flows from operating activities after investing activities [1]	**59,707**	**409,630**	**120,046**	**266,244**	**66,608**
Cash flows from financing activities					
Payment of lease liabilities	(7,827)	(12,048)	(7,819)	(7,854)	**(10,289)**
Credit facility renewal fee paid	—	—	—	—	**(660)**
Purchase of treasury shares	(354,963)	(99,929)	(66,715)	(140,142)	**—**
Proceeds from issuance of treasury shares	4,817	6,767	2,774	4,630	**—**
Dividends to common shareholders	(252,418)	(100,442)	(98,688)	(96,893)	**(121,650)**
Net cash used in financing activities	**(610,391)**	**(205,652)**	**(170,448)**	**(240,259)**	**(132,599)**
Foreign currency translation effect on cash and cash equivalents	**130**	**7,989**	**(12,244)**	**30,294**	**(6,201)**
Net increase (decrease) in cash and cash equivalents	**(550,554)**	**211,967**	**(62,646)**	**56,279**	**(72,192)**
Cash and cash equivalents at beginning of year	836,461	285,907	497,874	435,228	**491,507**
Cash and cash equivalents at end of year	**285,907**	**497,874**	**435,228**	**491,507**	**419,315**

[1] Non-IFRS performance measure. Please see Glossary and definitions.

23. FIVE-YEAR NON-FINANCIAL TABLES

CATEGORIES	INDICATORS	Units or definition	2018	2019	2020	2021	2022	Reference
EMPLOYEES	Employees	Number	2,181	2,337	2,583	3,312	**4,258**	People
	Employees including temp	Number	2,327	2,444	2,689	3,462	**4,397**	
	New hires	Number	659	407	515	1,146	**1,453**	
DIVERSITY & INCLUSION	Employees	Male (% globally)	85%	85%	85%	85%	**83%**	People
		Female (% globally)	15%	15%	15%	15%	**17%**	People
	Supervisory Board	% Female/% Male	20 / 80%	20 / 80%	33 / 67%	43 / 57%	**50 / 50%**	Supervisory Board
	Management Board	% Female/% Male	0 / 100%	0 / 100%	0 / 100%	0 / 100%	**0 / 100%**	Management Board
	Gender pay ratio	Female-Male (total)	101%	100%	99%	95%	**98%**	
	CEO pay ratio		27	31	27	29	**27**	Remuneration report
	Nationalities	Number	29	29	40	47	**59**	People
	Workforce split	Asia	58%	58%	58%	63%	**62%**	
		US	26%	27%	28%	25%	**24%**	
		Europe	16%	15%	14%	12%	**14%**	
	Foreign nationals workforce split	Asia	65%	60%	59%	66%	**66%**	(SASB)
		US	25%	30%	29%	23%	**21%**	(SASB)
		Europe	10%	10%	12%	11%	**13%**	(SASB)
OTHER SEGMENTATION	Employees in R&D	Percent	25%	26%	24%	20%	**22%**	
	Employees covered by collective bargaining (only NL)	Number	149	143	142	157	**208**	Note 13 of consolidated statements
	Percent of worker under collective bargaining	Percent	9.1%	10.8%	11.7%	7.7%	**9.6%**	
	Voluntary attrition rate	Percent	9.9%	8.7%	8.3%	11.1%	**10.2%**	People
	Total attrition rate	Percent	13.9%	10.7%	10.8%	12.5%	**12.0%**	
	% performance management completion	Percent	92.6%	98.0%	98.8%	99.7%	**99.6%**	

CATEGORIES	INDICATORS	Units or definition	2018	2019	2020	2021	2022	Reference
HEALTH AND SAFETY	Injury rate	per 100 employees	0.55	0.42	0.58	0.50	**0.55**	People
	Recordable injury rate	per 100 employees	0.18	0.17	0.23	0.26	**0.30**	People
	Number of recordable injuries	Number	4	4	6	8	**12**	
		Asia	1	2	3	2	**5**	
		Europe	1	1	–	2	**2**	
		US	2	1	3	4	**5**	
	Lost time injury rate (LTIR)	per 100 employees	0.05	0.13	0.16	0.17	**0.17**	
	Fatality rate	per 100 employees	0	0	0	0	**0**	
	Efforts to assess, monitor, reduce exposures	Qualitative	*See Health & safety, People section					(SASB)
TRAINING	Ethics training (bi-annual)	All employees	99.9%	100.0%	100.0%	97.2%	**96.9%**	
	Ethics training	New hire employees	100.0%	100.0%	99.2%	97.6%	**99.0%**	
	Technical training hours of ASM employees	Hours annually	37,836	48,075	28,624	46,727	**87,134**	
ENVIRONMENTAL	Electrical consumption	MWh	35,879	43,401	44,915	54,998	**60,519**	(SASB)
	Grid electricity	Percent from grid	100%	100%	100%	100%	**100%**	(SASB)
	Renewable EACs purchased	MWh (or EAC units)	n.a.	n.a.	366	41,563	**45,745**	
	Renewable electricity	Percent from renewable sources	10.7%	9.2%	9.9%	75.6%	**75.6%**	(SASB)
	Scope 1 and 2 (market-based) GHG emissions [1]	$mtCO_2e$	19,562.0	24,031.9	24,976.9	8,347.0	**10,203.6**	
	Gross global Scope 1 GHG emissions	$mtCO_2e$	508.4	920.8	987.0	941.8	**1,683.9**	(SASB)
	Gross global Scope 2 (location-based) GHG emissions	$mtCO_2e$	19,053.6	23,111.1	23,989.9	24,666.5	**26,348.7**	
	Gross global Scope 2 (market-based) GHG emissions [1]	$mtCO_2e$	19,053.6	23,111.1	23,989.9	7,405.2	**8,531.1**	
	Scope 1 and 2 (market-based) GHG per revenue (emission intensity) [1]	$mtCO_2e$/million €	23.9	18.7	18.8	4.8	**4.2**	Planet
	Scope 1 and 2 (market-based) GHG per R&D spend (emission intensity) [1]	$mtCO_2e$/million €	156.1	159.5	145.4	40.5	**33.9**	Planet
	Water withdrawn absolute	m^3	129,243	122,505	121,434	156,123	**148,795**	Planet (SASB)
	Water withdrawn from water-stressed regions	Percent from high or extremely high water-stressed regions	72.8%	52.8%	50.4%	47.6%	**41.0%**	(SASB)
	Water intake per revenue (water intensity)	m^3/million €	158	95	91	90	**62**	
	Water intake per R&D spend (water intensity)	m^3/million €	1,031	813	707	758	**493**	Planet

CATEGORIES	INDICATORS	Units or definition	2018	2019	2020	2021	2022	Reference
ENVIRONMENTAL (CONTINUED)	Significant chemicals spills or releases to the environment	Number	0	0	0	0	**0**	Planet
	Non-hazardous solid waste recycle	metric tons	789	664	714	1,403	**1,954**	Planet
	Non-hazardous solid waste landfill	metric tons	255	166	156	335	**415**	Planet
	Non-hazardous reuse - ASM diversion	metric tons	95	114	122	158	**362**	Planet
	Landfill diversion rate (ASM operations) [2]	% solid waste recycle or reuse	78%	82%	84%	82%	**86%**	Planet (SASB)
	Landfill diversion (in scope packaging reuse across ASM value chain) [3]	metric tons (through all reuse sectors)	95	139	163	259	**542**	Planet
ETHICS COMPLIANCE	Reported confidential concerns via SpeakUp!	Number	1	5	5	4	**7**	Business ethics
	Reported concerns from other channels	Number	4	2	4	4	**1**	Business ethics
	Confirmed cases of non-conformity to our Code of Business Conduct	Number	2	3	2	1	**1**	Business ethics
RBA RISK ASSESSMENT	RBA self-assessment rating	RBA rating (corporate + all applicable facilities)	Low	Low	Low	Low	**Low**	
SUPPLY CHAIN	Total supplier spend by region [4]	Asia percent	68%	71%	71%	72%	**72%**	Global operations
		North America percent	23%	22%	22%	20%	**20%**	
		Europe percent	9%	7%	7%	8%	**8%**	
SUPPLY CHAIN (CRITICAL, STRATEGIC SUPPLIERS)	RBA Code of Conduct acknowledgement	Percentage	100%	100%	100%	99%	**100%**	Global operations
	RBA self-assessment questionnaire (SAQ) with low/medium risk	Percentage	100%	40%	77%	84%	**84%**	Global operations
MATERIAL SOURCING	Description of the management of risks associated with the use of critical materials	Qualitative	See conflict minerals discussion in the supply chain section					(SASB)
	Critical/strategic suppliers conflict minerals CMRT received	Percentage	81%	100%	100%	100%	**100%**	
INTELLECTUAL PROPERTY	Patents in force	Number	1,692	1,959	2,094	2,250	**2,619**	Innovation and products
	Intellectual property protection & competitive behavior	Monetary losses as a result of legal proceedings associated with anti-competitive behavior regulations	0	0	0	0	**0**	(SASB)

1 For 2017-2020, ASM did not procure market-based renewable electricity. For those years the data included in the table represent location-based sourcing.
2 ASM manufacturing generates negligible hazardous waste and we do not manufacture chips/wafers. Our manufacturing waste is predominantly non-hazardous solid waste, thus solid waste is our waste-management indicator.
3 In 2022 we increased the scope of our packaging reuse program to include “Other Vendors” in addition to Customer, Contract Manufacturers, and Suppliers. This row reflects the scope of data as applicable in each reporting year.
4 In 2022 we redefined total supplier spend to include indirect services and materials. Comparative numbers have been adjusted to reflect this new definition.

INDEPENDENT AUDITOR'S REPORT ON THE NON-FINANCIAL INFORMATION

To: the General Meeting of Shareholders and the Supervisory Board of ASM International N.V.

Our opinion

We have reviewed the non-financial indicators in the Annual Report 2022 (hereafter: Annual Report) of ASM International N.V. (hereafter: the Company). A review is aimed at obtaining a limited level of assurance.

Based on the procedures performed nothing has come to our attention that causes us to believe that the non-financial indicators are not prepared, in all material respects, in accordance with the reporting criteria as described in the 'Reporting criteria' section of our report.

The non-financial indicators in scope consist of the following:

- Diversity & Inclusion: Gender Diversity, Gender pay ratio, CEO pay ratio, (Voluntary) attrition rates, Employee Age Bracket Statistics, Supervisory Board Gender Diversity and Employee Engagement Scores;
- Health & Safety: Injury rate, Recordable injury rate, Number of recordable injuries, Lost time injury rate (LTIR) and Fatality rate;
- Ethics compliance: Reported Confidential Concerns via SpeakUp! and Reported Concerns from other channels;
- Training: Ethics training;
- Environmental: Renewable EACs purchased, Renewable Electricity Used, Scope 1 and 2 (market-based) GHG emissions, Gross global Scope 2 (location based) GHG emissions, Gross global Scope 2 (market-based) GHG emissions, Water Withdrawn Absolute, Significant Chemical Spills, Non-Hazardous solid waste recycle, Non-Hazardous solid waste landfill, Non-Hazardous reuse ASM Diversion, and Landfill Diversion Rate;
- Supply Chain: RBA Self-Assessment (SAQ) with Low/Medium Risk; and
- Material Sourcing: Critical/Strategic Suppliers Conflict Minerals CMRT received.

The non-financial indicators are disclosed in the 'Non-Financial Performance Data' section of the Annual Report (pages 206 to 208).

Basis for our opinion

We performed our review in accordance with Dutch law, including Dutch Standard 3000A 'Assurance-opdrachten anders dan opdrachten tot controle of beoordeling van historische financiële informatie (attest-opdrachten) (assurance engagements other than audits or reviews of historical financial information (attestation engagements)). This engagement is aimed to obtain limited assurance. Our responsibilities in this regard are further described in the 'Auditor's responsibilities' section of our report.

We are independent of ASM International 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). Furthermore, we have complied with the 'Verordening gedrags- en beroepsregels accountants' (VGBA, Dutch Code of Ethics).

We believe the assurance evidence we have obtained is sufficient and appropriate to provide a basis for our conclusion.

Reporting Criteria

The non-financial indicators need 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 non-financial indicators are the internal reporting criteria of the Company as disclosed in the following chapters of the Annual Report:

- Chapter 10 People
- Chapter 11 Planet
- Chapter 12 Responsible Supply Chain
- Chapter 13 Corporate Governance
- Chapter 26 Glossary and definitions

Materiality

Based on our professional judgment we determined materiality levels for each non-financial indicator. When evaluating our materiality levels, we have taken into account quantitative and qualitative considerations as well as the relevance of information for both stakeholders and the Company.

We agreed with the Supervisory Board that misstatements which are identified during the review and which in our view must be reported on quantitative or qualitative grounds, would be reported to them.

Scope of the group review

ASM International N.V. is the parent company of a group of entities. The non-financial indicators incorporate the consolidated information of the full group.

Our group review procedures consisted of both review procedures at corporate (consolidated) level and at site level. Our selection of sites in scope of our review procedures is primarily based on the site's individual contribution to the consolidated information.

By performing our review procedures at site level, together with additional review procedures at corporate level, we have been able to obtain sufficient and appropriate assurance evidence about the group's Non-financial indicators to provide a conclusion about the non-financial indicators.

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. References to external sources or websites in the non-financial information are not part of the non-financial information itself as reviewed by us. Therefore, we do not provide assurance on this information.

Responsibilities of the Management Board and Supervisory Board for the non-financial indicators

The Management Board is responsible for the preparation of the non-financial indicators in accordance with the applicable criteria as described in the 'Reporting criteria' section of our report. Furthermore, the Management Board is responsible for such internal control as it determines is necessary to enable the preparation of the non-financial indicators that is free from material misstatement, whether due to fraud or error.

The Supervisory Board is, among other things, responsible for overseeing the Company's reporting process.

Auditor's responsibilities

Our responsibility is to plan and perform our review in a manner that allows us to obtain sufficient and appropriate assurance evidence for our conclusion.

Procedures performed in this context consist primarily of making inquiries with employees of the entity and determine the plausibility of the information included on the non-financial indicators. Therefore, these procedures differ in nature and timing, and extent, compared to a reasonable assurance engagement.

The level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

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 judgment and have maintained professional scepticism throughout the review, in accordance with the Dutch Standard 3000A, ethical requirements and independence requirements.

Our review included among others:
- Performing an analysis of the external environment and obtaining an understanding of relevant societal themes and issues, and the characteristics of the Company;
- Evaluating the appropriateness of the reporting criteria used, their consistent application and related disclosures on the non-financial indicators. This includes the evaluation of the results of stakeholder dialogue and the reasonableness of estimates made by the Management Board;
- Obtaining an understanding of the reporting processes for the non-financial indicators, including obtaining a general understanding of internal control relevant to our review;
- Identifying areas of the non-financial indicators with a higher risk of misleading or unbalanced information or material misstatements, whether due to fraud or error. Designing and performing assurance procedures aimed at determining the plausibility of the non-financial indicators responsive to this risk analysis. These procedures included, among others:
- Interviewing management and relevant staff at corporate level responsible for the strategy, policy and results;
- Interviewing relevant staff responsible for providing the information for, carrying out internal control procedures over and consolidating the data on the non-financial indicators;
- Reviewing, on a limited test basis, relevant internal and external documentation;
- Performing an analytical review of the data and trends;
- Evaluating the consistency of the non-financial indicators with the information in the Annual Report which is not included in the scope of our review; and
- Evaluating the presentation, structure and content of the non-financial indicators.

We have communicated with the Management Board and the Supervisory Board regarding, among other matters, the planned scope and timing of the review and significant findings that we identify during our review.

Amstelveen, March 2, 2023
KPMG Accountants N.V.

F.A.M. Croiset van Uchelen RA

24. EU TAXONOMY

EU TAXONOMY EXPLANATION

The first delegated act, Climate Delegated Act (Regulation (EU) 2021/2139), of the EU taxonomy was published in 2021, aiming to provide a common language and methodology across European listed companies for reporting on sustainability.

The EU taxonomy regulation requires companies, falling under 'Non-Financial Reporting Directive' (NFRD), in accordance with European Regulation 2020/852 of June 18, 2020, and 'Besluit bekendmaking niet- financiële informatie', to report on the EU taxonomy in accordance with Disclosure Delegated Act (Regulation (EU) 2021/2178). For financial year 2021, companies were only required to report what share of their economic activities were in scope of the EU taxonomy and were, in EU taxonomy terminology, considered to be 'eligible'. For financial year 2022, companies need to report whether these eligible activities are considered to be 'green', or in EU taxonomy terminology 'aligned', following a three-step approach including technical screening criteria set by the EU taxonomy. Finally, the key performance indicators (KPIs) for eligibility and alignment are reported as the proportion of turnover, capital expenditure (CapEx) and operating expenses (OpEx) in line with the EU taxonomy delegated acts.

ASM ELIGIBILITY AND ALIGNMENT FOR CLIMATE-CHANGE MITIGATION AND ADAPTATION

ASM's technology and innovation allows its customers and, in turn, their customers down the value chain to introduce electronic devices with superior performance and lower energy consumption. ASM's innovative R&D activities, aimed at continuously improving technologies to help deliver further energy reductions, are key in this. As such, ASM has an important role as an enabler in reducing the carbon footprint of its customers and end customers.

ASM has performed continuous research since July 2021 with both internal and external stakeholders on the eligibility of their turnover, CapEx and OpEx under the EU taxonomy.
In October 2022, ASM acquired LPE S.p.A. As the activities of LPE S.p.A would only be included in the EU Taxonomy eligibility and alignment assessment for the remaining part of the year, ASM considered this impact not to be material and hence the economic activities of LPE have not been included in the 2022 EU Taxonomy assessment. A detailed assessment will be performed in 2023.

TURNOVER

The EU Taxonomy requires alignment with the financial reporting standards. For ASM, this means that the turnover under the EU Taxonomy is equal to 'Revenue' included in the Consolidated statement of profit or loss in the IFRS financial statements.

Although this is the second year for reporting, ASM underlines that the EU taxonomy is still new and evolving. Furthermore, one specific category within the EU taxonomy (manufacturing of low carbon technologies (3.6)) close to the activities of ASM, is subject to interpretation. Similar to previous year, ASM applied a strict interpretation which requires that products are directly aimed at substantial GHG-emission reductions in other sectors of the economy, not being customers down the value chain. Therefore, none of the turnover was considered eligible for this specific economic activity 3.6. ASM did not identify any other potentially relevant economic activities listed in Annex I or II to the Climate Delegated Act, therefore 0% of the total turnover is reported as eligible and aligned.

CAPITAL EXPENDITURE (CAPEX)

The total CapEx under the EU Taxonomy consists of the following IFRS financial statement line items:
- Investments in property, plant, and equipment
- Investments in intangible asset
- Additions to right-of-use asset

The other elements of the CapEx denominator in the Disclosure Delegated Act are not applicable to ASM.

Through an assessment of ASM's CapEx for 2022, it was concluded that the majority of ASM's CapEx relates to machinery and equipment (plant and machinery, demo equipment, tools, evaluation tools), which is linked to revenue-generating activities. Since ASM's revenue does not directly link to any of the economic activities under the Climate Delegated Act as explained above, the same rationale applies to this majority of CapEx and thus, is considered not eligible and aligned. Additionally, ASM looked into eligibility for other investments made during the year. ASM concluded that the investment made for buildings meets the definition of the economic activity 7.7 Acquisition and ownership of buildings in the climate-change mitigation objective. ASM considered this to be immaterial compared to the total amount of CapEx, and therefore did not further assess these investments for alignment. No other material investments in relevant economic activities were identified. As such, 1.9% of ASM's CapEx is reported as eligible but not aligned for fiscal year 2022.

OPERATIONAL EXPENDITURE (OPEX)

The OpEx denominator includes the following categories of operational expenditure for ASM:

- Building maintenance expenses
- Research and Development expenses

The R&D expenses are directly linked to ASM's turnover-generating activity, ASM followed the same approach as CapEx and therefore assessed these expenses as not eligible and aligned. A detailed assessment of the building maintenance expenses resulted in 1% of eligible OpEx this year, related to the economic activity 7.7 Acquisition and ownership of buildings in the climate change mitigation objective. ASM considered this to be immaterial compared to the total amount of OpEx and therefore did not further assess these expenses for alignment. OpEx is reported to be 1% eligible but not aligned for fiscal year 2022.

The EU Taxonomy KPI disclosure templates for turnover, CapEx and OpEx are provided at the end of this chapter.

Based on the important role that ASM's R&D plays for energy reduction, and the fact that energy reduction is always a key objective, ASM will keep monitoring the developments of the EU taxonomy closely to ensure as much eligibility and alignment as possible in the future to climate change mitigation or adaptation, as well as, to the other environmental objectives expected in the near future.

LOOKING FORWARD

ASM has been performing an assessment of its current initiatives related to the EU taxonomy environmental objectives to assess whether this supports alignment with substantial contribution criteria and Do No Significant Harm criteria, as well as minimum safeguard criteria, if in the future any of ASM's activities would be considered eligible. Initiatives currently performed in this area are the Net Zero initiative, the Climate Adaptation Risk and Opportunity Assessment (CAROA) process, the water security project, refurbishment initiatives and the human rights policies and due diligence activities. In the upcoming year, these and other initiatives will also be assessed against the EU taxonomy criteria and any gaps will be assessed and acted on to take further control over becoming aligned under the EU taxonomy.

ASM does not have any nuclear energy and fossil gas-related activities and the Complementary Delegated Act of the EU taxonomy is therefore not relevant.

Proportion of turnover from products or services associated with Taxonomy-aligned economic activities – disclosure covering year 2022 (in million):

	Absolute Turnover	Proportion of Turnover
A. Taxonomy-eligible activities	0.0	0.0%
A.1. Turnover of environmentally sustainable activities (Taxonomy-aligned)	0.0	0.0%
A.2. Turnover of Taxonomy-eligible but not environmentally sustainable activities (not Taxonomy-aligned activities)	0.0	0.0%
B. Turnover of Taxonomy-non-eligible activities	2,410.9	100.0%
Total	2,410.9	100.0%

Proportion of CapEx from products or services associated with Taxonomy-aligned economic activities – disclosure covering year 2022 (in million):

	Absolute CapEx	Proportion of CapEx
A. Taxonomy-eligible activities	1.9	1.2%
A.1. CapEx of environmentally sustainable activities (Taxonomy-aligned)	0.0	0.0%
A.2. CapEx of Taxonomy-eligible but not environmentally sustainable activities (not Taxonomy-aligned activities)	1.9	1.2%
B. CapEx of Taxonomy-non-eligible activities	156.8	98.8%
Total	158.7	100.0%

Proportion of OpEx from products or services associated with Taxonomy-aligned economic activities – disclosure covering year 2022 (in million):

	Absolute OpEx	Proportion of OpEx
A. Taxonomy-eligible activities	0.3	0.6%
A.1. OpEx of environmentally sustainable activities (Taxonomy-aligned)	0.0	0.0%
A.2. OpEx of Taxonomy-eligible but not environmentally sustainable activities (not Taxonomy-aligned activities)	0.3	0.6%
7.7 Acquisition and ownership of buildings (Annex I)	0.3	0.6%
B. OpEx of Taxonomy-non-eligible activities	49.0	99.4%
Total	49.3	100.0%

25. OTHER SUSTAINABILITY INFORMATION

25.1 INFORMING OUR SUSTAINABILITY FOCUS

Our sustainability focus areas and priorities were informed by meaningful engagement with our stakeholders through our materiality assessment and ongoing stakeholder engagement, and the UN Sustainable Development Goals.

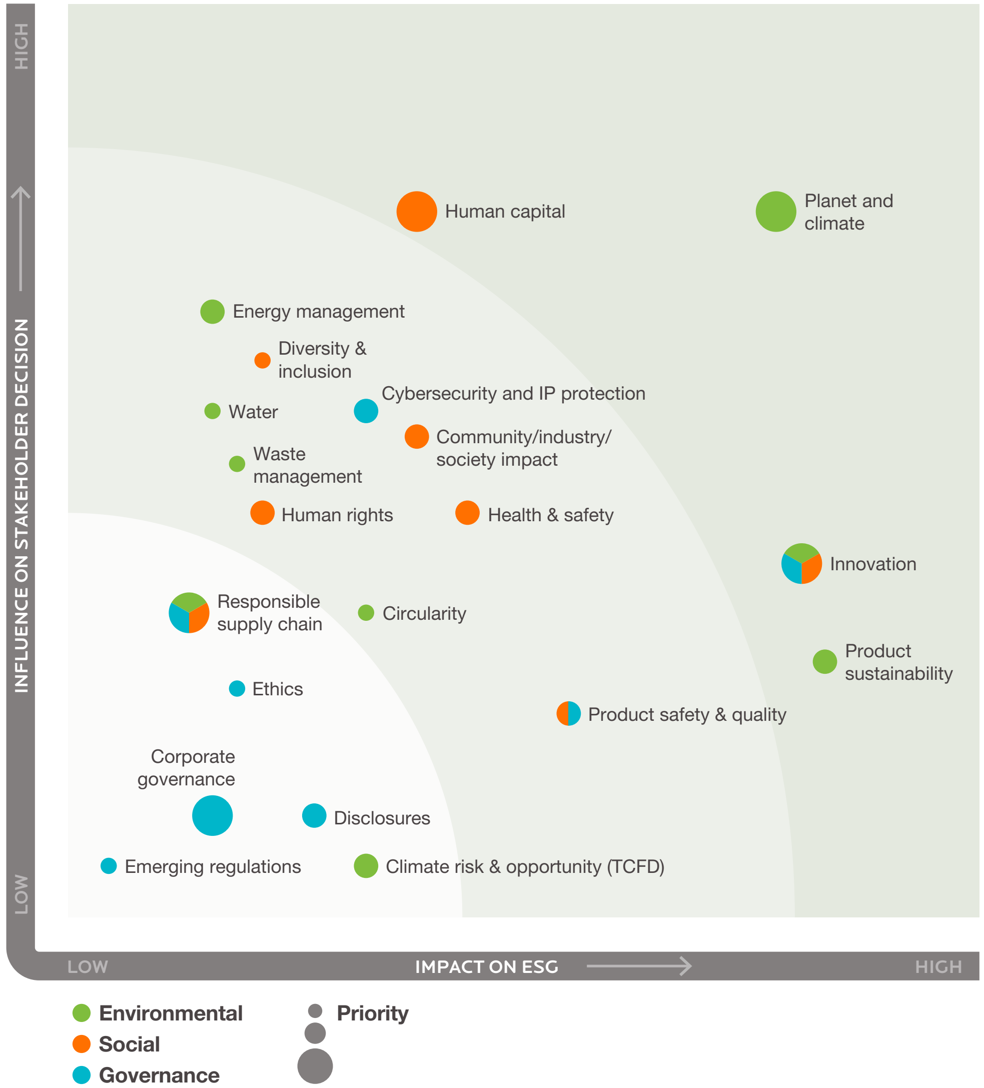
MATERIALITY ASSESSMENT

To best inform our sustainability focus areas, in 2021 we conducted a significant update of our materiality assessment, guided by an expert third party. Our process follows the sustainability materiality steps and matrix based on the Global Reporting Initiative's (GRI) G4 sustainability reporting framework.

Stakeholders engaged include: key investors, top customers, our employee 'Thought Leader' group, key suppliers, and engaged NGOs. The process included peer-group benchmarking. The collected inputs were initially reviewed and prioritized in a workshop with key employees facilitated by the expert third party. This output was then finalized with the Management Board, resulting in the materiality analysis presented here.

We intend to update our Materiality Assessment every two years. This next update will occur in the course of 2023, for disclosure in our 2023 annual report.

Materiality assessment



25.2 STAKEHOLDER ENGAGEMENT

Stakeholder	How we engage	Our applicable focus areas	Included in materiality assessment	Progress in 2022	Resulting strategy changes
Customers	• We engage directly with our customers on important issues through recurring meetings and development sessions • We have direct innovation engagement to enable customer roadmaps, addressing ESG expectations	• Innovation • People • Planet • Sustainable Supply Chain • Governance	Yes, desktop research	• Key innovation successes • Customer recognition • Further progress in IP Protection and Cybersecurity • Continued partnership in key customer sustainability leadership program • Extended Safety Leadership Collaborations with key customers and partners	• Growth Through Innovation strategy • Climate strategy • Sustainable Supply Chain priorities • Semiconductor Climate Consortium • Business Resilience
Employees	• Quarterly CEO-led all-employee meetings and open Q&A • CONNECT all-employee intranet site • Safety Culture survey • Engagement and other key topic surveys	• Innovation • People • Planet	Yes, through direct surveys with all employees and through thought leader surveys	• Two Thought Leader sessions and leadership culture development • Ability to retain and attract top talent • Accelerated progress to 2025 Gender Diversity target • Engagement participation and score improvements • Addressing Safety Culture Survey opportunities	• Multi-year Safety strategic plan • High risk area safety plans
Investors	• Direct engagement sessions • Response to their sustainability questionnaires • ESG ratings	• Innovation • People • Planet • Sustainable Supply Chain • Governance	Yes, direct engagement sessions	• Response to key investor inquiries • Solid progress in ESG ratings, indices, rankings (See Our Sustainability Approach section)	• Sustainability/ESG focus areas and priorities
Suppliers	• Executive and commodity manager engagement • Annual Supplier Day • Direct interviews	• Innovation • People • Planet • Sustainable Supply Chain • Governance	Yes, direct engagement sessions	• Full-time Sustainable Supply Chain leader • Three ASM Sustainability PRISM Supply Chain awards at annual Supplier Day	• Supplier partnerships • Business Resilience focus • Supplier Day Sustainability focus • Supplier Sustainability priority collaboration
NGOs	• NGO engagement letters • Direct engagement sessions • CDP Climate Change and Water Security disclosures	• Innovation • People • Planet • Sustainable Supply Chain • Governance	Yes, desktop research and recurring engagements	• Direct engagement sessions • Addressing key NGO priorities • CDP Climate Change and Water Security Scores	• Net Zero by 2035 target • Climate Adaptation response • Diversity and Inclusion focus and targets • Sustainable Supply chain focus area
Industry consortia	• R&D partnerships such as University of Helsinki and imec • Responsible Business Alliance (RBA) • SEMI and the SIA • Semiconductor Climate Consortium • SESHA	• Innovation • People • Planet • Sustainable Supply Chain • Governance	Yes, desktop research and active engagement in committees and working groups	• Principal role in founding Semiconductor Climate Consortium and Chair Governing Board • Signed renewed strategic R&D partnership agreement with imec, roughly doubling R&D spend over the next four years	• Further strengthened innovation network • Semiconductor Climate Consortium • Sustainability strategy Human Rights priority topic
Communities	• Employee volunteering and contributions to local communities and organizations	• People • Planet • Governance	No	• See Community section	• Sustainability strategy Community, Industry, Society priority

25.3 HOW WE ADDRESS THE UN SDGS

We are committed to supporting the UN SDGs that are relevant to our business. This summary indicates those that we have deemed relevant and how we support them.

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (UN SDGs) AND TARGET	ACTIONS BY ASM	SEE SECTION IN ANNUAL REPORT
5 GENDER EQUALITY **GENDER EQUALITY** **Achieve gender equality and empower all women and girls**		
5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life	We increased the percentage of women working at ASM from 15% in 2021 to 17% in 2022. In addition, we defined our group of directors and above, and set a 22% gender diversity target for 2027	**People**
5.6 Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women	We continued to activate our Women Initiative Network (WIN). WIN is active in Singapore, the US, Korea and Europe totalling around 120 women at ASM, pulling together to drive gender diversity in our workplace, leveraging amongst others the CONNECT platform for amplification	**People**
6 CLEAN WATER AND SANITATION **CLEAN WATER AND SANITATION** **Ensure availability and sustainable management of water and sanitation for all**		
6.3 Improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	Continued pursuit of water conservation through water auditing, and conservation projects in high water stress regions including Singapore and Phoenix	**Planet**
6.4 Substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of fresh water to address water scarcity and substantially reduce the number of people suffering from water scarcity	Updated ASM Water Policy and ASM will work toward Corporate Water Stewardship principles	
7 AFFORDABLE AND CLEAN ENERGY **AFFORDABLE AND CLEAN ENERGY** **Ensure access to affordable, reliable, sustainable and modern energy for all**		
7.2 Increase substantially the share of renewable energy in the global energy mix	Target for 100% renewable electricity procurement by 2024 with focus on high quality RECs that bring additionality to markets when available	**Planet**
7.3 Double the global rate of improvement in energy efficiency	ASM enables this through our innovation and support of customer roadmaps Exploratory phase of adding on-site generation of electricity	**Innovation**

8 DECENT WORK AND ECONOMIC GROWTH

DECENT WORK AND ECONOMIC GROWTH

Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and end child labour in all its forms	ASM engagement with supply chain on Forced Labor/Bonded Labor (FLBL) mapping and initiatives	**Responsible supply chain**
8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	ASM engagement with supply chain on Forced Labor/Bonded Labor (FLBL) mapping and initiatives	**Responsible supply chain**

9 INDUSTRY, INNOVATION AND INFRASTRUCTURE

INDUSTRY, INNOVATION, AND INFRASTRUCTURE

Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

9.4 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	ASM's continued investment in modernizing its infrastructure, particularly with recent upgrades and investment in operations and infrastructure in South Korea and Singapore	**Responsible supply chain**
9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	ASM strategic partnerships with industry leading research organizations such as: imec, University of Helsinki, the Semiconductor Research Corporation (SRC), and IBM SUNY Albany research center	**Innovation**

10 REDUCED INEQUALITIES

REDUCE INEQUALITIES

Reduce inequality within and among countries

10.2 Empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status	Renewed Business Code of Conduct, including enhanced focus on inclusion & diversity (I&D), career development opportunities of female leadership, and benchmarking living wage levels globally	**People/ Governance**
10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality	Adoption of Global Employment Standard (GES) including social protection policies. Active monitoring of gender pay ratios, living wage levels, and CEO pay ratio, and transparency of these in our Annual Reports	**People**

12 RESPONSIBLE CONSUMPTION AND PRODUCTION

RESPONSIBLE CONSUMPTION AND PRODUCTION

Ensure sustainable consumption and production patterns

12.2 Achieve the sustainable management and efficient use of natural resources	Wood crate responsible wood source and certification policy	
12.4 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	ASM waste minimization and management protocols, including objectives to eliminate all hazardous waste to landfill, and implementation of air emission control devices on process modules	**Planet**
12.5 Substantially reduce waste generation through prevention, reduction, recycling and reuse	ASM waste minimization and management protocols, including objectives to eliminate all hazardous waste to landfill, and implementation of air emission control devices on process modules	
12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	ASM Annual and Sustainability Reporting, including CDP	

13 CLIMATE ACTION

CLIMATE ACTION

Take urgent action to combat climate change and its impacts

13.2 Integrate climate change measures into national policies, strategies and planning	Target for 100% renewable electricity procurement by 2024 with focus on high quality EACs that bring additionality to markets when available	**Planet**
	Net Zero by 2035 Target, all scopes, 1.5°C, submitted to SBTi end of 2022 and pursing validation in 2023	

15 LIFE ON LAND

LIFE ON LAND

Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

15.2 Promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	ASM published its first Biodiversity Policy in this report as an important starting point, and to guide how we will begin to address this key environmental aspect and develop our roadmap	**Planet**
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and protect and prevent the extinction of threatened species		

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, the 17 United Nations Sustainable Development Goals (SDGs), are a call for action by all countries – developed and developing – in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

25.4 RESPONSIBLE MINERALS SOURCING – ADDITIONAL DETAIL

We require our suppliers to source tin, tantalum, tungsten, and gold (3TG) responsibly, and to use smelters and refiners that have been deemed ‘conflict-free’ by either sourcing in countries not affected by conflict or having successfully completed an assessment against the Responsible Minerals Assurance Process (RMAP) standard, or equivalent recognized protocol (as deemed by the Responsible Minerals Initiative). Our goal is to trace 3TG sourcing, ensure the use of certified conflict-free smelters, and confirm that our sourcing funds do not finance conflict in the covered countries.This expectation for suppliers is outlined in our Responsible Minerals policy (available on our website) and is further reinforced with our suppliers. Responsible sourcing of minerals is also part of the RBA Code of Conduct, which acts as our Supplier operating standard.

We conduct due diligence based on Organization for Economic Co-operation and Development (OECD) guidance, and detailed data verification with identified suppliers’ smelters and refineries. ASM’s suppliers are requested to submit a corporate level declaration using a Conflict Minerals Reporting Template (CMRT). This submission standard is in alignment to the current Responsible Minerals Initiative (RMI) format. ASM leverages a 3rd party vendor to survey our critical and strategic suppliers, requesting their current CMRT, and following up with suppliers who don’t respond, or have missing/inaccurate data. Our Supply Chain organization works to resolve gaps with any suppliers who are unable to respond to the 3rd party survey to ensure we get an as complete as possible picture of the most critical smelters and refineries in our supply chain. This process establishes traceability to the smelters and refineries. It also confirms that they are on the ‘conformant’ or ‘active’ smelter & refiners list published by the Responsible Minerals Initiative (RMI).

If a smelter of concern is identified, our third-party vendor determines the suppliers that are using that smelter and notifies them with a request to address the responsible sourcing concern. In most instances suppliers can address smelter related risks by urging the smelter of concern to join the RMI compliance program or by choosing to purchase the 3TG mineral(s) from a smelter that meets RMI’s smelter compliance criteria. If an ASM supplier refuses to act or is implicated directly in the procurement and/or processing of minerals that fund armed conflict, ASM would notify RMI of our concern and launch an ethics and compliance investigation to gather evidence to assess the truth of the allegation. If the allegation is found to have merit, the supplier would be expected to take immediate and effective action to address the issue or be subject to loss of business.

ASM is also independently engaged in the RMI, including efforts to extend supply chain due diligence measures to other minerals, such as cobalt and mica. The RMI brings together the electronics, automotive, and other industries to improve conditions in the extractives industry. It is through this engagement that ASM also has a voice in shaping regulatory requirements associated with responsible minerals sourcing that impact our industry.

25.5 ESG RATINGS AND INDICES

AEX ESG

The AEX ESG index by Euronext identifies the 25 companies within the AEX and AMX indices demonstrating best Environmental, Social and Governance (ESG) practices from the 50 constituents of the AEX and AMX indices. ASM was included in the inaugural index in 2022.

CDP

Companies that disclose to CDP are scored between A and F, with different scores given for each focus area, including climate and water. In 2022, we received a B score for both Climate Change and Water Security disclosures, unchanged from our 2021 rating. For more on our CDP disclosures, see the Planet section in this report.

CORPORATE KNIGHTS GLOBAL 100

The Corporate Knights Global 100 Index is a ranking of the world's 100 most sustainable corporations, comparing the world's largest publicly traded companies. ASM was named to the 2023 Global 100 for the first time and ranked 33rd.

FTSE4GOOD

The FTSE4Good Index Series uses the overall Rating from FTSE Russell's ESG Ratings and data model to select companies for inclusion. The ESG Ratings are comprised of an overall rating, which is used to adjust stock weights in the FTSE4Good Index Series. The ratings scale is 0 to 5 (higher scores are better). ASM's 2022 rating was 4.0. Our 2021 rating was 3.6. As a result of our score, ASM was included in the FTSE4GOOD Index.

ISS ESG SCORE

The ISS ESG Score provides an assessment of a company's ESG risks and quality of disclosures. A score of 1 indicates low risk, while a score of 10 indicates high risk. In 2022, we received an ISS Governance Score of 1 (2021: 1), an ISS Environment Score of 4 (2021: 4), and an ISS Social Score of 4 (2021: 5).

MSCI ESG[1]

MSCI ESG Research provides MSCI ESG Ratings on a scale of AAA (leader) to CCC (laggard), according to exposure to industry-specific ESG risks, and the ability to manage those risks relative to peers. In 2022, we received a rating of AA in the MSCI ESG Ratings assessment. Our 2021 rating was A.

S&P GLOBAL CSA

The S&P Global CSA Scores are a set of environmental, social and governance data that provides company-level, dimension-level, and criteria-level scores based on the S&P Global Corporate Sustainability Assessment (CSA) process, an annual evaluation of companies' sustainability practices. In 2022, we received a S&P Global CSA Score of 69 out of 100 (up from 58 in 2021), and were included to the 2023 S&P CSA Sustainability Yearbook and 'Industry Mover' designation, which highlights the top 15% across industries.

SUSTAINALYTICS[2]

In 2022, ASM received an ESG Risk Rating of 13.1, and was assessed by Sustainalytics to be at low risk of experiencing material financial impacts from ESG factors (which is an improvement compared to the 2021 score of 15.3).

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26. GLOSSARY AND DEFINITIONS

ESG/SUSTAINABILITY DEFINITIONS

Indicators	Definitions	Section covered
CDP	CDP is a not-for-profit charity running the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.	Planet
CLIMATE ADAPTATION	Changes in company processes, practices, and structures to mitigate priority risks moderate potential damages or to benefit from opportunities associated with climate change.	Planet
CLIMATE CHANGE	Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates. These changes have a broad range of observed effects upon the earth.	Planet
CMRT	The Conflict Free Sourcing Initiative (CFSI) Conflict Minerals Reporting Template (CMRT) is an industry widely adopted standard template used by companies to collect conflict minerals due diligence data.	Responsible supply chain
CONFLICT MINERALS	Tin, Tantalum, Tungsten and gold (3TGs) containing mineral ores that originate in the Democratic Republic of the Congo or the 10 adjoining areas and are sold illicitly to fund armed conflict in the region.	Responsible supply chain
CORPORATE SOCIAL RESPONSIBILITY (CSR)	Corporate social responsibility (CSR) is a self-regulating business model that helps a company be socially accountable – to itself, its stakeholders, and the public.	Sustainability
CRADLE-TO-CRADLE	A full lifecycle assessment & re-engineering of a product produced, closing the loop for material sourcing such that 'waste' products from one process becomes the feedstock for another. Minimizes ESG impacts.	Planet
CRADLE-TO-GRAVE	Typical linear process of material sourcing and waste generation in modern manufacturing. Results in high environmental, social, and other impacts for materials sourced and products produced.	Planet
CRITICAL AND STRATEGIC SUPPLIERS	Suppliers that are determined to be critical or strategic to our business either because the business spends, or critical components or critical materials, or strategic technical partnership.	Responsible supply chain
DATA NORMALIZATION (AS A FUNCTION OF R&D SPEND)	Total power or water purchases divided by total number of millions of dollars in R&D spend during that calendar year.	Planet
DRC	The Democratic Republic of Congo.	Global operations
EAC	Energy Attribute Credit represents a unit of energy produced from renewable sources, and contributes to supporting and growing the renewable energy markets in the geographic regions it is purchased.	Planet
EHS: ENVIRONMENTAL, HEALTH & SAFETY	Environmental, Health, and Safety is a general term used to refer to laws, rules, regulations, professions, programs, and workplace efforts to protect the health and safety of employees and the public as well as the environment from hazards associated with the workplace.	Sustainability
EMS	Environmental Management System is the processes and systems used to ensure environmental goals and aspects are understood, tracked, communicated, and supported by the organization.	Planet
EKOENERGY	A global, nonprofit ecolabel for renewable energy, gas and heat which certifies renewable energy projects to their sustainability criteria.	Planet
EMPLOYEES BASED ON NATIONALITIES	The number of nationalities of employees on the last reporting day of the period.	People

Indicators	Definitions	Section covered
EMPLOYEES COVERED BY COLLECTIVE BARGAINING AGREEMENTS	The percentage of employees that are covered by collective bargaining agreements per local labor requirement divided by the total number of employees at reporting year-end.	People
EMPLOYEES IN R&D	The number of employees on the last day of the reporting period whose work is directly related to the research and development of the product during a reporting year.	People
ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG)	The three primary factors for measuring the sustainability and societal impact of a company and/or business.	Sustainability
ETHICS CONCERNS REPORTED FROM ANONYMOUS GLOBAL REPORTING PROGRAM SPEAKUP!	The number of any ethics concerns reported by employees through our anonymous employee reporting channel SpeakUp!; that may be related to a potential violation of the Code of Business Conduct (COBC) and Business Principles or Policies in the reporting year.	People
ETHICS CONCERNS REPORTED THROUGH OTHER CHANNELS	The number of any ethics concerns reported by employees through other means including directly to management or the Compliance Officer, that may be related to a potential violation of the COBC Business Principles or Policies in the reporting year.	People
EU GOOS	An energy certificate defined in article 15 of the European Directive 2009/28/EU that evidences the origin of electricity from renewable sources.	Planet
FLBL: FORCED LABOR/BONDED LABOR	Forced labor refers to situations in which persons are coerced to work through the use of violence or intimidation, or by more subtle means such as accumulated debt, retention of identity papers or threats of denunciation to immigration authorities. Bonded labor, also known as debt bondage and peonage, happens when people give themselves into slavery as security against a loan or when they inherit a debt from a relative. The cyclical process begins with a debt, whether acquired or inherited, that cannot be paid immediately.	Responsible supply chain
FOREIGN NATIONAL	A foreign national is any person who is not a national of a specific country.	People
GREENHOUSE GAS (GHG) EMISSIONS	Greenhouse gas emissions from human activity, which strengthens the greenhouse effect causing climate change. See Scope 1, Scope 2, Scope 3 Emissions below for more information.	Planet
GRI	The Global Reporting Initiative is an international independent standards organization that helps businesses, governments and other organizations understand and communicate their impacts on issues such as climate change, human rights and corruption (www.globalreporting.org). The GRI standard was used to guide our Materiality Assessment and non-financial data summary.	Sustainability
ILO: INTERNATIONAL LABOR ORGANIZATION	The International Labor Organization (ILO) is a United Nations agency responsible for dealing with employment-related issues across the world, including employment standards and problems of exploitation.	Sustainability, People
INFORMATION RIGHTS MANAGEMENT (IRM)	A subset of digital rights management (DRM) which includes processes and technologies that protect sensitive information from unauthorized access.	IP and cybersecurity
INJURY RATE	The Injury Rate is a measure of all first aid or greater (more serious) injuries per every 100 employees in reporting period.	People
ISO 14001	The ISO 14001 Environmental Management System (EMS) standard is an internationally recognized environmental management standard.	Sustainability
J-CREDITS	A Japanese government program that certifies the amount of greenhouse gas emissions (such as CO2) reduced or removed through implementation of energy-saving devices or sustainable forestry.	Planet
LANDFILL DIVERSION RATE	The percentage of solid waste diverted from landfill via recycling and reuse efforts as generated at ASM key Manufacturing, Engineering and R&D sites in the reporting period.	Planet
LIVING WAGE	A living wage is defined as the minimum income necessary for a worker to meet the basic needs of an average sized family, including food, housing, and other essential needs such as clothing.	People

Indicators	Definitions	Section covered
NET ZERO	The goal of reducing environmental impacts to the point where no net adds or removes are occurring. Can relate to emissions, water withdraws, habitat, or other environmental aspects.	Planet
NUMBER (#) OF EMPLOYEES COMPLETING BI-ANNUAL ETHICS TRAINING	All employees completing the online compliance training courses bi-annually during our compliance month within the reporting year. We track # of employees and % of the total that completed the training. It is applicable to all employees.	People
OECD	Organization for Economic Cooperation and Development is an international organization helping governments tackle the economic, social and governance challenges of a globalized economy. It publishes guidance and frameworks such as OECD Due Diligence Guidance for Responsible supply chains of Minerals from Conflict-Affected and High-Risk Areas.	Responsible supply chain
PFAS	A broad family of Per and polyfluoroalkyl substances such as Teflon used in engineering applications requiring high thermal stability and non-stick properties.	Innovation
PRODUCT LIFE CYCLE (PLC)	The entire lifecycle of a product from its initial introduction to eventual withdrawal from the market.	Innovation and sustainability
PRODUCT LIFECYCLE MANAGEMENT (PLM)	Product lifecycle management (PLM) refers to the handling of a good as it moves through the typical stages of its product life: development and introduction, growth, maturity/stability, and decline. This handling involves both the manufacturing of the good and the marketing of it.	Innovation and sustainability
RBA CODE OF CONDUCT	The RBA Code of Conduct is a set of social, environmental and ethical industry standards for governing how companies conduct business. www.responsiblebusiness.org/code-of-conduct/	Responsible supply chain
RBA SAQ SUPPLIER RISK RANKING	The percent of critical/strategic RBA Scorecard suppliers who completed the required Supplier RBA Self-Assessment Questionnaire (SAQ) and resulted with low or medium risks.	Responsible supply chain
RBA SELF ASSESSMENT QUESTIONNAIRE (RBA SAQ)	Self-Assessment Questionnaire is one of the RBA's standardized risk assessment tools that is useful for assessing a companies commitment to ethical business conduct and compliance with the RBA Code of Conduct.	Responsible supply chain
RBA SELF-ASSESSMENT QUESTIONNAIRE (SAQ) RISK RATING/RESULT	We adopted the RBA standard tool for risk assessment Self-Assessment Questionnaire (SAQ) to assess our own and supply chain risk. This rate applies to our own operation SAQ results with our major sites.	Responsible supply chain
REACH	An EU Regulation of chemical substances intended to protect human health, improve the environment and reduce chemical-related risks.	Innovation and sustainability
RECORDABLE INJURY RATE	The Recordable Injury Rate measures the number of cases that require a response greater than first aid (or serious injuries) per 100 employees in the reporting period.	People
RENEWABLE ELECTRICITY	Electricity derived from sources that are not depleted upon use, such as wind or solar power.	Planet
RESPONSIBLE BUSINESS ALLIANCE (RBA)	RBA: Responsible Business Alliance – World's largest industry coalition seeking to create a industry-wide standards on social, environmental and ethical issues in the industry supply chain. Rebranded from the Electronics Industry Citizenship Coalition (EICC) in October 2017. ASM is a member of the RBA. (responsiblebusiness.org)	Responsible supply chain
RMI: RESPONSIBLE MINERALS INITIATIVE	Responsible Minerals Initiative provides companies with tools and resources to make sourcing decisions that improve regulatory compliance and support responsible sourcing of minerals from conflict-affected and high-risk areas.	Responsible supply chain
ROHS	A regulation which originated in the European Union which restricts the use of hazardous materials found in electrical and electronic products.	Innovation and sustainability
SASB	The Sustainability Accounting Standards Board (SASB) is an independent nonprofit organization that sets standards to guide the disclosure of financially material sustainability information by companies to their investors. www.sasb.org/about/	Five-year non-financial table
SBTI	The Science Based Target Initiative aims to align industry, government, and organizational goals with the latest science with the goal of maintaining planet warming to no more than 1.5C.	Planet

Indicators	Definitions	Section covered
SESHA	The premier international organization promoting the effective communication of safety, health and environmental information to the high technology and associated industries.	Planet, Safety leadership
SCOPE 1, SCOPE 2, SCOPE 3 EMISSIONS	Terms used to define the source of green house gas (GHG) emissions of a corporation. Scope 1 are emissions that the company produces from its operations through use of chemicals, boilers and vehicles. Scope 2 are GHG emissions associated the purchase of electricity or energy. Scope 3 emissions are all other GHG emissions associated with the company's value chain and use of its products that occur outside the Scope 1 and 2 boundary.	Planet
SEMI	Global industry association representing the semiconductor manufacturing and design supply chain connecting over 2,400 member companies and 1.3 million professionals worldwide.	People, Planet, Responsible supply chain
SEMI MOD	Semiconductor Manufacturing Ownership Diversity (SEMI MOD) is a special interest group dedicated to increasing the number of diverse owned and led suppliers serving the semiconductor industry.	Responsible supply chain
SPEAK UP!	Globally available anonymous reporting channel to report ethics concerns or whistleblower concerns.	People
STAFF (EMPLOYEE)	Staff (employee) is a person with a fixed contract, excluding temporary labor. Definition may be varied by country per local and country labor law. The number of employees at the last day of the reporting period.	People
SUPPLIER CODE OF CONDUCT COMMITMENT %	The percent of critical and strategic suppliers that have acknowledged their commitment to RBA code or whose code of conduct is assessed to be acceptable as it covers the similar principles of the RBA Code of Conduct.	Responsible supply chain
SUPPLY CHAIN SPEND BY REGION	Total amount of Euro spent with our global suppliers for the materials, components, and services that are used to produce our products and services for our customers and for non-product related products services that enable our operations globally in the reporting period.	Responsible supply chain
SUPPLY CHAIN SPENDS PER REGION (IN EURO AND %)	Total Euro amount we spent and equivalent to the % of total spends with suppliers by each region.	Responsible supply chain
TCFD	The Financial Stability Board Task Force on Climate-related Financial Disclosures (TCFD) is a market-driven initiative, set up to develop a set of recommendations for voluntary and consistent climate-related financial risk disclosures in mainstream filings. (www.fsb-tcfd.org)	Sustainability, Planet
TIGR	Tradeable Instrument for Global Renewables (TIGR) is a global standard for the documenting and tracking renewable energy certificates (RECS) as tradable instruments/assets.	Planet
TOTAL ATTRITION RATE	The percentage of employees in a workforce that leave voluntarily or involuntarily during a reporting period.	Five-year non-financial table
UN SDG	United Nations Sustainable Development Goals provides an global agenda and plan of action for people, planet and prosperity. It also seeks to strengthen universal peace and freedom. https://sdgs.un.org/goals	Sustainability
VOLUNTARY ATTRITION RATE	The percentage of employees in a workforce that leave voluntarily during a reporting period.	People
WATER CONSUMPTION	The total amount of water consumption in cubic meters for a reporting period.	Sustainability
VSQG	Under US waste regulations, a Very Small Quantity Generator is defined as those that generate 100 kilograms or less per month of hazardous waste or one kilogram or less per month of acutely hazardous waste.	Planet
WWF	The World Wildlife Foundation works to help local communities conserve the natural resources they depend upon; transform markets and policies toward sustainability; and protect and restore species and their habitats.	Planet
ZERO HARM!	Refers to ASM striving to prevent harm to people, reduce our impact on the environment, and make positive contributions to society.	People, Planet

27. PRODUCT DESCRIPTION

Our products include wafer-processing deposition systems for ALD, epitaxy, silicon carbide, PECVD, and vertical furnace systems, and services and spare parts for these systems.

PRODUCT APPLICATIONS AND DESCRIPTIONS

Atomic layer deposition (ALD)

ASM offers ALD tools in two technology segments: thermal ALD and plasma enhanced ALD (PEALD).

Pulsar XP ALD system

Pulsar XP is a 300mm thermal ALD tool designed for depositing extremely thin high-k dielectric materials required for advanced transistor gates and other applications. Pulsar is the benchmark ALD high-k gate dielectric tool for the industry. Up to four Pulsar process modules can be configured on a Pulsar XP system.

EmerALD XP ALD system

EmerALD XP is a 300mm thermal ALD tool designed for depositing metal gate layers for advanced high-k metal gate transistors and other applications. Up to four EmerALD process modules can be configured on an EmerALD XP system.

Synergis ALD system

Synergis is a high-productivity 300mm tool for thermal ALD applications. The system can be configured with up to four dual chamber modules (DCM), enabling eight chambers in high-volume production within a very compact footprint. The system is capable of depositing a broad range of thermal ALD films including metal oxides, metal nitrides, dielectrics, and pure metals.

Eagle XP8 PEALD system

Eagle XP8 is a high-productivity 300mm tool for PEALD applications. The system can be configured with up to four dual chamber modules (DCM), enabling eight chambers in high-volume production within a very compact footprint. The system is capable of a broad range of dielectric PEALD processes, including low-temperature spacers for multiple patterning applications and low-temperature silicon nitride.

DEPOSITION APPLICATION	ASM PRODUCT PLATFORM	ASM PRODUCTS	PROCESS APPLICATION
ALD	XP [1]	Pulsar XP ALD system EmerALD XP ALD system	High-k gate dielectric Metal gate layers
	XP8 [1]	Synergis ALD system	Metal oxides Metal nitrides Metals
PEALD	XP8 [1]	Eagle XP8 PEALD system XP8 QCM PEALD system	Patterning layers Gate spacers and liners Gap-fill
PECVD	XP8 [1]	Dragon XP8 PECVD system	Low-k and TEOS oxide Silicon nitride
Diffusion Oxidation LPCVD ALD	Vertical furnace	SONORA vertical furnace system A400 DUO batch vertical furnace system	Diffusion, oxidation Polysilicon Silicon oxide/nitride Aluminum oxide
Epitaxy	XP [1]	Intrepid ES epitaxy Intrepid ESA epitaxy	Silicon channel Source/drain layers CMOS wafers Analog/power
	Epsilon	Epsilon 2000 single-wafer epitaxy system	
Silicon carbide epitaxy		PE106A single-wafer epitaxy system PE108 single-wafer epitaxy system PE208 dual chamber single-wafer epitaxy system	Silicon carbide

1 The XP is our standard single-wafer processing platform designed to accommodate multiple process application modules with common platform standards. In 2012, ASM launched the XP8 high-productivity platform for PECVD and PEALD. It is based on our common XP platform standard with an expanded configuration. This enables the integration of up to eight chambers on one wafer-handling platform.

XP8 QCM PEALD system

XP8 QCM is a 300mm tool for high-productivity PEALD applications. XP8 QCM allows for the integration of up to four modules, each containing four process reactors, enabling 16 chambers in high-volume production within a compact footprint. The system is capable of a broad range of dielectric PEALD processes, including silicon oxide gap-fill.

Epitaxy

We offer two families of epitaxy tools: Intrepid and Epsilon.

Intrepid epitaxy system

Intrepid ES is a 300mm epitaxy tool using our XP platform, and is designed for depositing critical transistor source/drain and channel layers. Processes include silicon (Si), silicon-germanium (SiGe), and other silicon-based compounds. Up to four Intrepid process modules can be configured on an Intrepid ES system. Intrepid ESA for 300mm is based on the Intrepid ES system, operating in atmospheric mode for analog and power applications, as well as silicon epitaxy for wafer manufacturing.

The Previum process module, which can be integrated with epitaxy modules on the Intrepid platform, is available for 300mm Epi applications that require pre-deposition surface cleaning, which improves the performance of deposited films. Previum surface cleaning enables quality epitaxial depositions for advanced node channel and source/drain engineering applications.

Epsilon epitaxy system

The Epsilon series is a single-wafer, single-chamber tool that deposits silicon-based materials for many applications, ranging from high-temperature silicon for wafer manufacturing, to low temperature silicon for analog and power applications.

Silicon carbide

Our silicon carbide (SiC) products are designed for 150mm and 200mm substrates and use an epitaxy process to deposit the SiC materials on either bare substrates or as part of the transistor device fabrication process. The ASM SiC tool portfolio includes the PE106A and PE108, single wafer epitaxy tools for 150mm and 200mm respectively. For higher productivity we also offer the PE208 dual chamber 200mm tool.

Plasma Enhanced Chemical Vapor Deposition (PECVD)

We offer single-wafer plasma enhanced CVD (PECVD) systems for various low-temperature deposition applications.

Dragon XP8 PECVD system

DragonXP8 is a high-productivity 300mm tool for PECVD applications. The system can be configured with up to four dual chamber modules (DCM), enabling eight chambers in high-volume production within a very compact footprint. Processes include a broad range of dielectric PECVD films for applications such as interconnect low-k dielectric layers, passivation layers, etch stop, and hardmask layers.

Vertical Furnaces

ASM offers vertical furnaces in a batch configuration where a large number of wafers are processed at the same time for productivity and cost savings. Our furnace tools are designed with dual-batch reactors for even more productivity. Our furnace tools are capable of running low pressure CVD (LPCVD), as well as diffusion and oxidation applications. Various thermal ALD films can be deposited using batch furnaces for high productivity.

SONORA Vertical Furnace system

SONORA is a 300mm batch vertical furnace capable of both atmospheric and low pressure thermal wafer processing. Atmospheric thermal applications include diffusion and activation of dopants, annealing to affect material properties by heating to a specific temperature, and oxidation to form silicon oxide. LPCVD applications include polysilicon, silicon nitride, and silicon oxide.

A400 DUO Vertical Furnace system

A400 DUO is a batch vertical furnace for 200mm and smaller wafers, and focuses on applications in the markets for power, analog, RF, and MEMS devices. The new A400 DUO is compatible with the original A400, so existing process recipes can be easily transferred, accelerating system acceptance for production. Atmospheric thermal applications include diffusion and activation of dopants, annealing to affect material properties by heating to a specific temperature, and oxidation to form silicon oxide. LPCVD applications include polysilicon, silicon nitride, and silicon oxide.

Services and spare parts

Services and spare parts are important product offerings for our business. We provide service support to our customers with technical service personnel that are trained to maintain our systems at customers' fabrication plants around the world. Our service teams are located at regional and local service centers to assure prompt availability. We sell spare parts for our equipment from parts stocks located at local distribution centers.

28. LOCATIONS WORLDWIDE

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29. ARTICLES OF ASSOCIATION

The additional information below includes a brief summary of several significant provisions of our Articles of Association.

INFORMATION ON THE PROVISIONS IN THE ARTICLES OF ASSOCIATION RELATING TO THE APPROPRIATION OF PROFIT

The Articles of Association of ASM International N.V. (the company) provide the following with regard to distribution of profit and can be summarized as follows:

- From the profits, distributions shall in the first place, if possible, be made on the preferred shares equal to the EURIBOR rate for six-months loans, increased by one and a half, on the paid-up amount which had to be paid on the preferred shares, weighted to the number of days to which this was applicable. If profits are insufficient, the dividend will be paid from the reserves with priority over any dividends. If the reserves are insufficient, the dividend deficit has to be made up in future years;
- Second, a dividend, if possible, is distributed on financing preferred shares. The dividend is a percentage of the par value, plus share premium paid, on the financing preferred shares. The percentage is determined by the Management Board, subject to approval of the Supervisory Board. The percentage is related to the average effective yield on government loans with a weighted average remaining term of no more than 10 years, if necessary increased or decreased by no more than 3%, subject to the then prevailing market conditions. If profits are insufficient, the dividend shall be paid from the reserves. If the reserves are insufficient, the dividend deficit has to be made up in future years;
- With the approval of the Supervisory Board, the Management Board will determine which part of the profit remaining after adoption of the provisions of the previous paragraphs will be reserved. The profit after reserving will be at the disposal of the Annual General Meeting of Shareholders;
- The company may only make distributions to the shareholders and other persons entitled to profit insofar as its equity exceeds the amount of the paid-up and called amounts of the share capital increased with the reserves that must be kept by virtue of law; and
- Article 33, paragraph 3 of the Articles of Association provides that dividend claims expire after the lapse of five years.

For the full text, please see our website.

SPECIAL STATUTORY CONTROL RIGHTS

Article 27 of the Articles of Association provides that each common share gives the right to cast one vote, each preferred financing share to cast 1,000 votes, and each preferred share to cast 1,000 votes.

Article 29 of the Articles of Association provides that meetings of holders of preferred shares or of financing preferred shares shall be convened as often and insofar as a decision of the meeting of holders of preferred shares or financing shares desires this, and furthermore as often as the Management Board and or the Supervisory Board shall decide to hold such a meeting. At the meeting, resolutions will be passed with an absolute majority of the votes. In the event that there is a tie of votes, no resolution will take effect.

The following resolutions and actions can only be taken on a proposal by the Management Board and the Supervisory Board:

- any amendment to the Articles of the company; and
- the dissolution of the company.

For the complete text, please see our website.

30. DECLARATIONS

CORPORATE GOVERNANCE STATEMENT

The Dutch Corporate Governance Code was last updated on December 20 2022. As of book year 2023, Dutch listed companies will be required to report on compliance with the Updated Code. For the book year 2022, the 2016 Dutch Corporate Governance Code applies. The full text of the Dutch Corporate Governance Code and the Updated Code can be found on the website of the Monitoring Commission Corporate Governance Code.

ASM complies with the Dutch Corporate Governance Code, save for the deviations set out herein. ASM applies the relevant principles and best practices of the Dutch Corporate Governance Code applicable to the company, to the Management Board, and to the Supervisory Board, in the manner set out in the Corporate Governance section, as long as it does not entail disclosure of commercially sensitive information and other than as set out below:

- The Supervisory Board has delegated the contacts with the internal auditor to the Audit Committee. The Audit Committee is the body with the most financial experience, best equipped to properly discuss with the internal auditor, in which 4 out of 6 Supervisory Board members are represented. Albeit not formalized, the internal auditor may always contact the Chair of the Supervisory Board directly in case there are any matters to escalate. Moreover, the Audit Committee shares full minutes of all its meetings with the Supervisory Board, so that the Supervisory Board remains informed of all items discussed. This means that ASM deviates from best practice provisions 1.3 (as the Supervisory Board does not oversee the internal auditor directly, but through the Audit Committee).
- For the same reasons as included in the previous bullet, the Audit Committee, rather than the Supervisory Board, has maintained the contact with the external auditor and KPMG Accountants N.V. has attended several Audit Committee meetings. This means that ASM deviates from best practice provisions 1.6.2 (it is the Audit Committee instead of the Supervisory Board that gives the external auditor a general idea of the content of the reports relating to its functioning) and 1.6.3 (the Supervisory Board nominates the external auditor to the General Meeting, but the Chair of the Audit Committee and the Chief Financial Officer agree on the terms of the engagement).
- Pursuant to best practice provision 2.1.5, the Supervisory Board should draw up a diversity policy which is also for the Executive Committee. As set out in chapter 13.1, ASM will amend the Diversity policy to bring it in line with the Updated Code (and also include the Executive Committee).
- Pursuant to best practice provision 2.3.6, the Chair of the Supervisory Board should ensure that the Supervisory Board elects a vice-chair. The Supervisory Board has extensively discussed whether or not to appoint a vice-chair, but has come to the conclusion that it was not needed given the relatively limited size of the Supervisory Board. In case the Chair of the Supervisory Board is not available, the Supervisory Board will at that time elect a vice-chair. Informally, the Chair of the NSR Committee acts as vice-chair.

Corporate governance-related documents are available on our website. These include, among others, the Supervisory Board Profile, Supervisory Board Rules, Management Board Rules, Executive Committee Rules, the Audit Committee Charter, the Nomination, Selection and Remuneration Committee Charter, the COBC, the SpeakUp policy, the anti-fraud policy, the rules concerning Insider Trading, the Remuneration policy of the Management Board, the Remuneration Policy of the Supervisory Board, the Diversity policy, and Policy regarding communications and bilateral contacts with shareholders.

RESPONSIBILITY STATEMENT

The members of the Management Board state that, to the best of their knowledge, the statutory financial statements prepared in accordance with IFRS-EU and Title 9 of part 2 of the Dutch Civil Code as included in this Annual Report 2022 provide a true and fair review of the assets, liabilities, financial position, and results of the company and its subsidiaries included in the consolidated statements, and that the management report provides a true and fair review of the position and the business of the company and its subsidiaries, and the Annual Report 2022 provides a fair review of the state of affairs at the balance sheet date, the development / performance during the financial year of the business (and group as a whole) and the principal risks that ASM faces.

For additional information on the risks ASM faces, the internal risk management and control framework, and the declarations provided in relation thereto pursuant to the Dutch Corporate Governance Code, see chapter '13.2 Risk management'.

ARTICLE 10 EU TAKEOVER DIRECTIVE DECREE

The Management Board states that the information required under Article 10 of the EU Takeover Directive Decree is disclosed herein to the extent that it is applicable to ASM:

- RCF includes a change of control clause, which could lead to prepayment of any outstanding amount see Note 16 ‘Credit facility’;
- ASM is party to commercial agreements, including lease agreements, which occasionally include change of control clauses;
- ASM is party to an agreement with the Stichting Continuïteit ASM International pursuant to which the Stichting is granted an option to acquire up to a number of our preferred shares in the event of a potential public takeover, see chapter ‘13.1 Stichting Continuïteit Agreement’; and
- In case of a change of control, Management Board members may be entitled to a severance amount in, as set out in the Remuneration report of the Management Board.

31. SAFE HARBOR STATEMENT

In addition to historical information, some of the information posted or referenced herein or on the website contains statements relating to our future business and/or results, including, among others, statements regarding future revenue, sales, income, expenditures, sufficiency of cash generated from operations, maintenance of interest in ASMPT Ltd, business strategy, product development, product acceptance, market penetration, market demand, return on investment in new products, facility completion dates and product shipment dates, corporate transactions, restructurings, liquidity and financing matters, outlooks, and any other non-historical information. These statements include certain projections and business trends, which are 'forward-looking'. We caution readers that no forward-looking statement is a guarantee of future performance and that actual results could differ materially from those contained in the forward-looking statements.

You can identify forward-looking statements by the use of words like 'may', 'could', 'should', 'project', 'believe', 'anticipate', 'expect', 'plan', 'estimate', 'forecast', 'potential', 'intend', 'continue', 'aim', 'strive' and variations of these words or comparable words.

Forward-looking statements do not guarantee future performance and involve risks and uncertainties. You should be aware that our actual results may differ materially from those contained in the forward-looking statements as a result of certain risks and uncertainties. These risks and uncertainties include, but are not limited to, economic conditions and trends in the semiconductor industry and the duration of industry downturns, currency fluctuations, the timing of significant orders, market acceptance of new products, competitive factors, litigation involving intellectual property, shareholder or other issues, commercial and economic disruption due to natural disasters, terrorist activity, armed conflict or geopolitical tensions or political instability, changes in import/export regulations, epidemics and other risks indicated in our most recently filed Annual Report and other filings from time to time. The risks described are not the only ones. Some risks are not yet known and some that we do not currently believe to be material could later become material. Each of these risks could materially affect our business, revenues, income, assets, liquidity, and capital resources. All statements are made as of the date of posting unless otherwise noted, and we assume no obligation to update or revise any forward-looking statements to reflect future developments or circumstances.

Feedback and questions
Please feel free to contact us if you have any feedback on or questions about our Annual Report:
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Published on March 2, 2023

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