Our company

ams OSRAM is a global leader in optical solutions with a focus on lighting and sensing technologies. We are known for our imagination, deep engineering expertise and worldwide industrial manufacturing capacities. Our innovative products and technologies enable radically new applications that make life better for everyone. Using the full spectrum of light, we capture, analyze and visualize the information our environment provides. We enable humans and machines to comprehend and interact with the world around us: to make journeys safer, medical diagnoses more accurate and everyday moments of communication a richer experience.

Pursuing our vision to become the uncontested leader in optical solutions, we continuously advance our technologies in sensing, illumination and visualization. We offer what we believe to be an unparalleled portfolio of optical solutions and technologies: from high-quality light emitters and optical components to light sensors, micro-modules, ICs and the related software and algorithms.

Optical semiconductor solutions are a key enabling technology, making many other innovations possible across industries. Our deep system understanding, paired with our leading expertise in the areas of emitting, directing, sensing and processing light, makes us the partner of choice for many industries. We enable our customers in the automotive, consumer, industrial, and healthcare sectors to create innovative, market-changing applications and thus maintain their competitive edge.

With a view to creating technologies for growth markets, we continue to add to our innovation roadmap through significant R&D investments and strategic acquisitions, strengthening our excellent IP position with more than 15,000 patents. We continually invest in our leading semiconductor expertise and world-class manufacturing network to live up to our reputation of reliably bringing top quality to the world at scale.

Systematically executing our strategy for innovation and technology leadership, we move towards realizing our vision while pursuing long-term profitable growth for our company and its stakeholders.

Our business

As a global leader in optical technologies, we harness the full spectrum of light to make life better. From product idea to tangible design through to the manufacturing process, we enable our customers to create high performance optical applications for the automotive, consumer, industrial and healthcare markets. What differentiates us, is our broad technology spectrum covering the emission of light as well as its detection through sensing and intelligent processing. We serve the value chain of optical solutions with our innovative products and solutions, which are designed for best-in class performance, size, cost and energy efficiency.

We are experts in the development and integration of a wide range of optical technologies, from single components through to complex systems. This enables us to be a market and innovation leader, serve our customers as trusted partners and differentiate ourselves in the marketplace.

Automotive: Reliability drives innovation

The automotive industry is changing. New technologies and innovative mobility concepts are making vehicles continually safer and smarter. The rise of e-mobility places new demands on automotive design and requires new energy-efficient solutions. As a long-standing innovation leader in optical semiconductor technologies, we play an important role in redefining mobility. We turn ideas into tomorrow's technologies with the highest quality and reliability, proving our trusted partnership with the automotive sector.

Optical technologies are a key element of new mobility concepts. The combination of optical sensors and light emitters makes our product portfolio special. We offer real added value for safety and comfort in road traffic. Our innovative solutions for interior and exterior lighting and sensing complement each other in high quality and precision and are tailored to the requirements of the respective application areas. Based on our advanced highly-pixelated matrix LEDs we enable intelligent lighting and visualization solutions for dynamic headlights that can instantly adapt the light beam to the traffic situation. Advanced driver assistance systems are the backbone of automated and autonomous driving. With our innovative technologies, we enable reliable and highly efficient solutions to protect passengers and traffic participants.

The new mobility is transforming the car interior into a living space. High-resolution displays, smart surfaces, seamless human-machine interaction and adaptable ambient lighting solutions are gaining importance. Our optical solutions enable a high level of comfort and a more attractive user experience with high precision and energy efficiency.

We provide a spectrum of technologies to make automotive mobility safer, more comfortable and more sustainable.

Consumer: Performance enables experiences

We are closely connected to the world with smartphones, computers, tablets and wearables as constant companions. They make our lives easier and safer while allowing us to interact, capture moments and create fun and excitement.

Our advanced sensing and light-emitting technologies actively shape the way we capture and interact with the world. Our portfolio holds both parts of optical technologies: the emitting as well as the detecting and sensing technologies. These technologies play a key role for applications such as bright full-screen displays, health data sensing and brilliant images for mobile, portable and computing devices.

Together with our customers, we are involved in pioneering solutions for outstanding user experiences. We are a frontrunner in the industrialization of emerging innovation areas such as microLEDs for next-generation displays. MicroLEDs offer significant advantages over LCD and OLED displays in key performance aspects such as brightness, contrast, viewing angle and energy efficiency. We are in a strong position to become a clear leader in high resolution microLED technology. We have the capabilities and a focused roadmap to deliver this demanding technology with microLEDs in smallest structure size.

Our lighting and sensing technologies also improve the quality of images and their visualization in current applications. They enable accurate ambient light, color and proximity sensing solutions to operate behind OLED displays. Our miniaturized solutions help achieve outstanding picture quality for mobile device cameras and support emerging AR/VR functionalities in fields like proximity sensing, eye-tracking, and near-to-eye projection.

With our expertise, we create inspiring user experiences in next-generation applications, and make today's ideas tomorrow's reality.

Industrial: Making light work with reliable innovations

Digitalization and 5G are revolutionizing industrial automation by enabling machines to interact with each other as well as with humans. For machines to sense their environment, they need high-performance sensor and light-emitting solutions. Our comprehensive portfolio covers different market requirements: speed, power and accuracy coupled with form factors and cost efficiency.

Our products make industrial production faster and more efficient by enabling innovations ranging from advanced machine vision to predictive maintenance and secure human-machine interaction. From production lines to home appliances – our technologies make machines and robots smarter and thus more powerful, including safety solutions for collaborative human-machine environments.

As a market leader in horticultural lighting, we create the perfect light environment for indoor plant growth in indoor or vertical farming. We combine pioneering wavelength-optimized LEDs across the relevant color spectrum with spectral sensing technologies for cutting-edge growth stimulation and precise condition monitoring. Targeted lighting solutions also minimize fertilizer use and reduce energy costs.

Our highly efficient UV-C LED emitters, spectral sensors and accurate presence detectors are able to make our environment safer. We enable new functionalities for easy, safe and affordable UV treatment – for example, embedding in light sources to clean public areas or workplaces.

Our comprehensive lighting portfolio perfectly matches various industrial lighting needs with innovative LEDs alongside spectral and ambient light sensors. Miniaturized LED products provide our customers with endless design possibilities, greater cost efficiency, outstanding performance and maximum accuracy.

With our extensive portfolio and application expertise, we help make industrial processes and applications smart and efficient.

Medical: Delivering miniaturized solutions with high precision

Awareness of personal health and fitness is steadily growing. Increasing digitization is driving professional and personal healthcare and opening up completely new functionalities.

Co-creating with customers requires extensive experience and a deep understanding of medical and health application needs. We develop key technologies for accessible, precise and efficient diagnostics and healthcare systems. Our advanced sensing and lighting products offer the highest levels of accuracy, simplify processes and create new use cases, for example in medical imaging, where we enable best-in-class digital X-ray and CT images as well as micro-camera invasive examinations.

We bring together innovative light-emitting and optical sensor solutions for advanced fitness tracking and health data capture. As a leading supplier of vital sign monitoring solutions, we pioneer technologies spanning from innovative biometric optical sensor solutions to components for fitness and health monitoring, with and without medical supervision.

Our products make diagnostics less burdensome and healthcare more accurate, affordable and individual.

Driving the revolution in automotive and mobility

“The classic driving experience is transforming into a more holistic mobility experience.”

On the road to highly assisted and autonomous driving, the classic driving experience is transforming into a more holistic mobility experience – with optical solutions playing a key part in enhancing safety, comfort and driving pleasure.

Electrification, connectivity, assisted and autonomous driving – the automotive industry is undergoing a fundamental change. Which role do optical semiconductors play in this?
Gerald Broneske (Global Product Marketing Automotive): Over more than 100 years as a trusted partner for the automotive industry, we have witnessed and pioneered many groundbreaking trends in automotive technology. The most revolutionary, however, is happening right now. For a long time, in the driver’s perspective, the engine, chassis and driving experience came first. Today, with cars becoming increasingly electrified, automated, connected and shared, the user and driver focuses on a more holistic mobility experience: on safety and comfort, on connectivity and entertainment, on increased interaction with the vehicle’s functions and features. To bring this new automotive paradigm into reality, optical solutions play an essential role.

Can you give us some examples?
GB: For many years, traditional optical technologies provided essential functions for headlights, breaking and turn signals, and in-cabin lighting. With LEDification many of these traditional technologies have already been replaced by LED light sources. In addition, we find many more optical products for smart illumination and visualization in modern or next generation cars – from highly-pixelated matrix headlamps, ambient lighting to C2X communications and display backlighting.
And there are several promising new growth drivers in the field of sensing, such as in-cabin sensing and driver monitoring due to regulatory requirements, the upcoming use of LiDAR sensing for automated driving functions, or smart surfaces as the car develops into a third living room for the user. Based on our global leadership in automotive lighting and a strong sensing portfolio, ams OSRAM serves these applications with a broad spectrum of light emitters and sensing solutions.

What does this trend toward smart solutions mean for exterior lighting?
GB: One major trend is Dynamic Forward Lighting, which is about intelligent pixelated headlights with a number of light points. These adaptive headlights are becoming increasingly sophisticated as they allow adaption to oncoming traffic, highlight traffic signs and even project information on the road. To solve the problem of glare, for example, the highly pixelated LED headlights automatically switch off pixels that would interfere with the view of the driver of an oncoming vehicle. The more pixels, the more precisely the beam can be adjusted. Our EVIYOS technology raises the number of pixels from the current level of just a few dozen pixels to around 25,000 pixels, which not only enables a significant improvement in adaptive headlight operation but also the projection of warning symbols onto the road surface.

You mentioned smart surfaces. What is behind this concept?
GB: Car manufacturers today want to bring increasing functional complexity into the car interior. At the same time, the trend is moving toward tidy cockpits with smooth surfaces and intuitive controls. Physical buttons and knobs are becoming more and more outdated. And displays are limited to certain areas due to geometric restrictions and relatively high cost, while also suffering from reflections.
A new human-machine interface is needed – which can be realized via so-called smart surfaces. They combine light sources, drivers, and sensors to allow novel applications inside the car. For example, interactive, decorative backside-illuminated animations and Shytech buttons that only appear when the user looks at them or moves his hand toward them. This will revolutionize interaction across the full car interior, including the middle console, center stack, overhead consoles, door panels or steering wheel.

Are all these new functionalities not impacting the distance range of electric vehicles?
GB: Of course, these functions need electrical power, and there are intense discussions in the industry about trade-offs between functionality and energy consumption. At the same time, our increasingly efficient semiconductor solutions help save energy in these functions. For example, our latest LED light sources for daytime running lights require 33% less power compared to six years ago, while providing more brightness at the same time. In the end, this will be a question of optimizing trade-offs for car manufacturers and buyers. Particularly as light and sensing features are becoming an increasingly more important differentiation factor for OEMs.

microLEDs revolutionize the way we see

“microLED promises to combine some of the really important features that the industry desires.”

We are surrounded by displays. They constantly provide us with information – from the latest news, the hottest movie and our current fitness level to the shortest traffic connection.

LED technology laid the foundation for high-quality, color-intensive video walls and screens. It was followed by OLED technology offering high color contrasts, wider viewing angles, and flexible designs. In future, microLED technology promises exceptionally brilliant colors at very low power consumption, extremely high brightness and resolution, great reliability, fast response time and flexibility.

What is a microLED display?
Julia Halasz (Head of Business Line): MicroLED displays are based on tiny LED devices that are used to directly generate the individual pixels from individual, independently controllable red, green and blue LEDs, so-called sub-pixels.
We are working on an ultra-small-scale microLED technology which would enable you to place more than four million microLEDs on a 1 Euro coin, that’s four million individual and functioning LEDs.
In addition to the brilliant colors and all the benefits above, microLEDs also offer the potential to integrate sensors and infrared LEDs to enable touch, light, or motion sensing functions in future generations of the technology.

The extremely small dimensions make manufacturing very challenging. Why do we need this complex technology when we have other established display technologies?
JH: MicroLED promises to combine some of the really important features that the industry desires. High image quality and brilliant colors, for example, and being fully readable even in bright sunlight. For this you need wide color gamut, high contrast, wide viewing angles, high pixel density, and fast refresh rates – that is exactly what microLEDs can enable even better than incumbent technologies.
Energy efficiency is, of course, also very important. As micro LED based displays only draw power for lit pixels, their efficiency is high. Depending on the application, this offers significantly lower power consumption and longer battery life.
In applications such as automotive, displays need to be very robust and durable in extreme temperature conditions and humidity. MicroLEDs can rely on the underlying LED technology that offers a long lifetime and a wide temperature range.

Which aspect of the technology impresses you most?
JH: It’s hard to choose one single answer. Once you have seen a microLED based display, you will be really impressed by the incredible difference in image quality and the pure and vivid colors. But there is also the aspect of a whole supply chain that must go new ways. Because the technology cannot rely on existing manufacturing processes or equipment, manufacturers of LEDs, equipment and displays must work together in close collaboration.

Our talent

In a year characterized by global challenges, we were able to rely on our employees as a source of continuous engagement and support. Once again, our team of around 22,000 employees worldwide showed their commitment to paving the way for new innovative products and solutions by combining our passion for innovation, our deep engineering expertise and our profound understanding of our customers' needs. As further factors in our success, we can count our truly global set-up, our diverse working style and our inventiveness.

In setting a benchmark, we rely on two essential assets. On the one hand, our unparalleled, decade-long expertise along the entire value chain of lighting and sensing technologies. And, on the other hand, our distinct capacity to anticipate tomorrow's world and translate it into today's technologies. Boasting these assets, we set out to attract and retain the best talent in the semiconductor industry. Our corporate culture is based on appreciative and respectful relationships, supported by a set of clear core values and leadership principles. To fulfill our responsibility along the entire value chain, we published a comprehensive human rights policy in 2022.

Trust and integrity, respect, and appreciation are integral parts of our business. They are reflected in fair working conditions and in a working atmosphere that is free of discrimination, and where diversity is seen as an opportunity. A global, group-wide policy sets binding standards on hiring, diversity and inclusion, talent acquisition, development, training, compensation and benefits.

Our teams bring together more than 83 nationalities in 43 countries. At the same time, we continued our efforts to increase gender diversity in all areas last year. Against the backdrop of meaningful transformation and reorganization throughout the group in 2022, the proportion of female colleagues in the engineering workforce stood at 20% last year, and the proportion of female leaders in the first two management levels remained stable at 21%.

With a variety of employee communities and self-managed networks, we are working to create a dynamic, engaged, and collaborative work environment: an environment where our employees can develop an entrepreneurial mindset, make quick decisions, and develop their skills. In addition, our regular dialog formats with management representatives give space to different ideas.

We have significantly increased our internal communications activities, adding quarterly virtual global town hall meetings, for example. We have also expanded and improved our communications via external channels, including our website, professional business networks and, in particular, social media.

Because every voice matters, we conducted the first global employee survey within the now combined ams OSRAM team. Supported by an encouragingly high participation rate of almost 80%, we analyzed the valuable and helpful results and initiated over 1,300 initiatives globally as a result. Most of the actions and initiatives address the topics "people development", "transformation", "organizational efficiency" and "engagement".

Committed to lifelong learning, we offer attractive opportunities for both personal and professional development. Direct, regular, and structured interchanges between employees and managers are supported by the extensive training program offered at our ams OSRAM University.

Our employees are the foundation and the driver of our long-term success. We strive to foster a culture of performance, engagement and retention throughout our organization that enables our team to be successful with customers and partners. As one company, one team, we can further advance what we have started together: making life better with technology.

With photons to the next revolution in computed tomography

“The move to photon counting is seen to be as significant as the transition from black-and-white to color television.”

The history of computed tomography (CT) has been defined by technology innovation, and the latest one is a breakthrough: photon-counting detectors. These novel devices count and analyze the energy of X-ray quanta on a photon level, providing better spatial resolution and lower radiation doses for patients.

What is this new computed tomography imaging method?
Roger Steadman (Head of System Solution Engineering): In general, computed tomography or CT is a special X-ray examination method acquiring 3D images of the body. With the help of an X-ray tube that rotates around the body, several thousand images of a region of the body or an organ are taken and then combined into one 3D volume.
Conventional CT detects a signal which is proportional to the total energy of the X-ray photons, neglecting that the attenuation of the body or tissue is in fact energy dependent. Photon counting removes that limitation. As it provides a measure of not only the number of photons, but also the energy of those photons, it ultimately allows us to discern which materials are present within the body at which position. In other words, photon counting provides information that can be used to resolve unknown variables. This improves image contrast – today each individual photon contributes equally to the image.
Another interesting aspect of photon counting is the significantly higher spatial resolution. Given the different sensors required for this technology, the spatial resolution can be up to 4 times better that in conventional CT depending on system parameters defined by the CT system manufacturer.

Why do you consider photon counting to be different from other innovations?
RS: It is the clear goal of all parties involved to further reduce the radiation dose and to improve early diagnosis by offering additional information. The move to photon counting is seen to be as significant as the transition from black-and-white to color television in terms of the additional information it provides. This leads to higher resolution at a much lower radiation dose, resulting in major benefits for the patient. As a key aspect of the technology, photon counting can reduce X-ray doses by 40 to 80% depending on the clinical protocol.

In your opinion, what exactly sets us apart here?
RS: We offer our customers a complete solution. Not only does our readout IC meet the stringent requirements of clinical photon-counting spectral CT with very low noise and power consumption, it also comes in an innovative system-in-package where multiple ICs and passive components are embedded in a single package. This system is “tileable”, meaning that it can be combined with adjacent devices in all directions to form a large detector area which is required for clinical CT. This advanced solution creates an unmatched winning combination for our customers, combining ease-of-implementation with state-of-the-art performance.

Sustainably successful

“Making a positive contribution to society is key to our company’s long-term success”

→ ams OSRAM Sustainability Report 2022

At ams OSRAM, we regard sustainability as an opportunity for long-term growth and success – as well as a mission to enhance people’s lives with our products.

What role does sustainability play at ams OSRAM?
Martin Bachler (Head of Corporate Sustainability): For us, sustainability stands for the long-term success of our company. This will be achieved by creating equal measures of added value for our company, our customers and society as a whole. We will enjoy long-term success if our products contribute to achieving our customers’ sustainability goals. We are attractive to investors if we create long-term value and make ourselves resilient to risks. And from a social perspective, we are successful when our products improve people’s lives.
In this sense, sustainability has important ramifications for our economic success, and our sustainability mission is closely interconnected with our company’s business operations: “Through our optical solutions, we create sustainable value and enrich people’s lives.”

How exactly do our products help customers reach their ESG targets?
MB: Firstly, by taking responsibility for our products, in terms of environmental compatibility, sustainable manufacturing and product safety. In addition, customers benefit in particular from the positive properties of our products. Due to their energy efficiency and small form factor, optical semiconductors are ideally placed to replace traditional technologies with a poorer ecological balance. The use of LEDs, for example, has led to significant energy savings in both general lighting and automotive applications. To illustrate the magnitude: simply by replacing all halogen daytime running lights with LED technology, around 1,900 metric tons of CO_2 could be saved every year, in Germany alone.
We also like to emphasize a key characteristic of our optical sensor solutions: they enable customers to capture the environment and generate data about the surrounding world. This, in turn, helps make processes more intelligent in terms of efficiency, safety and convenience. In the field of horticulture, our innovative LEDs and sensors contribute to reductions in the use of energy, water and fertilizers in greenhouses. On the road, our driver assistance solutions help avoid accidents and create a more pleasant driving experience. And our innovative solutions for computed tomography and digital radiography make it possible to reduce the radiation dose for patients. Optical solutions therefore enable us to live better and more sustainably in many different ways.

What is the current status of the company’s efforts with regard to sustainability?
MB: It is still only just over two years since the start of the integration of ams OSRAM, however we have achieved a lot in this timeframe. For instance, we harmonized a wide range of our processes, we carried out a materiality analysis and published our first joint sustainability report. We have also developed a sustainability strategy encompassing the entire group, with five focus areas. Our key goals have already been published: carbon neutrality in our own value-creation by 2030 as well as a 25 percent share of women in management positions by 2026. The Supervisory Board has also defined key points with regard to sustainability: the long-term compensation paid to members of the Management Board will be tied to specific ESG targets, and an ESG Committee has been set up within the Supervisory Board.
These efforts have already been rewarded, as we have improved very significantly in important ESG ratings in this short time. In a sector comparison, we are now even ranked in the top third. In the S&P Global Corporate Sustainability Assessment, for example, we have improved our score from 18 to 72 points over the last two years. Nevertheless, we have no intention of resting on our laurels. All companies are facing increasing requirements from legislators, capital markets and customers. We want to actively address these – and use it as a competitive advantage for us.

Additional information about Sustainability at ams OSRAM, including our Sustainability Report, is available on our website.

1. Overview of the economic environment and the past fiscal year

1.1 Development of the semiconductor sector

The war in Ukraine, high inflation rates, and rising interest rates negatively impacted demand in many end markets in 2022. Although the global semiconductor market still showed 3% growth last year to USD 574 billion, up from USD 556 billion the year before, monthly growth rates have been negative since August 2022. Excluding the very volatile metal oxide semiconductor (MOS) memory market (which fell by 16%), the semiconductor market grew by 10%. This growth was driven by sensors, MOS logic, analog integrated circuits (ICs), and discrete semiconductors, whose growth rates were well above the 3% market average for the semiconductor sector. Growth for optoelectronic semiconductors was only 1%, however, down from 7% in the previous year.

ams OSRAM's most important end markets are the automotive market, consumer devices such as smartphones and wearables, and industrial and medical technology. Shipments in the global smartphone market fell by 8% in 2022, following an increase of 3% in the previous year. In the global wearables market, shipments decreased by 3% (2021: increase of 20%). Auto production, meanwhile, recorded growth of 6% in 2022, following an increase of 3% in the previous year.[1]

1.2 Structure and development of the segments

The business activities of the ams OSRAM group are presented in two segments, Semiconductors and Lamps & Systems. The business segment Semiconductors comprises the group's semiconductor-related business in the automotive, consumer, and industrial and medical technology market areas. The business segment Lamps & Systems comprises the group's business related to lamps and lighting systems, with a focus on the automotive market, and including traditional lighting technologies, as well as the industrial and medical technology market areas.

Semiconductors
The Semiconductors segment contributed the majority of group revenues last year from its automotive, consumer, and industrial business areas. The Semiconductors automotive business is positioned as global leader in automotive LED lighting for a wide range of exterior and interior lighting applications. This includes differentiated LED solutions for head lamps and other front lighting, signaling/rear lighting and other exterior lighting, and interior ambient lighting. In addition, the segment's automotive business comprises interior sensing, safety systems such as ADAS, and visualization technologies. High-performance solutions and innovations for exterior and interior applications form the basis of the group's success and strong customer penetration in all key regions. The automotive market environment in 2022 was characterized by continued supply chain volatility for most of the year as well as notable inventory adjustments in automotive supply chains in the second half. In light of this continued demanding market situation, the segment's automotive business recorded solid full-year results for 2022. Overcoming unfavorable market conditions, the segment's automotive area confirmed its strong market position last year and expanded its design pipeline for the future.

The Semiconductors consumer business serves leading global OEMs as a major supplier of advanced sensing and optical solutions for smartphones, wearables, and other consumer devices. The business includes solutions for display management, proximity sensing, world-facing camera enhancement, 3D technologies, spectral and bio-sensing, and other optical applications. The segment's consumer business recorded an overall mixed performance for 2022. At the same time, the group underscored its leading position in key markets, which was evident in positive market feedback and successful designs for future devices. Although major segments of the smartphone and consumer market held up well through most of 2022, a lack of demand recovery in China and in the Android market from the late first half through the second half had a negative impact on the Group's consumer markets. The fourth quarter saw additional negative volume effects in the smartphone market due to COVID 19-related production cutbacks in China.

The segment's industrial and medical business showed an overall good performance. In the segment's industrial area, ams OSRAM's end markets provided attractive demand support for a large part of the year. Next to the company's LED lighting solutions for industrial and outdoor lighting, industrial imaging offered a healthy contribution. Demand momentum for horticulture lighting applications remained positive into the second half of the year. In the fourth quarter, increasingly negative demand effects driven by the macro-economic environment and regional dynamics in China as well as higher energy costs impacted the segment's industrial business in several areas including horticulture solutions as well as industrial and outdoor lighting. The Semiconductors medical technology business offered a very solid performance, largely driven by its leading position in medical imaging solutions for computed tomography and digital X-ray systems.

Lamps and Systems
The Lamps & Systems (L&S) segment provided the remaining contribution to total group revenues last year. The automotive business of L&S comprises automotive lamps and illumination products including traditional automotive lighting technologies. As a leader in automotive lighting, L&S serves OEMs as well as the automotive aftermarket in major geographic regions. Like the Semiconductors automotive business, the L&S automotive business was negatively affected by supply chain imbalances and inventory adjustments in the global automotive market. Despite these effects, the L&S automotive business showed a good performance for the year overall. The OEM-related business performed well in light of these market developments. Demand in the automotive aftermarket recorded positive seasonal effects in the second half, which supported segment results. The other areas of the L&S business encompass a range of lighting products for diverse industrial, building-related and medical applications. These areas saw overall solid results last year as demand in a number of industrial markets, including entertainment, developed positively for most of the year.

ams OSRAM is nearing the completion of the planned and announced strategic re-alignment of its business portfolio. As part of this portfolio re-alignment, the group announced the disposal of four businesses in the L&S segment that belonged to the former OSRAM Digital (DI) division: Fluence for horticulture lighting systems, Digital Systems Eurasia for electronic lighting modules and components such as drivers and ballast, Traxon Technologies for architectural outdoor lighting, and Clay Paky for entertainment lighting fixtures. The sale transactions for Fluence and Traxon Technologies were concluded in the second quarter and fourth quarter, respectively. In addition, the group announced the disposal of the automotive lighting systems activities that had remained at ams OSRAM after dissolution of the joint venture with Continental AG. This transaction was concluded in the third quarter of 2022.

In its operations, ams OSRAM was able to ensure high production volumes across its global manufacturing network, despite supply chain challenges and COVID-19 effects and restrictions in certain regions. The group's protective and risk-reduction

1 Sources: WSTS, OMDIA, IDC.

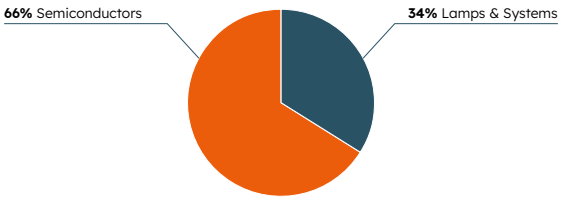
measures helped ams OSRAM to avoid significant negative impacts from COVID-19 and ensured the health and safety of its employees globally. ams OSRAM's robust operational infrastructure and its highly committed employees once again played a key role in managing volatile market and supply chain developments in 2022.

2. Business results

2.1 Revenue

In fiscal year 2022, consolidated revenue decreased by 4% to EUR 4,819 million, compared to EUR 5,038 million in 2021. The decrease was primarily due to portfolio effects from business disposals of EUR 307 million, i.e. sales that divested businesses contributed to consolidated revenue in fiscal 2021 and which ceased to exist in 2022. These include in particular the sale of the business with Automotive Lighting Systems (AMLS), Fluence Bioengineering, Inc., Digital Systems (DS) North America, Connected Building Applications (CBA), and Traxon Technologies. The Semiconductors segment contributed EUR 3,167 million (2021: EUR 3,279 million), which equates to a share in sales of 66% (2021: 65%). The Lamps & Systems (L&S) segment contributed EUR 1,652 million (2021: EUR 1,760 million) to consolidated revenue, which equates to a share in sales of 34% (2021: 35%).

Revenue breakdown by segment



in millions of EUR	2022	% of revenues	2021	% of revenues	Change in %
Semiconductors	3,167	66%	3,279	65%	-3%
Lamps & Systems	1,652	34%	1,760	35%	-6%
	4,819		**5,038**		

The breakdown of revenue by region does not reflect the demand situation in the Company's target markets, but rather the location of the invoice recipient. Revenue in the Americas region declined due to portfolio effects from business divestments.

Revenue breakdown by region

in millions of EUR	2022	% of revenues	2021	% of revenues	Change in %
EMEA	1,455	30%	1,413	28%	3%
Americas	849	18%	962	19%	-12%
Asia / Pacific	2,515	52%	2,663	53%	-6%
	4,819		**5,038**		

2.2 Earnings

Gross profit decreased to EUR 1,258 million in fiscal year 2022, compared with EUR 1,449 million in the previous year.

Adjusted for M&A-related expenses, transformation costs, and expense for share-based compensation, the gross profit margin for the full fiscal year 2022 decreased to 31%, compared to 34% in the previous year. The unadjusted gross profit margin reported in accordance with IFRS fell to 26%, compared to 29% in the previous year. The change in margin was influenced by lower capacity utilization at our

semiconductor plants as compared with the previous year. In the year under review, the gross profit margin was further burdened by impairment losses on property, plant, and equipment in the amount of EUR 97 million, which were incurred as a result of reorganizing our manufacturing sites. In the previous year, impairment losses on property, plant, and equipment of EUR 151 million were recognized in connection with the loss of market share for certain consumer applications.

Expressed as a percentage of revenue, research and development expenses decreased to 13%, down from 14% in the previous year. The absolute amount decreased to EUR 630 million, down from EUR 692 million in the previous year. The long-term target for research and development expenses is 11-14% of revenue.

Selling, general, and administrative expenses decreased to EUR 608 million, down from EUR 697 million in the previous year due to the reduction in the number of employees. Expressed as a percentage of revenue, they fell from 14% to 13%.

The result from operations (EBIT), adjusted for M&A-related expenses, transformation costs, expense for share-based compensation, and the result from investments in associates and from the sale of businesses, decreased by EUR 95 million year-on-year to EUR 407 million. Unadjusted EBIT decreased by EUR 358 million to EUR -161 million. In fiscal year 2022, M&A-related expenses and transformation costs included in particular impairment losses on goodwill of EUR 287 million and on other intangible assets and property, plant and equipment totaling EUR 143 million. A positive one-off effect of EUR 151 million was realized from the sale of Fluence Bioengineering, Inc. In fiscal year 2021, transformation costs included impairment losses on property, plant, and equipment totaling EUR 151 million. Positive one-off effects totaling EUR 191 million were recognized in fiscal year 2021 in connection with the liquidation of OSRAM Continental, the appreciation in the carrying amount of LeddarTech Inc., and with respect to the sale-and-leaseback transaction concerning a property in Berlin.

EBITDA amounted to EUR 857 million, compared with EUR 957 million in the previous year. Adjusted EBITDA decreased by EUR 105 million year-on-year to EUR 853 million. Adjusted EBITDA is further adjusted for M&A and transformation-related depreciation, amortization, and impairment losses in addition to the effects adjusted in EBIT.

The net financial result remained almost unchanged at EUR -201 million in the year under review, compared to EUR -198 million in the previous year. Higher interest expenses, particularly due to the greater use of supply chain financing programs than in the previous year, combined with a higher interest rate level, were half offset by higher interest income. Negative currency translation effects in the previous year were EUR 70 million, compared to positive currency effects of EUR 2 million in the year under review. Accordingly, income from derivatives, which are mainly foreign currency derivatives for hedging purposes, was lower in the year under review, at EUR 8 million, than in the previous year, at EUR 32 million. A negative effect of EUR 25 million resulted from the valuation of an option for the early redemption of bonds (senior notes), which had no positive fair value as of December 31, 2022.

Income tax expense increased to EUR 82 million in fiscal year 2022, up from EUR 31 million in the previous year. The current taxes for the year under review of EUR 84 million (2021: EUR 48 million) resulted mainly from foreign companies that were profitable due to the global transfer pricing system and includes one-off tax expenses of EUR 32 from the disposal of Fluence Bioengineering, Inc. The current taxes were offset by deferred taxes with a net positive effect totaling EUR 2 million (2021: EUR 17 million).

In 2022, the net result amounted to EUR -444 million, compared to EUR -32 million in the previous year. As described above, this development was partly caused by non-recurring one-off effects, in particular impairment losses on goodwill and property, plant, and equipment. The return on equity was -16% (2021: -1%), while the return on revenue was -9% (2021: -1%).

in millions of EUR	2022	2021 reclassified*	Change in %
Gross profit	1,258	1,449	-13%
Gross margin – IFRS reported	26%	29%	
Gross margin – adjusted	31%	34%	
EBITDA (IFRS)	857	957	-10%
EBITDA – adjusted	853	958	-11%
Result from operations (EBIT) – IFRS reported	-161	197	-182%
EBIT margin – IFRS reported	-3%	4%	
Result from operations (EBIT) – adjusted	407	502	-19%
EBIT margin – adjusted	8%	10%	
Financial result	-201	-198	-1%
Result before income taxes	-361	-1	
Net result	-444	-32	
Return on equity	-16%	-1%	
Return on revenues	-9%	-1%	

The gross margin (adjusted) is based on gross profit adjusted for M&A-related expenses, transformation costs, and expense for share-based compensation.

The result from operations (EBIT, adjusted) and EBIT margin (adjusted) are additionally adjusted for the result from investments in associates and from the sale of a business, which are included in the result from operations (EBIT, IFRS).

EBITDA (adjusted) is derived from EBIT (adjusted) by adding non-M&A and transformation-related depreciation, amortization and impairment losses.

M&A-related expenses include depreciation, amortization and impairment losses on assets from purchase price allocations, as well as integration, carve-out, and acquisition costs. Transformation costs result mainly from measures needed to strengthen our competitiveness (changes to manufacturing capacity, improvement of cost position, etc.).

* 2021 figures reflect the reclassification within the functional cost categories, see Note 1. General principles in the notes to the consolidated financial statements.

Reconciliation of adjusted financial figures to the financial figures reported in accordance with IFRS:

in millions of EUR	2022	2021 reclassified*
Gross profit – adjusted	**1,470**	**1,714**
Acquisition-related expense / Asset restructuring	-184	-238
Share-based compensation	-2	-2
Transformation costs	-25	-24
Gross profit – IFRS reported	**1,258**	**1,449**
Operating expenses – adjusted	**-1,063**	**-1,211**
Acquisition-related expense / Asset restructuring	-421	-94
Share-based compensation	-38	-41
Result from the sale of businesses	155	162
Transformation costs	-48	-36
Results from investments accounted for using the equity method, net	-4	-33
Operating expenses – IFRS reported	**-1,419**	**-1,252**
Result from operations (EBIT) – adjusted	**407**	**502**
Acquisition-related expense / Asset restructuring	-605	-180
Share-based compensation	-40	-43
Transformation costs	-73	-59
Result from the sale of businesses	155	162
Result from investments in associates	-4	-33
Result from operations (EBIT) – IFRS reported	**-161**	**197**
Result from operations (EBIT) – adjusted	**407**	**502**
Amortization, depreciation and impairment (excluding acquisition-related expense)	446	456
EBITDA – adjusted	**853**	**958**

* 2021 figures reflect the reclassification within the functional cost categories, see Note 1. General principles in the notes to the consolidated financial statements.

2.3 Assets and financial position

The balance sheet has a high ratio of non-current assets to total assets, which is common in the semiconductor industry. At the same time, the intangible assets reflect the significant acquisitions carried out in recent years. At 62%, the proportion of total assets accounted for by property, plant, and equipment and by intangible assets was slightly higher than the prior-year figure of 58%.

Capital expenditure on non-current assets (CAPEX) amounted to EUR 537 million, or 11% of revenue (2021: 6%). Depreciation, amortization and impairments of EUR 1,018 million included scheduled amortization and depreciation totaling EUR 446 million (2021: EUR 456 million), i.e. amortization and depreciation that were not M&A and transformation-related. The ratio of non-current assets to equity decreased to around 52% at the end of fiscal year 2022, compared to 56% in the previous year. Non-current assets include deferred tax assets of EUR 69 million (2021: EUR 182 million).

Inventories decreased to EUR 864 million, down from EUR 938 million in the previous year, in particular due to reclassifications in the balance sheet item assets held for sale in the amount of EUR 81 million.

Trade receivables decreased to EUR 533 million as of the balance sheet date (2021: EUR 688 million), in particular because supply chain financing programs were utilized to a greater extent as of December 31, 2022 than at the end of the previous fiscal year. Another significant effect was the disposal of receivables due to the sale of our AMLS division.

Assets held for sale amounted to EUR 157 million and include the assets of the Digital Systems (DS) business in Europe and Asia and of Clay Paky S.p.A., as well as the investments in Unternehmertum VC Fonds II GmbH & Co. KG and Partech Partners S.A.S. The EUR 134 million in assets held for sale as of December 31, 2021 were the assets of Fluence Bioengineering, Inc., which were sold to Signify N.V., the Netherlands, at the beginning of May 2022.

The increase in property, plant, and equipment to EUR 1,856 million (2021: EUR 1,606 million) is mainly due to the construction of the new semiconductor manufacturing plant in Kulim (Malaysia). The carrying amount of assets under construction and advance payments on property, plant, and equipment increased by EUR 391 million to EUR 609 million (2021: EUR 218 million), which was offset by impairment losses on property, plant, and equipment and reclassifications in assets held for sale. Intangible assets amounted to EUR 3,645 million (2021: EUR 3,989 million). The change resulted mainly from the scheduled amortization of assets capitalized in connection with the acquisition of OSRAM and from impairment losses, particularly on goodwill, amounting to EUR 277 million, as well as from disposals due to the above-mentioned business divestments.

The decrease in the financial investments line item to EUR 59 million (2021: EUR 147 million) was mainly due to the change in the value of the investment in LeddarTech Inc., which was recognized directly in equity.

Financial liabilities decreased by EUR 323 million (2021: EUR 177 million) to EUR 2,803 million (2021: EUR 3,126 million), mainly due to the full repayment of the USD convertible bond, the carrying amount of which was EUR 276 million as of December 31, 2021. Further repayments related to bank loans of EUR 72 million and promissory note loans of EUR 31 million. This was mainly offset by compounding and currency effects. As financial debt, which decreased by EUR 323 million, decreased more than cash and cash equivalents, which decreased by EUR 244 million, net financial debt decreased to EUR 1,717 million, down from EUR 1,795 million in the previous year.

Group equity decreased by EUR 316 million to EUR 2,833 million as of December 31, 2022. This change mainly consists of the result after tax of EUR -444 million and positive other comprehensive income totaling EUR 90 million, which includes currency effects from the Euro translation of foreign subsidiaries of EUR 165 million that arose as a result of the depreciation of the Euro against other currencies, in particular the US-Dollar.

Liabilities associated with assets classified as held for sale amounted to EUR 50 million and include the liabilities of the Digital Systems (DS) business in Europe and Asia, and of Clay Paky S.p.A. The liabilities of EUR 40 million reported in this item as of December 31, 2021, related to Fluence Bioengineering, Inc.

For information on financial instruments and changes in equity, please refer to the disclosures in the notes to the consolidated financial statements.

Assets in millions of EUR	2022	2021
Inventories	864	938
Trade receivables	533	688
Other current assets	1,487	1,656
Non-current assets	5,879	6,180
Deferred tax asset	69	182
Total assets	**8,832**	**9,644**

Equity and liabilities in millions of EUR	2022	2021
Interest-bearing loans and borrowings	2,803	3,126
Trade liabilities	811	710
Other liabilities	1,904	2,103
Provisions	480	556
Shareholders' equity	2,833	3,150
Total equity and liabilities	**8,832**	**9,644**

The debt to equity ratio was 99%, as in the previous year, and the equity ratio was 32% (2021: 33%).

	2022	2021
Equity ratio	32%	33%
Debt to equity ratio	99%	99%
Equity to fixed assets ratio	52%	56%
Net debt	1,717	1,795

These performance indicators are derived directly from the consolidated financial statements.

2.4 Cash Flow

Cash flows from operating activities decreased to EUR 599 million, down from EUR 792 million in 2021. This was due to the development of earnings adjusted for non-cash items and the commitment of funds regarding current assets and liabilities of EUR 44 million. In 2021, funds of EUR 57 million were released in that context.

Cash flows from investing activities amounted to EUR -183 million (2021: EUR -560 million). Investments in intangible assets and property, plant, and equipment amounted to EUR -537 million (2021: EUR -310 million), of which a large part is attributable to the construction of the new semiconductor manufacturing plant in Kulim (Malaysia).

Cash payments for acquisitions amounted to EUR -25 million (2021: EUR -524 million). Of that amount, EUR 7 million related to the acquisition of a further 70% of the shares in 7Sensing Software BV, Belgium (7Sensing), which became a subsidiary of ams OSRAM as a result. In addition, payments of EUR 19 million (2021: EUR 452 million) were made for the acquisition of shares in OSRAM Licht AG. Accordingly, the interest held by ams-OSRAM AG in OSRAM Licht AG increased from 79.91% to 80.35% as of December 31, 2022. Furthermore, fiscal year 2021 included payments of EUR 72 million for the acquisition of 50% of the shares in OSRAM CONTINENTAL GmbH in connection with the dissolution of OSRAM Continental.

The net cash provided by the sale of business activities amounted to EUR 346 million (2021: EUR 277 million), of which EUR 251 million was attributable to Fluence Bioengineering Inc., EUR 85 million to Automotive Lighting Systems (AMLS), and EUR 10 million to Traxon Technologies (Traxon). In fiscal year 2021, a significant sum within this figure, EUR 144 million, related to the sale of companies to Continental.

Free cash flow came to EUR 62 million (2021: EUR 482 million). The Company's available liquidity in the form of cash and cash equivalents decreased by EUR 244 million to EUR 1,087 million in 2022. As of December 31, 2022, ams OSRAM had unused committed credit lines from banks in the amount of EUR 1,026 million (2021: EUR 1,001 million). In fiscal year 2022, a prepayment agreement related to future deliveries underpinning existing engagement was concluded. When such customer prepayments are utilized, the unused credit lines from banks are reduced based on contractual security agreements in the form of bank guarantees. As of December 31, 2022, no customer prepayments were utilized.

Cash flows from financing activities amounted to EUR -726 million in the year under review (2021: EUR -534 million). In fiscal year 2022, maturing convertible bonds with a remaining nominal volume of USD 320 million were redeemed as scheduled, which resulted in a cash outflow of EUR 334 million. In fiscal year 2021, convertible bonds with a nominal volume of EUR 77 million were repurchased at a purchase price of EUR 67 million and thereby redeemed. The repayment of bank loans and promissory note loans, which were only partially refinanced by taking out new loans, led to a net cash outflow of EUR 102 million in 2022, and EUR 190 million in 2021.

in millions of EUR	2022	2021	Change in %
Operating cash flow	599	792	-24%
Cash flow from investing activities	-183	-560	-67%
Free cash flow	62	482	-87%
Cash flow from financing activities	-726	-534	-36%
Effects of changes in foreign exchange rates on cash and cash equivalents	69	33	111%
Cash and cash equivalents	1,087	1,331	-18%

Free cash flow comprises the cash flows from the operating activities of continuing operations less cash payments for the purchase of intangible assets and property, plant, and equipment.

3. Research and development

Our development sites are globally positioned, with LED development in Germany and Malaysia, VCSEL technology in the US and Singapore, packaging development in Malaysia, China, Singapore, and Germany, micro-optics in Switzerland and Singapore, the development of conversion solutions, optical coatings and filter solutions, image and color sensor technology in the US, Germany and Austria, and IC design and development in India, the US, Italy, Spain, Austria, and Switzerland. This global network and associated leading expertise give ams OSRAM a strategic advantage.

ams OSRAM's technological leadership in the development and manufacturing of high-quality sensing and lighting technologies for use in products such as mobile devices, automotive lighting, industrial applications, and medical diagnostic technology is based on intensive research and development activities. To secure and strengthen our leadership position, we invest significantly in research and development (R&D) on a continuing basis. Research and development expenses in the past fiscal year amounted to EUR 630 million, or 13% of revenues, compared to EUR 642 million (13% of revenues) in 2021. The average number of employees in research and development was 3,453 in 2022 (2021: 3,445).

ams OSRAM's R&D activities mainly comprise optical technologies for applications involving sensors, lighting, and visualization. Our broad technology portfolio serves the consumer, automotive, industrial, and medical end markets. Furthermore, the development of software and algorithms and the integration of machine learning and artificial intelligence are now an integral part of ams OSRAM's R&D activities. In addition, the combination of individual hardware components into modules and systems with differentiating software solutions represents an important element of our product development.

One current focus of development is micro LED technology, which is characterized by microscopically small LEDs that form individual light points/pixels and can be combined to form high-resolution displays. Future areas of application include televisions, automotive head-up displays, and wearables. In particular, the technology allows for more vibrant colors, a high contrast ratio, improved display performance in unfavorable lighting conditions, and lower relative energy consumption for improved efficiency.

Our LED product portfolio was expanded in 2022 to include various new products, some of which are listed here as examples. Intelligent RGB LED solutions for dynamic automotive interior lighting open up countless design possibilities for automotive manufacturers. A new high-performance infrared edge emitter laser diode in surface mount technology (SMT) complements our LiDAR portfolio for automotive sensors. ams OSRAM has also introduced highly efficient, high-power UV-C LEDs to the market for the disinfection of air, surfaces, and water. In addition, our LED portfolio for uniform and efficient crop lighting has been expanded to support new applications in agricultural crop production. In consumer applications, ams OSRAM has introduced new solutions for display management and ambient light measurement, including behind-display technology and infrared LED lighting for 2D authentication.

ams OSRAM is a market and technology leader in optical sensors, high performance ambient lighting, and color sensors, the core elements of which are highly sensitive photodiodes that are fully integrated in CMOS ICs. These are combined with other components, such as optical filters and diffusers manufactured in a thin-film process. The combination of high-sensitivity photodiodes with hybrid optical filter technologies and chip-scale packaging solutions supports smartphone, wearable, and automotive applications. Thanks to the latest optical packaging technologies, the sensors meet performance and robustness requirements for the latest consumer applications, such as augmented reality (AR) and virtual reality (VR) data glasses. Improved sensor technologies and optical coatings extend the wavelength range of multispectral sensors, allowing for products for material analysis, as well as products where eye protection is required (e.g. in AR/VR). The new image sensors combine high performance with low power consumption and offer more flexibility to manufacturers of products with limited installation sizes. In medical imaging, ams OSRAM's fast and ultra-low-noise sensor solutions provide unprecedented image quality and reduced radiation exposure. They also form the basis of upcoming photon-counting technology, which will enable even greater resolution in computed tomography.

Close strategic coordination between our business units, strategy department, and the CTO ensures continuous improvement of our innovation processes and determines our strategic decisions on technology and product development. Collaboration takes place, for example, through research programs such as those funded by the European Commission as well as local funding programs around the world. For example, the CAVIAR project, co-funded by the EU and involving nine partners, received the PENTA Innovation Award in 2022. The CAVIAR project developed sensor components and technologies for CMOS image sensors. As part of our approach to working with strategic partners, ams OSRAM also collaborates globally with leading research institutes, universities and other companies.

The creation, maintenance, enforcement and use of patents, trademarks, and other intellectual property rights is an important aspect of our strategy to differentiate ourselves in the marketplace and to protect and monetize our R&D investments. Our global patent portfolio comprises around 15,000 patents and patent applications (2021: 15,000 patents and patent applications), corresponding to approximately 5,700 patent families (2021: 5,800 patent families).

4. Purchasing and manufacturing

Continuing imbalances in the semiconductor and other supply chains continued to affect the procurement situation in fiscal 2022, and were exacerbated by lockdown effects in Asia. Despite overall cost savings achieved through price negotiations and productivity projects, it was not possible to fully compensate for price increases with respect to contract manufacturers and particularly for electricity, precious metal, and industrial gas prices.

As of December 31, 2022, the ams OSRAM Group had 20 production sites worldwide, excluding the Clay Paky production site, which is reported as an asset held for sale on the balance sheet as of December 31, 2022. As of December 31, 2021, the Group had 23 production sites, excluding the Fluence production site, which was reported as an asset held for sale on the balance sheet as of December 31, 2021. In addition to Clay Paky, the decrease resulted from the disposal of AMLS plants in Hendersonville (Tennessee, USA) and Kunshan (China). Production sites are located in Premstaetten (Austria), Regensburg and Herbrechtingen (both in Germany), Singapore, Wuxi (China), Penang and Kulim (both in Malaysia), Antwerp (Belgium), Nové Zámky (Slovakia), Treviso (Italy), Hillsboro (New Hampshire, USA), Calamba City (in the Philippines), and elsewhere. Of the three existing plants located in Singapore, one plant in the Woodlands district was closed in fiscal year 2022.

Capacity utilization at our semiconductor plants was lower than in the previous year, following the sales trend in corresponding end markets, particularly during the second half of the year. CMOS manufacturing in Premstaetten showed improved capacity utilization compared with the previous year, however. Our most important investments in manufacturing in 2022 included starting the construction of the industry's first 8-inch LED manufacturing facility in Kulim for front-end semiconductor manufacturing of LEDs and micro LEDs. ams OSRAM also plans to expand its plant in Premstaetten (Austria) to increase internal CMOS capacity. The move should provide better opportunities for ams OSRAM to respond faster and more flexibly to increased demand and reduce the risk of dependence on external producers, allowing us to strengthen our manufacturing processes and improve profitability over the long term.

5. Employees

Our employees form the foundation for our long-term business success and create the added value ams OSRAM wants to offer its customers. It is important to us to offer our employees a long-term job with appealing working conditions and prospects, to contribute to their development, and to pay them fairly. Furthermore, as a globally active company, the diversity of our employees is a major concern for us. As of December 31, 2022, ams OSRAM Group had 22,461 employees (2021: 24,499). The average number of employees for the year was 23,322 (2021: 26,130), based on FTEs (full-time equivalents).

At ams OSRAM, we are aware of our responsibility as an important employer in the regions where we operate. Accordingly, we continued to offer comprehensive internal and external training and development opportunities for all of our employee groups during the past year, in addition to providing training positions for apprentices.

We seek to retain our employees by offering a long-term compensation concept. A profit-sharing program for all ams OSRAM employees adds an attractive direct component to our existing stock option plans and employee compensation programs. Our profit-sharing program embodies the belief that our employees are the most important factor in the success of our company by rewarding the joint contribution of all of our employees to ams OSRAM's success.

Based upon earnings performance in the previous fiscal year, a profit-sharing bonus was paid to employees in the amount of EUR 16 million in 2022 (2021: EUR 19 million). The amount of the bonus is determined on the basis of adjusted earnings after tax.

In addition, active internal corporate and employee communication, as well as a long-standing company tradition of regular employee events, promote employee identification with our company. Such events include, for example, town hall meetings or webcasts given by our Management Board and other management representatives. To obtain continuous feedback from employees in addition to such dialogue events, a global employee survey was held in 2022 in which 78% of our workforce participated. The insights gained from the survey will be used as a basis for developing measures that will further increase ams OSRAM's attractiveness as an employer.

6. Environmental management

As an industrial company, ams OSRAM consumes natural resources and creates greenhouse gas emissions at its production facilities. In order to meet our environmental responsibilities, we have committed to conserving resources through environmental management, as well as developing innovative and energy-efficient products. As a first step, we have also created a climate strategy that aims to achieve CO2 neutrality in our own value creation by 2030. As part of our environmental reporting, we collect data on energy consumption, greenhouse gas emissions, water abstraction, and waste generation.

The ways in which we implement environmental management and address other aspects of sustainability are described in a separate sustainability report, which can be found here. In addition to describing our organizational structure, responsibilities, guidelines and processes, the report also explains the specific goals, measures, and results relating to all topics of importance to ams OSRAM.

7. Subsidiaries and investments

As the parent company of the ams OSRAM Group, ams-OSRAM AG had 99 subsidiaries in 40 countries as of December 31, 2022 (December 31, 2021: 117 subsidiaries in 43 countries). The decrease resulted both from disposals (AMLS companies and Fluence Bioengineering Inc.) and from company mergers. As a result of the complete acquisition of 7Sensing Software BV, it was fully consolidated as a subsidiary for the first time in fiscal year 2022. In addition, ams-OSRAM AG held direct or indirect interests in 26 companies as of December 31, 2022 (December 31, 2021: 33 companies).

As of December 31, 2022, ams-OSRAM AG held 80.35% (2021: 79.91%) of the outstanding shares in OSRAM Licht AG. OSRAM Licht AG directly or indirectly holds 100% of the shares in all fully consolidated OSRAM companies, with the exception of OSRAM China Lighting Ltd., in which it holds only 90% of the shares.

Significant associates and other investments:
As of December 31, 2022, significant associates for ams OSRAM that are accounted for using the equity method particularly included the following:

Name of holding	Country of incorporation	Ownership interest
Jinan Smart Sensing Sensor Co, Ltd.	China	49.00%
Sciosense Holding BV	Netherlands	45.22%
Bolb Inc.	USA	20.38%

Bolb Inc. is a manufacturer of high-efficiency ultraviolet C-band (UV-C) light-emitting LEDs. Research collaboration between our two companies is expected to accelerate the industrialization of highly efficient, high-performance UV-C LEDs.

Jinan Smart Sensing Sensor Co. Ltd. is a holding company for a provider of environmental sensors and high-performance flow sensing systems. Sciosense Holding B.V. is a direct subsidiary of Jinan Smart Sensing Sensor Co. Ltd.

As of December 31, 2022, significant investments for ams OSRAM that are accounted for at fair value particularly included the following:

Name of holding	Country of incorporation	Ownership interest
LeddarTech Inc.	Canada	19.20%
Recogni, Inc.	USA	5.33%
SiLC Technologies Inc.	USA	4.86%

8. Risk management

Main features of the accounting-related internal control system
The internal control system, which has been adapted in the context of integration into the ams OSRAM Group, is being implemented in the course of the harmonization of processes and IT systems at the Company as a whole. In this respect, ams OSRAM made further progress as planned in fiscal year 2022, and thus the process is now almost completed. We are also continuously refining our internal control system in order to meet all requirements.

The overarching goal of our accounting-related internal control system is to ensure the correctness of financial reporting in the annual and consolidated financial statements. The system consists of preventive and detective controls, which aim to ensure that group-wide standards for accounting, valuation, and account assignment are continuously updated and maintained. It aims to ensure that transactions can be completely recorded, that group-internal transactions are appropriately eliminated, and that processes and rules are established for the separation of functions and for observing the principle of dual control when preparing the financial statements. It also aims to ensure that individual access authorizations for accounting-related IT systems are in place.

The effectiveness of the internal control system is reviewed on an annual basis. The relevant internal controls are adjusted if necessary to eliminate any detected areas of weakness. The internal audit function of ams OSRAM uses continuous and group-wide audits to ensure compliance with group-wide guidelines as well as the reliability and functionality of the control system.

The Audit Committee of the Supervisory Board oversees the accounting process and the effectiveness of the control system. It is also responsible for auditing the documents for the individual financial statements of ams-OSRAM AG and the consolidated financial statements, and it discusses the individual financial statements of ams-OSRAM AG, the consolidated financial statements, and the combined management report with the Management Board and the auditor. The Supervisory Board also examines the sustainability report of the ams OSRAM Group, which is prepared on a voluntary basis.

Enterprise Risk Management (ERM) System
ams OSRAM practices systematic risk management to identify, assess, and control risks. Risks that could endanger the continued existence of the ams OSRAM Group or the achievement of our strategic, operational, financial, and compliance objectives can therefore be identified at an early state and risk-limiting measures initiated. We are continuously refining our risk management system in order to meet changing internal and external requirements.

The central office for risk management coordinates the risk management process and risk reporting. Responsibility for the identification, assessment, reporting, and management of significant risks is borne by management at the level of the central units and the business units.

Semi-annual meetings are held with management to assess any material risks identified. In these meetings, the reported risks are assessed uniformly based upon their effects on our business activity and their probability of occurrence. ams OSRAM's assessments follow the net principle, in which we assess risks in light of previously initiated effective actions.

Non-financial risks, such as transitory and physical climate risks, are also included in the ERM process and are qualitatively assessed using the aforementioned method. If this assessment shows significant risks for the Group, the risks are reported as part of the subsequent risk reporting.

At ams OSRAM, the enterprise risk management system is a part of the interrelated processes and systems used for managing the Company. In this system, strategic business planning, controlling, and reporting provide detailed information about the Company's performance. Although enterprise risk management focuses primarily on systematically addressing risks to the Company, business opportunities that arise and the means to achieve them form the core of the strategy, planning, and controlling process.

Regular reports on significant risks to the Company are submitted to the Management Board and the Audit Committee of the Supervisory Board on a semiannual basis and are supplemented by ad hoc reports as necessary. This ensures that the Management Board and the Supervisory Board receive complete and timely information on significant risks to the Company. The Management Board of the ams OSRAM Group determines whether risks, either individually or in their entirety, represent an existential threat and establish that there is no substantial threat to the going concern. The Audit Committee of the Supervisory Board monitors the effectiveness of this system.

The following section provides a description of the significant risks for the ams OSRAM Group, which could have particularly negative effects overall on our business activity as well as the results of operations, net assets, and financial position. Based upon the individual development of the two risks reported in the prior year, 'Risk of failure to achieve strategic objectives in connection with the OSRAM Group merger' and 'Material shortages', as well as the current assessment of their effects, these risks are classified as no longer particularly negative and are therefore no longer part of the following report. The first reason for this is that the cost synergies and the sale of portions of the Company will foreseeably be implemented as planned. Secondly, the COVID-19 pandemic is having a less negative effect on ams OSRAM's supply chain. Because of their increasing importance, the following report will also cover the risks > Geopolitical risks – Russia and China as well as > Manpower shortages and the loss of skilled employees.

Strategic risks

Competition for the introduction of new technologies
The ams OSRAM Group operates in a high-tech industry with a strong focus on technologically advanced applications and relatively short product life cycles. There is a risk that disruptive technologies could quickly become market-ready. Competitors could also introduce alternative products or technologies that are more cost-effective, of higher quality, possess greater functionality, or are more competitive for other reasons. There is also the risk that changes in market and customer requirements are not or cannot be considered early enough and to a sufficient extent. In the case of the introduction of new technologies, such as micro-LED technology, there are also uncertainties as to when and to what extent sales will be generated from the products based on these new technologies. It is also possible that the actual adoption of new and highly innovative technologies by the markets will deviate from expectations. This entails the risk that investments already made in research and development or in fixed assets could be recovered through sales at another point of time or may not be sufficiently recouped through revenues. Most notably, this could also prevent the sufficient utilization of newly built production capacities and thereby reduce the profitability of the entire Group.

ams OSRAM must therefore develop innovative and differentiated technologies for products that can be manufactured competitively in terms of technology and cost for the right applications and markets and make them market-ready in a timely manner. The future success of ams OSRAM also depends upon whether its internally developed intellectual property can be sufficiently protected and profitably utilized. Failure to do so may endanger the future growth and competitiveness of the entire Group. It may lead to a rapid decline in market share in established areas of business or failure to achieve growth objectives in new fields of technology. Investments already made in research and development could not be recouped through revenues, which would reduce the profitability of the entire Group.

ams OSRAM counters these risks with specific measures. Potential new fields of technology are monitored and the results of these observations are thoroughly considered in our strategic planning. Technological expertise that will be necessary in the future is incorporated into the technology roadmap for the respective business segments at an early stage. The technology roadmap is an integral part of medium and long-term strategic planning. ams OSRAM has also further reinforced a team that performs market analyses and reviews areas of technology as well as research and development plans on a regular basis, so that these areas can be focused on more sharply if needed. A newly established committee closely monitors the most important areas of application for new technologies. Risk management for the most important innovation projects has been further intensified. In addition, we are working to optimize the efficiency of our operational product development processes.

Macroeconomic effects as well as volatile and cyclical market developments
Following the COVID-19 pandemic's severe effects on macroeconomic performance in fiscal years 2020 and 2021, the incipient global economic recovery in fiscal year 2022 was severely impeded by the Chinese government's zero-COVID policy and the war in Ukraine. In the opinion of ams OSRAM, there are still enormous uncertainties with respect to the global macroeconomic situation, and these might continue to grow in the future.

Other factors, such as the emergence of new geopolitical conflicts or the intensification of existing conflicts > Geopolitical risks – Russia and China could also have a negative effect on global economic performance.

Supply chain disruptions caused by the pandemic, which continue even though they are clearly in decline, and above all the war in Ukraine with its associated sanctions and supply restrictions led to a further significant rise in inflation in 2022. As a consequence and a countermeasure, a number of central banks, including the European Central Bank and the US Federal Reserve, increased base rates substantially at times and adjusted their previously expansive monetary policies. This led to a tangible weakening of economic activity and more negative economic forecasts for 2023 in the course of fiscal year 2022. It remains to be seen how many interest rate increases by the central banks will be necessary to curb inflation. There is a risk that economic growth will weaken more than previously assumed. It is therefore possible that global economic performance, as well as performance in relevant regional submarkets, will be poorer than forecast in the current plans for fiscal year 2023.

The overcast economic climate could cause end customer demand for technologically advanced consumer products and automobiles to decline more strongly than anticipated in our plans. This could also have negative effects on the demand for semiconductor-based technologies such as sensors, LEDs or optical solutions, and could cause customers to make short-term adjustments of their purchase quantities. In addition to the revenue risk, this also creates a cost risk for ams OSRAM due to fluctuations in capacity utilization of our own production and potentially increased inventories. Inflation-related price increases could also have an effect on relevant procurement markets for ams OSRAM. Economic trends could also cause individual countries and regions to experience significant increases in wages and salaries, which could lead to a higher than expected increase in personnel costs.

We continuously monitor appropriate early warning indicators and incorporate them into continuously improved market models that enable us to develop and regularly adapt effective response strategies. We take appropriate proactive measures where needed to safeguard the generation of profits and financial resources. We precisely monitor our inventory levels and structures and have installed a strict receivables management system. Investments are also rescheduled and reduced to the extent possible.

We also conduct regular reviews of our value chains, i.e., our global and regional presence and the relevant processes. With these measures, we strive to achieve cost savings and operational improvements that will enable ams OSRAM to secure its profitability, even in unfavorable economic conditions.

Geopolitical risks – Russia and China
The geopolitical situation is currently dominated by the war in Ukraine. There could also be a further escalation in China's claims of sovereignty over Taiwan and therefore an increased decoupling of the relationship between the USA and China.

These risks could have direct effects on ams OSRAM's existing procurement and sales markets, as well as indirect consequences due to changing macroeconomic conditions.

A possible geographical expansion of the war in Ukraine, including the NATO countries, could have serious consequences on the macroeconomic environment and also on the market environment of ams OSRAM. Even a continuation of the current military conflict entails significant risks, however. Possible bottlenecks in energy supplies could lead to energy rationing as well as a further increase in the already high level of inflation, which could result in new monetary policy responses by the central banks and further weakening of the business environment. The consequences of this development could increase the risks described under > Macroeconomic effects, > Business interruption, > Financial risk, and > Dependence on suppliers, and the realization of such risks could have negative effects on the results of operations, financial position, and net assets of the ams OSRAM Group. ams OSRAM's business could also suffer from increasing protectionism and the expansion of trade barriers caused by political conflicts between individual countries. First and foremost, an increase in the political tensions between the USA and China could impair the trade relationships of both nations' economies – which are also important for ams OSRAM's business – and could lead to further restrictions. Such restrictions could notably also have an effect on sales volume and procurement by ams OSRAM in both markets. Customers and suppliers of ams OSRAM could also be directly impacted by the effects of the geopolitical conflicts. On the other hand, the indirect consequences, such as those described under > Macroeconomic effects and volatile as well as cyclical market developments, could also have an impact on sales and procurement markets.

ams OSRAM is monitoring developments very closely so that it can react in a rapid and prepared manner to any changes in business conditions. Geopolitical developments are also playing an increasingly important role in upcoming investment decisions.

Competitive environment
Competitive pressure in the semiconductor industry continues to be generally high due to the large number of existing competitors and new market participants. Because of the semiconductor shortage, made particularly severe over the past few years by the COVID-19 pandemic, worldwide expansions of production capacity are currently being implemented, some with substantial government subsidies.

Given the drop in demand for semiconductor products caused by the overcast economic climate and the existing risk of further deterioration of economic conditions described under > Macroeconomic effects as well as volatile and cyclical market developments, there is the risk that manufacturers such as ams OSRAM will have to differentiate themselves by price to a greater extent than expected in order to fully utilize their production capacity. This increased price competition could negatively influence the achievement of our objectives in terms of both profitability and market share.

ams OSRAM continuously monitors and analyzes its competitive environment. In addition, we regularly review additional productivity enhancement and cost reduction measures, including the consolidation of production capacities. ams OSRAM also focuses on targeted research and development expenditures that allow us to differentiate our products through technological advances, thereby ensuring the profitable utilization of existing capacities. Through these efforts, we can also counteract the risk described under > Competition for the introduction of new technologies.

We also regularly review the effectiveness of our channels of distribution.

Operational risks

Customer concentration
If a disproportionately high percentage of the ams OSRAM Group's revenue and profit is earned from individual customers, the Company's business success or market share could become dependent upon these individual customers' market share or business success. If these customers cannot be contractually committed to minimum order quantities, customer order quantities may be reduced and orders may be delayed or canceled. In such a case, it may be impossible to recoup through revenues the investments already made in research and development or to sufficiently utilize customer-specific production capacities. This would reduce the profitability of the entire Group. There is also the risk that customer-specific product adaptations for significant orders from key accounts could lead to higher development costs and higher production costs in serial production, and that the additional costs thereby incurred could not be adequately compensated, for example through price adjustments. Thus, there is the risk that profit contributions from business with key accounts could be lower than forecast in the original plans.

The consumer business of ams was characterized by high customer concentration. The merger with the OSRAM Group has clearly expanded the existing customer and product portfolio of ams and reduced the share of customer specific contract manufacturing volume. ams OSRAM is nevertheless striving to achieve further diversification of the customer and product portfolio in order to reduce possible negative effects from business with key accounts. We have also set up a close-knit risk management system for significant individual orders from key accounts.

Cyber risks and IT risks
The increasing digitization of business processes makes the reliability and security of the company-wide system infrastructure extremely important. Regulatory requirements for the protection, integrity, and availability of data are also on the rise.

There has been an evident increase in cyberattacks worldwide, and external attacks on IT systems of ams OSRAM can therefore not be ruled out. Such attacks could result in the theft of business information, intellectual property, and personal data. A lack of risk awareness on the part of employees and improper handling of our IT systems could also make external attacks easier or could lead to situations in which data are lost or can be recovered only at significant expense. Malfunctions in the IT systems could also cause significant interruptions of the production and supply chain, which would entail loss of revenue.

To counter these risks, ams OSRAM has already transferred IT systems and applications to sufficiently secure cloud solutions, and we conduct independent tests at regular intervals to determine the vulnerability of our IT systems. In terms of information security, the company operates in accordance with the ISO27001 standard. In addition, regular employee training is conducted and an emergency response service provider is contracted in the event of a serious cyberattack. ams OSRAM has a Chief Information Security Officer, who reports directly to the Chief Information Officer. In addition to technical measures, information security also requires communication and governance. The existing system is continuously improved and its effectiveness monitored by means of internal and external audits. The Supervisory Board is kept informed about the results of these activities. In the area of data protection, a comprehensive data protection management system has been implemented and globally applicable corporate guidelines ensure company-wide standards for handling personal data. Further refinement of data protection is promoted by actions that include training for all employees and implementation of uniform technical and organizational measures, particularly when data are being processed by external service providers.

Business interruption risk
The continuous optimization and focusing of the integrated production environment means that dependence on individual production locations is increasing. Thus, there is a risk that disruptions at ams OSRAM's plants or external influences could result in an inability to produce or deliver products in the planned scope. That is why, in addition to insuring against damage to equipment and buildings, we also maintain appropriate insurance to protect against risks arising from business interruption. We also conduct preventive maintenance and have defined emergency plans for critical areas to ensure the availability and quality of our products. Fire and disaster protection for significant locations is also continually reviewed and improved. The risk of supply bottlenecks is reduced where possible by diversifying our supplier base and closely monitoring critical vendors and materials.

The current war in Ukraine is having enormous effects on global energy supply, and particularly in Europe > Geopolitical risks – Russia and China. ams OSRAM has been working to secure gas supplies for the plants in Germany and Austria since the beginning of fiscal year 2022 and have largely eliminated the risk of a gas shortage. Energy supply bottlenecks could lead to rationing of energy supplies, however, or in a worst-case scenario could also cause unannounced, longer lasting, and widespread power outages. ams OSRAM is countering this risk with appropriate emergency plans.

Based upon the measures already undertaken, the experience gained during the COVID-19 pandemic, and the pandemic's overall decline, ams OSRAM considers the probability of business interruptions to be lower than in the prior year. Nevertheless, we continue to prioritize the prevention of COVID-19 infections within our own company.

Dependence on suppliers
To avoid dependence on individual suppliers for critical materials, we generally vet at least one secondary source in addition to the preferred vendor. This is not always possible or economically practical, however. Moreover, certain production services in the semiconductor industry can be outsourced to only a limited number of wafer producers.

Firstly, ams OSRAM faces the risk of price increases by suppliers. Secondly, one or more of these suppliers may fail to fulfill its supply obligations, which would impair our delivery capacity and result in loss of revenue.

Although we were able to find alternatives for Russian suppliers in fiscal year 2022 to the extent necessary, given the sanctions in force at the time, we continue depend substantially upon Taiwan-based suppliers. The occurrence or worsening of the geopolitical risks described under > Geopolitical risks – Russia and China could negatively affect the supply situation for these suppliers, and in a worst-case scenario could also lead to business interruptions > Business interruption risk. It is also possible that we will be unable to develop a long-term business relationship with some of our alternate suppliers and must therefore establish new supplier relationships.

Information collection and regular monitoring of our suppliers' financial situations is also a fixed component of our supplier risk management process. Dedicated employees coordinate our collaboration with important production service providers. ams OSRAM also maintains a forward-looking inventory and procurement management process and concludes long-term delivery agreements wherever possible.

Manpower shortages and the loss of skilled employees
To develop, produce, and sell its high-tech products and solutions, the ams OSRAM Group requires, in some cases, highly qualified employees in the engineering sciences and other technical areas, as well as executives with international experience. There is tough competition for such talent and experts, as well as for executives, particularly in the semiconductor industry and in the regions where we are active. Moreover, due to uncertainties related to the merger of ams and OSRAM, the Company was unable to retain certain key personnel in recent years to the desired extent. The future performance of ams OSRAM also depends upon the degree to which it can identify, recruit, develop, and retain the talent, engineers, and executive managers needed.

ams OSRAM is countering this risk with a professional approach that is adapted to the current circumstances in personnel recruitment, and which we are continually optimizing and adapting to market conditions. In addition, we are using information gained from employee surveys to implement measures that will make working for ams OSRAM even more attractive. We also place a high priority on further enhancing opportunities for career development and employee satisfaction in order to ensure the long-term retention of important skilled employees and top performers.

Well-defined career development processes and programs, as well as targeted succession planning for key functions, help our employees grow and to prepare them internally for management positions if they are suitable and willing to reach out for such functions. We have also strongly expanded our presence in social media and use these channels to recruit new employees. In addition, we engage in many employer branding activities, such as participation in training days and career fairs for students to communicate our employer positioning and to present the Company as an attractive employer.

Quality risk
Meeting market and customer-specific requirements for our products is particularly important for our business success. The increasing complexity of product and manufacturing processes and shorter development cycles increase the risk of possible quality issues. Products manufactured by ams OSRAM are integrated into complex electronic systems. Errors or functional defects in products produced by ams OSRAM could directly or indirectly compromise the property, health, or life of third persons, and could therefore lead to recalls from our customers and negative effects on our reputation.

We counter this risk through group-wide quality processes, which are audited internally at regular intervals based upon established standards (such as ISO 14001, ISO 13485, ISO 9001, and IATF 16949) and audited externally by our customers, and also certified by external companies. In the event of quality defects and product safety incidents, we have established an effective reporting system to ensure a timely response.

Financial risks

The ams OSRAM Group is subject to a variety of financial risks. The relevant risks include liquidity risk, interest-rate risk, foreign currency risk, and credit risk.

Changes in credit ratings, currency exchange rates, interest rates, and the general capital market situation can influence both our operational business and our investment and financing activities. Market price fluctuations can lead to significant volatility in profits and payment flows.

Financial risk management is conducted by the central Treasury department based upon guidelines approved by the Company's Management Board and Supervisory Board. The Treasury department assesses and hedges against financial risks in close collaboration with the operational business areas, also using financial derivatives.

Liquidity risk
The liquidity risk is that ams OSRAM could be incapable of meeting its financial obligations when they come due. Debt financing undertaken in conjunction with the acquisition of the OSRAM Group has increased the need for financing as well as expectations with respect to the Group's financial performance. Short-term and long-term liquidity and business planning that accounts for the sale of parts of companies and the achievement of integration-related cost synergies are helping to secure the future financial success of the ams OSRAM Group. The Company has sufficient cash on hand, as well as a substantial amount in approved long-term credit lines that have not been utilized. A financing structure that has been diversified in terms of financial instruments and maturity profile also provides a sufficient margin.

Several financing agreements contain arrangements customary for the market, under which the ratio of net financing debt to adjusted EBITDA (pursuant to the respective definition) must not exceed 4.0:1. The resulting risk of calls for early repayment or blocks on utilization of credit is intensively analyzed in the context of short and long-term business and financial planning.

Most notably, the realization, either to their full extent or in a disadvantageous combination, of the risks described under > Macroeconomic effects as well as volatile and cyclical market developments, > Geopolitical risks – Russia and China, > Competition for the introduction of new technologies, and > Customer concentration could significantly increase future financing risk.

Interest-rate risk
In particular, the effects and risks described under > Macroeconomic effects, as well as volatile and cyclical market developments and > Geopolitical risks – Russia and China, have led to changes on the financial markets in the course of fiscal year 2022, including higher interest rates and more restrictive financing.

In principle, an increase in interest rates could lead to rising financing costs for ams OSRAM and thus to increased interest-rate risk, while falling interest rates could lead to lower interest income from financial investments. This risk of changes in interest rates is countered by the fact that under liabilities, approximately 95% of the Company's financial liabilities have fixed interest rates. Upcoming refinancing of existing fixed-interest-rate financing may encumber the future interest result, depending upon how the market develops. Under assets, risks of changes in interest rates exist primarily in relation to short-term time deposits, which are linked to the market interest rate. Offsetting items under assets and liabilities naturally reduces overall exposure.

Most notably, the realization, either to their full extent or in a disadvantageous combination, of the risks described under > Competition for the introduction of new technologies and > Customer concentration could cause rating agencies to adjust the financial valuation of the ams OSRAM Group. Possible adjustments could also negatively affect the Group's future individual financing terms.

Foreign currency risk
As a global company, we conduct financial transactions in a number of different currencies. This results in risks caused by fluctuations in foreign currency exchange rates, both in our operational business as well as in financial reporting from currency conversion into the group reporting currency. Based upon our corporate structure, these result primarily from fluctuations of the Euro vis-à-vis the US-Dollar and Malaysian ringgit. Exchange rate fluctuations can have a negative effect on our profit, equity, and cash flow. In order to hedge currency risks from our operational business and financial positions, we monitor all transaction risks and conversion risks. Depending upon the respective risk situation, we also use financial derivatives to hedge against net risks from balance sheet items and possible risks from scheduled transactions.

Credit risk
Credit risks arise when a customer or a counterparty to a financial instrument is incapable of fulfilling its payment obligations. In accordance with the treasury and risk management policy, investments and transactions involving derivative financial instruments are carried out only with a diversified selection of financial institutions having a high level of creditworthiness. Individual credit limits for customers and financial institutions are defined on the basis of external and internal data and are monitored on an ongoing basis. There was no significant concentration of credit risks as of the balance sheet date.

Legal and compliance risks

As a global company, the ams OSRAM Group with its subsidiaries is subject to a variety of legal and compliance risks. These include the risk of litigation, the risk of infringement of proprietary rights, and the risk of noncompliance with regulatory requirements. ams OSRAM may therefore be confronted with various court proceedings, claims, and official investigations. These could cause the Company to incur costs, e.g. for damages, recalls, fines, or other financial detriments, as well as reputational damage.

Like ams OSRAM, many of our competitors, suppliers, and customers also protect their technology through patents or other proprietary rights. The enforcement of claims by other parties based upon an alleged infringement of proprietary rights could lead to significant costs in the form of court costs, damages, and/or license fees. Such claims could also hinder the business of ams OSRAM. We reduce that risk by maintaining and, if necessary, enforcing a strong IP portfolio. We also monitor the external IP environment. If necessary, we also acquire licenses to ensure our freedom of action.

ams OSRAM is also subject to a variety of governmental regulations worldwide, e.g., in the areas of environmental protection, product safety, and labor conditions. Of primary significance here is the increasing complexity of regulations relating to reporting obligations in the area of sustainability and in dealing with the protection of human rights in the supply chains. Under certain circumstances, a failure to comply with the relevant regulations may result in significant fines and reputational risks. To prevent this to the extent possible and to anticipate future regulatory changes in a timely manner, ams OSRAM monitors global changes in the legal landscape through central departments that support the country-specific implementation of appropriate processes and controls.

If economically practical, we also purchase insurance to cover a portion of the risks. Note 18 ‘Provisions’ of the Notes to the Consolidated Financial Statements provides an overview of significant legal disputes. In order to avoid and, if necessary, identify compliance-related events in a timely manner, ams OSRAM also has a group-wide compliance management system.

Overall estimate of risks
In the past fiscal year, the risk situation of the ams OSRAM Group was particularly influenced by the general worsening of macroeconomic conditions, whereas risks related to the COVID-19 pandemic decreased. Geopolitical risks, on the other hand, increased significantly in connection with the direct and indirect consequences of the Russian war of aggression against Ukraine.

The risks associated with the overall business environment, which are strongly influenced by geopolitical crises, could have a serious effect on the business of ams OSRAM and could frequently require new operational actions as well as adjustments to its strategy. It remains to be seen how extensive and long-lasting these effects will be for our business in future.

Taking into account the respective probability of occurrence and the potential effects, the risks enumerated in this report currently do not put the going concern assumption at risk, either individually or in their entirety. Given the balance sheet structure and the current business prospects, the Management Board does not expect any substantial threat to the going concern. This assessment is supported by the current financing structure, see Note 19 ‘Interest-bearing Loans’ of the Notes to the Consolidated Financial Statements.

9. Events after the balance sheet date

On January 30, 2023, ams OSRAM announced that, after more than seven years, Alexander Everke will retire from his position as Chief Executive Officer effective March 31, 2023, and will resign from the Company's Management Board. The Supervisory Board has appointed Aldo Kamper as a member and Chairman of the Management Board effective April 1, 2023. He has been CEO of Leoni AG, Nuremberg, a global provider in the field of energy and data management for the automotive industry, since 2018. Previously, he held various management positions at OSRAM for more than 15 years, including General Manager of the Opto Semiconductors business. Mr. Everke will actively support the handover of his duties and will remain available for consultation for ams OSRAM until the end of 2023.

10. Outlook

In 2023, ams OSRAM expects significant uncertainties and an unclear outlook for global economic trends, private consumption, and worldwide industrial production, including automotive unit volumes, to determine the development of major economies and regions. ams OSRAM is therefore subject to potentially volatile end market developments, customer performance that may be difficult to anticipate, and potential unforeseen changes in semiconductor industry dynamics, demand trends, and supply chain performance. ams OSRAM has built a strong market position in important markets and is confident of its ability to serve evolving customer needs. Leveraging these advantages, ams OSRAM expects to introduce advanced solutions for illumination, visualization, and sensing, make high volume shipments to its global customer base, and achieve planned production ramps of diverse design-wins.

ams OSRAM will continue the successful integration of OSRAM in the current year on the basis of planned programs and the domination and profit and loss transfer agreement between the two companies. ams OSRAM therefore expects to record further expenses from integration-related activities in 2023 based on current information. Looking ahead, ams OSRAM expects the full integration of both companies to offer significant mid and longer-term business advantages and positive financial effects for the group.

Given its current assessment of semiconductor and end market dynamics and the global macro-economic trends, ams OSRAM expects its business to record an overall solid development in 2023. However, should global semiconductor demand and the macro-economic environment develop more unfavorably in 2023 and/or the US-Dollar show notable weakness, ams OSRAM would experience a meaningful impact on the development of its business and earnings.

ams OSRAM has set itself the strategic goal of becoming the global leader in optical solutions supported by the full integration of OSRAM. In this growth strategy, the mid-term priorities for ams OSRAM are expanding the group's business with key accounts globally and driving higher penetration of its worldwide markets and customer base. ams OSRAM focuses on an innovation-driven portfolio of optical technologies for light emission and sensing to create customer-centered high-performance solutions. ams OSRAM expects this approach to drive diversified long-term growth opportunities in its automotive, consumer, industrial and medical end markets.

11. Other information

For information on equity, treasury shares, and equity investments, please refer to the notes to the consolidated financial statements.

Premstaetten, February 27, 2023

ams-OSRAM AG, Premstaetten

Alexander Everke
Chairman of the Management Board
CEO

Ingo Bank
Member of the Management Board
CFO

Dr. Thomas Stockmeier
Member of the Management Board
CTO

Mark Hamersma
Member of the Management Board
CBO