BOSCH

Onwards

Annual report 2022

We have the future in our sights, and the solutions we are working on orient to this.

Technology can’t solve all the world’s problems – but it can make a crucial contribution. Our response to climate change is to use Bosch technology to make our locations worldwide carbon neutral, and we are already working to achieve our next sustainability milestones. Our research and development is pressing ahead to establish the hydrogen economy and electromobility. In our view, it is our task to extend our technological expertise for the good of society – and in doing so to give rise to technology that is ever better and smarter. It’s no coincidence that our strategic imperative is “Invented for life.”

“Onwards,” the title of this year’s annual report, gives expression to this proactive mindset – a mindset that examines crises from all angles in order to help overcome them.

Table of contents

The Bosch Group

Selected key data

Figures in millions of euros

	2022	2021
Sales revenue	**88,201**	**78,748**
percentage change from previous year	12.0	10.1
percentage share of sales revenue generated outside Germany	80	80
Research and development cost	**7,224**	**6,110**
as a percentage of sales revenue	8.2	7.8
Capital expenditure	**4,896**	**3,949**
as a percentage of depreciation	141	116
Headcount		
average for the year	413,811	399,703
at December 31	421,338	402,614
Balance-sheet total	**100,247**	**97,723**
Equity	**46,727**	**44,304**
as a percentage of total assets	47	45
EBIT	**3,474**	**2,815**
as a percentage of sales revenue	3.9	3.6
Profit after tax	**1,838**	**2,499**
Dividend of Robert Bosch GmbH	**162**	**143**

Bosch at a glance

The Bosch Group is a leading global supplier of technology and services. It employs roughly 421,300 associates worldwide (as of December 31, 2022). The company generated sales of 88.2 billion euros in 2022. Its operations are divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. As a leading IoT provider, Bosch offers innovative solutions for smart homes, Industry 4.0, and connected mobility. Bosch is pursuing a vision of mobility that is sustainable, safe, and exciting. It uses its expertise in sensor technology, software, and services, as well as its own IoT cloud, to offer its customers connected, cross-domain solutions from a single source. The Bosch Group's strategic objective is to facilitate connected living with products and solutions that either contain artificial intelligence (AI) or have been developed or manufactured with its help. Bosch improves quality of life worldwide with products and services that are innovative and spark enthusiasm. In short, Bosch creates technology that is “Invented for life.” The Bosch Group comprises Robert Bosch GmbH and its roughly 470 subsidiary and regional companies in over 60 countries. Including sales and service partners, Bosch's global manufacturing, engineering, and sales network covers nearly every country in the world. With its more than 400 locations worldwide,

Bosch at a glance

the Bosch Group has been carbon neutral since the first quarter of 2020. The basis for the company's future growth is its innovative strength. At 136 locations across the globe, Bosch employs some 85,500 associates in research and development, of which nearly 44,000 are software engineers.

The company was set up in Stuttgart in 1886 by Robert Bosch (1861–1942) as "Workshop for Precision Mechanics and Electrical Engineering." The special ownership structure of Robert Bosch GmbH guarantees the entrepreneurial freedom of the Bosch Group, making it possible for the company to plan over the long term and to undertake significant upfront investments in the safeguarding of its future. Ninety-four percent of the share capital of Robert Bosch GmbH is held by Robert Bosch Stiftung GmbH, a charitable foundation. The remaining shares are held by Robert Bosch GmbH and by a corporation owned by the Bosch family. The majority of voting rights are held by Robert Bosch Industrietreuhand KG, an industrial trust. The entrepreneurial ownership functions are carried out by the trust.

Business sectors

Mobility Solutions

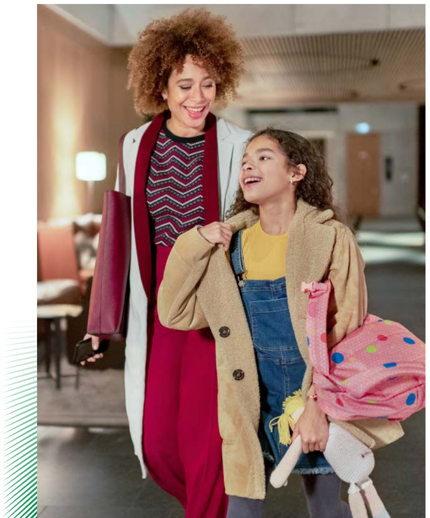
- **Powertrain Solutions**
- **Chassis Systems Control**
- **Electrical Drives**
- **Cross-Domain Computing Solutions**
- **Automotive Electronics**
- **Automotive Aftermarket**
- **Automotive Steering**
- **Bosch eBike Systems**

- Bosch Engineering GmbH
- ETAS GmbH
- ITK Engineering GmbH
- Two-Wheeler and Powersports

Industrial Technology

- **Drive and Control Technology**[1]

- Bosch Connected Industry
- Robert Bosch Manufacturing Solutions GmbH



Energy and Building Technology

- **Building Technologies**
- **Thermotechnology**
- **Bosch Global Service Solutions**

- Robert Bosch Smart Home GmbH

Consumer Goods

- **Power Tools**
- **BSH Hausgeräte GmbH**

Other businesses not allocated to business sectors
- Bosch Healthcare Solutions GmbH
- grow platform GmbH
- Robert Bosch Venture Capital GmbH

1. Bosch Rexroth AG (100% Bosch)

Foreword

DR. STEFAN
HARTUNG

Ladies and gentlemen,

“Onwards,” the title of the present annual report, sums up how we act. Even when times are difficult, we set our sights on the future.

In the 2022 business year, we were not only faced with the challenge of the lingering Covid-19 pandemic and continuing supply shortages of chips, but also with new and unexpected tasks as a result of the war in Ukraine. Central to these tasks was the well-being of the associates affected. Much of our business in Russia came to a halt. In addition, we were confronted with massive price hikes for energy and raw materials. The 2023 business year will also be demanding, especially as the global economy will grow only slightly. Yet despite this challenging environment, we remain optimistic.

We have every reason to be so: we rose to the great challenges we encountered in 2022. Our sales revenue was significantly higher than expected and, despite the considerable burdens, we were able to slightly increase our EBIT margin from operations year on year. This alone was a fantastic feat on the part of our more than 420,000 associates worldwide, to whom the photographs in this year’s annual report are dedicated.

For on top of all this, they put boundless energy into driving the many elements of our strategy forward. For this, we owe them a great debt of thanks. We would also like to thank our business partners and customers. In times such as these, collaboration and trust are highly significant.

"As a leading technology company, we want to help shape tomorrow's world with technology that is 'Invented for life.'"

At the beginning of 2022, as the newly formed board of management, we made it our task to stimulate the growth of the Bosch Group. On this subject, we took a very close look at our multifaceted company. We asked ourselves some fundamental questions. Are we going in the right strategic direction? Are our objectives ambitious enough? To what extent is our strategy already contributing to their achievement? Yet in all this, it is the people at Bosch – in short, leadership, collaboration, and personal dedication – that are decisive for success. What will we need in the future to achieve these objectives?

As I see it right now, we're fundamentally on the right path. As a leading technology company, our aim is to help shape tomorrow's world with technology that is "Invented for life." In this respect, we see considerable growth opportunities in our existing areas of business, as well as in adjacent and new areas. Currently, we are working to create the conditions needed for this. Despite our enormous upfront investments in areas such as electrification, automation, digitalization, and further regional diversification, it is indispensable that we place our company on a strong footing – in terms of both profitability and finance. After all, sustainable earnings and the highly efficient use of capital resources are the basis for long-term success. This also involves strict portfolio management. We regard our diversification as a strength, but it also has to be focused.

One of our biggest current projects is the organizational realignment of our Mobility Solutions business sector to changed market, customer, and technological requirements. At the start of 2023, a first step was taken by appointing a cross-divisional sector board for Mobility Solutions in order to take the transformation forward. In addition, we believe that digitalization and sustainability promise significant growth stimuli for the company as a whole. Digitalization is now a management-board responsibility, which underscores the significance of this subject. Tanja Rueckert took on this task at the start of 2023. Responsibility for the Drive and Control Technology division, which performed very successfully in 2022, has passed to our CFO Markus Forschner from Rolf Najork, who has stepped down from the board of management as planned.

Many of these developments and considerations are addressed in our present annual report, which is once again embedded in a digital magazine containing examples of interesting innovations.

I hope you will find its contents stimulating and interesting.

With best regards,

Dr. Stefan Hartung
Chairman of the board of management

The Bosch board of management in 2022

DR. MARKUS HEYN

DR. STEFAN HARTUNG

DR. TANJA RUECKERT

DR. MARKUS FORSCHNER

FILIZ ALBRECHT*

DR. CHRISTIAN FISCHER

* In early 2023, there was a change on the board of management, with Filiz Albrecht stepping down effective March 31, 2023. Stefan Grosch joined the Bosch board of management as director of industrial relations effective April 1, 2023.

Board of management

Dr. Stefan Hartung

Chairman

Technology, Innovation, and Quality

Functions and services

- Strategy, Organization, and Business Development
- Communications and Governmental Affairs
- Corporate Affairs
- Human Resources Senior Management Personnel
- Research and Advance Engineering
- Technology Engineering[1]
- Technology Manufacturing[2]
- Quality Management[2]
- Intellectual Property
- Digital Transformation[3]
- Field Quality Board[2]

Business area

- Healthcare Solutions

Regions

China, India[4]

Dr. Christian Fischer

Deputy chairman

Consumer Goods business sector
Energy and Building Technology business sector

Business areas

- Power Tools
- BSH – Home Appliances
- Building Technologies
- Thermotechnology
- Bosch Global Service Solutions[3]
- Smart Home

Regions

Africa, Southeast Asia

Rolf Najork[3]

Manufacturing and Quality, Industrial Technology business sector

Functions and services

- Manufacturing and Technology[5]
- Technology Manufacturing[1]
- ATMO – Manufacturing Tools and Systems
- Quality Management and Field Quality Board

Business areas

- Digital Business Industrial Technology
- Drive and Control Technology
- Connected Industry

Regions

North America, South America, Japan, South Korea, Australia

Dr. Markus Heyn

Mobility Solutions business sector

Chairman of the sector board[2]

Functions and services

- Sector board[2]
  Commercial Affairs
  Operations
  Sales and Customers
  Technology
- Business-sector functions
  Communications and Governmental Affairs[6]
  Human Resources, People, and Culture[2]
  Strategy, Sales, and Business Excellence
  Purchasing Direct Materials[7]
  Performance Management[7]
- Software Development Services
- Mobility Company project

Business areas*

- Powertrain Solutions
- Chassis Systems Control
- Electrical Drives
- Cross-Domain Computing Solutions
- Automotive Electronics
- Automotive Aftermarket
- Automotive Steering
- eBike Systems
- BEG – Automotive Engineering Solutions
- Two-Wheeler and Powersports
- ETAS

1. Effective June 1, 2022
2. Effective Jan. 1, 2023
3. Until Dec. 31, 2022
4. Until June 30, 2022
5. Until May 31, 2022
6. Effective Oct. 1, 2022
7. Until Sept. 30, 2022

* Assigned to Mobility Solutions sector board effective Jan. 1, 2023

Dr. Markus Forschner

Finance and Performance, Industrial Technology business sector[2]

Functions and services
- Finance, Reporting, and Treasury
- Performance Controlling, Risk Management, Mergers and Acquisitions
- Performance Management
- Transformation and Performance Consulting
- Tax and Customs Duties
- Supply Chain Management
- Real Estate and Facilities
- Global Real Estate
- Internal Auditing
- Digital Business Industrial Technology[2]
- Global Business Services[3]

Business areas
- Drive and Control Technology[2]
- ATMO – Manufacturing Tools and Systems[2]

Regions
Europe[3], Europe 1[2], Turkey

Filiz Albrecht[9]

Human Resources, Legal, Compliance, and Sustainability

Functions and services
- Human Resources People and Culture
- Human Resources Transformation
- Legal
- Compliance
- Sustainability, Environment, Health and Safety
- BMS – Bosch Management Support

Region
India[8]

Stefan Grosch[10]

Human Resources, Legal, Compliance, and Sustainability

Functions and services
- Human Resources People and Culture
- Human Resources Transformation
- Legal
- Compliance
- Sustainability, Environment, Health and Safety
- BMS – Bosch Management Support

Region
India

Dr. Tanja Rueckert[2]

Digital Business and Services

Functions and services
- Cybersecurity
- Information Technology and Digitalization
- Bosch Digital
- Global Business Services
- Software Next
- Residential IoT Services
- Software and Digital Solutions
- Security and Safety Things

Business areas
- Global Service Solutions
- Connected Industry

Regions
North America, South America, Japan, Korea, Australia, Europe 2

2. Effective Jan. 1, 2023
3. Until Dec. 31, 2022
8. Effective July 1, 2022
9. Until Mar. 31, 2023
10. Effective Apr. 1, 2023

Mobility Solutions sector board[2]

Dr. Markus Heyn
Chairman

Dr. Uwe Gackstatter
Commercial Affairs

Klaus Maeder
Operations

Andreas Dempf
Sales and Customers

Dr. Mathias Pillin
Technology

Presidents of the divisions

Manfred Baden[5]
Rupert Hoellbacher[1]
– Automotive Aftermarket

Henk Becker
– Power Tools

Dr. Steffen Berns
– Chassis Systems Control

Henning von Boxberg
– Bosch Global Service Solutions

Claus Fleischer
– Bosch eBike Systems

Dr. Uwe Gackstatter[7]
Dr. Thomas Pauer[6]
– Powertrain Solutions

Jan Brockmann
– Thermotechnology

Klaus Maeder[7]
Michael Budde[6]
– Automotive Electronics

Rolf Najork[11]
Dr. Steffen Haack[12]
– Drive and Control Technology

Dr. Mathias Pillin[7]
Christoph Hartung[6]
– Cross-Domain Computing Solutions

Thomas Quante
– Building Technologies

Dr. Gerta Marliani
– Automotive Steering

Michael Budde[7]
Volker Schilling[6]
– Electrical Drives

1. Effective June 1, 2022
2. Effective Jan. 1, 2023
5. Until May 31, 2022
6. Effective Oct. 1, 2022
7. Until Sept. 30, 2022
11. Until July 31, 2022
12. Effective Aug. 1, 2022

Supervisory board report

Ladies and gentlemen,

In the 2022 business year, the Bosch Group once more had to come to terms with a demanding environment, made more acute by the war in Ukraine. The challenges included price increases for raw materials and energy that were in some cases enormous. Despite the ongoing containment of the Covid-19 pandemic, the further recovery of the economy failed to materialize. This makes the extraordinary commitment that was shown all the more valuable – commitment that allowed us to increase our sales revenue and EBIT margin from operations year on year in 2022. The supervisory board would like to thank the board of management and associates of the Bosch Group for this achievement. Their dedication and expertise make us confident that the Bosch Group will successfully come through the 2023 business year – a year that will likely be no less demanding. Despite difficult economic conditions and considerable upfront investments in areas of future importance, the objective is to grow further and improve EBIT margin from operations.

PROF. STEFAN ASENKERSCHBAUMER

The supervisory board also owes a debt of thanks to Rolf Najork, who was responsible for the Industrial Technology business sector until the end of the year. Over the past years, he successfully took the business sector forward through innovations and acquisitions. Our chief financial officer Markus Forschner assumed most of his responsibilities at the beginning of the year. The supervisory board is also pleased that, in the shape of Tanja Rueckert, the key future issue of digitalization will now be given greater weight on the board of management. In addition, she has brought greater diversity to our senior management level.

In our supervisory board capacity, we once again fulfilled our legal and regulatory obligations with great care in 2022. The supervisory board concerned itself in detail with the difficult environment and business situation of the Bosch Group. In addition, it kept itself informed about measures relating to compliance, the risk management system, and significant risks such as cyber-risks, about the consequences of the war in Ukraine for Bosch, the security of energy supplies, and the phasing-out of business activities in Russia. The reports it received also focused on financial and investment planning, as well as the 2023 business plan. A lot of attention was devoted to the board of management's deliberations about a new iteration of strategy with respect to growth potential in existing, adjacent, and new business fields. The Mobility Company program concerning the organizational reconfiguration of the Mobility Solutions business sector was discussed at length. The supervisory board also concerned itself in depth with the status of the transformation in the Powertrain Solutions division, and about products of future importance such as the fuel cell. In addition, outside of board meetings, the chairman of the supervisory board was regularly informed by the chairman of the board of management about current developments and significant events in the company.

Ernst & Young GmbH Wirtschaftsprüfungsgesellschaft audited the Robert Bosch GmbH annual financial statements and consolidated financial statements, as well as the accompanying management reports, as of and for the year ended December 31, 2022. They furnished all these reports with an unqualified audit opinion. The supervisory board discussed these documents at length and subjected them to its own examination; all members of the board had access to the auditor's reports. Moreover, the auditor met with the supervisory board to report on the main findings of the audit, which were then discussed in detail. After receiving the auditor's final report, the supervisory board raised no objections, concurred with the results of the audit, and approved the Robert Bosch GmbH annual financial statements and consolidated financial statements. Following its own review, the supervisory board endorsed the board of management's proposal for the appropriation of net profit.

Stuttgart, March 2023
For the supervisory board

Stefan Asenkerschbaumer

Prof. Stefan Asenkerschbaumer
Chairman

"The supervisory board would like to thank the board of management and associates of the Bosch Group for their outstanding achievement in difficult times."

Supervisory board

Prof. Stefan Asenkerschbaumer
Stuttgart
Chairman
Managing partner of Robert Bosch Industrietreuhand KG, formerly deputy chairman of the board of management of Robert Bosch GmbH

Frank Sell
Gerlingen
Deputy chairman
Deputy chairman of the works council of the Feuerbach plant, and chairman of the central works council of the Mobility Solutions business sector as well as deputy chairman of the combined works council of Robert Bosch GmbH

Nadine Boguslawski
Stuttgart
Chief representative (managing director) of the Baden-Württemberg regional directorate of the trade union Industriegewerkschaft Metall

Dr. Christof Bosch
Königsdorf
Spokesperson for the Bosch family

Christian Brunkhorst
Mühltal
Representative of the chairman of Industriegewerkschaft Metall, Frankfurt am Main

Dr. Arne Fischer[1]
Gemmrigheim
Vice president, Commercial Vehicle Electrification, Powertrain Solutions division, and chairman of the combined executives committee of the Bosch Group in Germany

Prof. Elgar Fleisch
St. Gallen
Professor of information and technology management at the University of St. Gallen and ETH Zürich

Klaus Friedrich
Würzburg
Chairman of the works council of Bosch Rexroth AG, Lohr am Main, and chairman of the central works council of Bosch Rexroth AG and member of the combined works council of Robert Bosch GmbH

Mario Gutmann
Bamberg
Chairman of the works council of the Bamberg plant, and member of the central works council of the Mobility Solutions business sector as well as chairman of the economic committee of the Mobility Solutions business sector

Jörg Hofmann
Frankfurt am Main
President of Industriegewerkschaft Metall

Prof. Michael Kaschke
Oberkochen
Chairman of the supervisory board of Karlsruhe Institute of Technology
President of Stifterverband

Prof. Renate Köcher
Konstanz
Managing director, Allensbach Institute for Public Opinion Research

Martina Koederitz
Stuttgart
Member of the supervisory board of Robert Bosch GmbH

Matthias Georg Madelung
Munich
Member of the board of trustees of Robert Bosch Stiftung GmbH

Kerstin Mai
Hildesheim
Chairwoman of the works council of the Cross-Domain Computing Solutions division, Hildesheim, and chairwoman of the combined works council of Robert Bosch GmbH

1. Effective May 1, 2022

Oliver Simon
Dunzweiler
Chairman of the works council of the Homburg plant, and member of the central works council of the Mobility Solutions business sector

Karin Solda
Filderstadt
Chairwoman of the works council at the Leinfelden-Echterdingen location and of the central works council of Robert Bosch Power Tools GmbH

Peter Spuhler
Weiningen
Majority shareholder and president of the supervisory board of Stadler Rail AG

Dr. Eberhard Veit
Göppingen
Managing partner of Robert Bosch Industrietreuhand KG

Dr. Richard Vogt[2]
Willstätt
Vice president, Electrical Drives division, and chairman of the executives committee of Robert Bosch GmbH as well as of the combined executives committee of the Bosch Group in Germany

Prof. Beatrice Weder di Mauro
Geneva
Professor of international economics at the Geneva Graduate Institute, president of the Centre for Economic Policy Research (CEPR), and research professor at INSEAD

HONORARY CHAIRMAN OF THE BOSCH GROUP

Prof. Hermann Scholl
Stuttgart

2. Until April 30, 2022

Industrial Trust and International Advisory Committee

Robert Bosch Industrietreuhand KG

GENERAL PARTNERS

Prof. Stefan Asenkerschbaumer
Stuttgart
Chairman of the shareholders' meeting

Dr. Eberhard Veit
Göppingen

LIMITED PARTNERS

Dr. Christof Bosch
Königsdorf

Dr. Christian Fischer
Stuttgart

Prof. Elgar Fleisch
St. Gallen

Prof. Lino Guzzella
Uster

Dr. Stefan Hartung
Ludwigsburg

Prof. Michael Kaschke
Oberkochen

Prof. Renate Köcher
Konstanz

Peter Spuhler
Weiningen

Robert Bosch International Advisory Committee

Prof. Stefan Asenkerschbaumer
Stuttgart
Chairman

Sigmar Gabriel
Goslar

Dr. Christoph Heusgen
Berlin

Baba N. Kalyani
Pune

Pascal Lamy
Paris

Yumiko Murakami
Tokyo

Paul Ryan
Janesville

Jing Ulrich
Hong Kong

Prof. Igor Yurgens
Moscow

Highlights 2022

Jan 25

Automated driving: Bosch and Cariad agree to partner

More safety and less stress for drivers, more rapid deployment of automated driving functions across all vehicle classes: Bosch and Cariad, the Volkswagen Group's software subsidiary, want to work together to achieve this goal.

Feb 17

Boost to software and automotive engineering in India

At its Hyderabad location, Bosch is setting up a new technology and innovation center. By 2025, the number of people employed there is set to rise to 3,000.

Startup for quantum sensors

To commercialize quantum sensors, the research findings of recent years are being combined and translated into products. In this way, Bosch hopes to participate in the expected strong growth of this technology.

Feb 24

Biggest single Bosch investment in Japan

Bosch is to invest some 300 million euros in a new research and engineering center, as well as a cultural facility, in Yokohama. Construction is to be completed in September 2024.

Map specialist Atlatec adds to development expertise

Atlatec GmbH is one of the world's most innovative providers of high-resolution digital maps for driver assistance systems and automated driving.

Mar 9

Help for people in Ukraine

Bosch helps with a donation of one million euros for humanitarian aid, and there are many initiatives on the part of countries and divisions. Privately as well, a lot of associates are helping to provide relief – by offering shelter, by donating, or by helping at the frontier.

Apr 5

Changsha plant singled out by World Economic Forum (WEF)

With its award, the WEF acknowledges the role played by the Bosch plant in China as a global forerunner of the fourth industrial revolution. With pioneering innovations such as an AI-assisted energy management system, the plant is driving forward the digital transformation in manufacturing technology.

Apr 12

Acquisition of Five accelerates the development of software for automated driving

Five is Europe's leading startup for automated driving. At six locations in the United Kingdom, some 140 associates are pursuing the goal of safe self-driving vehicles.

Apr 13

Bosch and Amazon agree to collaborate on digitalization of logistics

The aim is for Bosch to run a platform on Amazon Web Services that will give freight carriers and forwarders around the world fast and uncomplicated access to digital services. These services will help in areas such as utilizing the capacity of truck fleets, monitoring the flow of goods, and order handling.

May 4

Development of components for hydrogen electrolysis to start

Bosch is to develop the stack – the core component of an electrolyzer– and invest up to 500 million euros in this new area of business by the end of the decade.

May 19

Hydrogen cycle demonstrated at Industry 4.0 lead plant in Homburg

In the context of Hannover Messe, Bosch presents technology for hydrogen applications in industry, as well as its partnership with Maximator Hydrogen, aimed at setting up hydrogen filling stations worldwide.

Jun 14

Bosch opens additional software center

This move will augment the Bosch Global Software Technologies subsidiary. In the years ahead, thousands of new jobs, especially in automotive engineering, are to be created at a new location in Hanoi, Vietnam.

Jun 30

Smart campus opened in India

Over the past five years, Bosch has invested more than 100 million euros in developing its India headquarters in Bengaluru. The new campus, which was designed for up to 10,000 associates and will go by the name of Spark.NXT, has now been officially opened at a formal ceremony.

Jul 15

Bosch Rexroth announces acquisition of HydraForce

In acquiring the U.S. company HydraForce, headquartered in Lincolnshire, IL, Bosch Rexroth plans to expand its hydraulics business. With a workforce of 2,100, HydraForce develops and manufactures compact hydraulic valves and solutions at six manufacturing sites in the U.S., Brazil, the U.K., and China.

Jul 19

Sector board set up for Mobility Solutions business sector

Effective January 1, 2023, Bosch plans to reorganize Mobility Solutions as a business sector with profit and loss responsibility. The aim of the reorganization of Bosch Mobility Solutions is to be able to serve existing and new customer needs with customized technologies and solutions from a single source.

Aug 31

Live fantastically #LikeABosch

Bosch and the German band “Die Fantastischen Vier” are collaborating in a reprise of the successful marketing campaign. The pioneers of German hip-hop have reinterpreted the acclaimed campaign song and play the leading roles in the accompanying music video.

New indoor camera: Smart Home Eyes II

Thanks to smart motion detection, the new camera can distinguish between known and unknown persons. Its alarm deters unwanted guests. In addition, residents receive a push notification on their smartphone, with a video livestream.

Sep 13

Bosch at the Automechanika trade fair

The Automotive Aftermarket division offers a wide range of innovations for the repair-shop market. These innovations will enable independent and multibrand repair shops to carry out effective and high-quality diagnostic, servicing, and repair work – even on the latest vehicle models.

Sep 19

Bosch at the IAA Transportation

On the path to climate-neutral freight haulage, Bosch is continuing to expand its portfolio. With software, a logistics platform, and climate-neutral powertrains, it is helping make the movement of goods sustainable. Apart from the diesel engines that will remain indispensable for trucks for many years to come, Bosch presents battery-electric and fuel-cell powertrains. As a further option, especially for heavy construction and agricultural machinery, these powertrains have now been joined by hydrogen engines.

Sep 29

Open Bosch Award presented

The first prize goes to the Atlatec startup and the Cross-Domain Computing Solutions division, whose collaboration is ensuring that Bosch can access high-resolution 3D mapping technology. Bosch is working on innovations in more than 300 startups.

Oct 20

Bosch launches cost-effective movement sensor

Combining simplicity and an excellent cost-benefit ratio, the smart BMI323 inertial sensor will open up new applications. These include standard consumer electronics goods such as toys, gaming controllers, remote controls, wearables, fitness trackers, smart watches, tablets, and laptops.

Oct 25

Charleston plant starts production of electric motors

In addition, investments are to be made in further upscaling manufacturing operations for electrification products and in extending the existing building at this location in South Carolina.

Nov 9

Quantum-computing partnership agreed with IBM

Within the next ten years, the aim is to use quantum-computer materials simulations to find substitutes for the precious metals and rare earths in carbon-neutral powertrains, whether electric motors or fuel cells.

Nov 22

New research and engineering center in China

The new center is to be home to more than 540 associates, who will work on smart cockpit technologies and intelligent powertrain solutions, focusing especially on software development.

Nov 30

World first: AVP receives approval for regular use

The AVP automated valet parking system developed by Bosch and Mercedes-Benz is the world’s first fully automated driverless (SAE Level 4) parking function to be approved by the authorities for regular use.

Dec 8

Smart Home Controller II for the smart homes of the future

This new smart controller brings together all key items of information while providing maximum data protection. It also connects all appliances and controls functions, scenarios, and automated processes. Even now, it is ready for Matter, the international connection standard.

Robert Bosch Stiftung

Not-for-profit, independent, and cross-partisan, Robert Bosch Stiftung GmbH works on the major social challenges of our age relating to healthcare, education, and global issues. In these three funding areas, it acts as a civil-society player to initiate positive changes. It is one of the biggest company-related foundations in Europe. For nearly 60 years, it has been living up to the mission handed down by its founder Robert Bosch by carrying on his social and societal commitment in contemporary form. To do so, the Stiftung runs its own institutions, conducts innovative projects, and works with a wide variety of partners, supporting them on an ad hoc basis.

Special grants for Ukraine

The initial reaction is one of shock – and anxiety. Anxiety for our many friends in Ukraine, whose lives are suddenly threatened by the Russian attack. But also for the people in Russian civil society who are fighting for democracy in their country, and whose protests against the war would put their liberty at risk. Markus Lux, who is responsible in Robert Bosch Stiftung for immigration society and democracy, and whose work has focused on central and eastern Europe for many years, describes the feelings that gripped him in March 2022: “As a result of our many years of support, we have many European partners and a strong network in the region. We wanted to help them – quickly and unbureaucratically. We needed answers to very concrete questions: How can we protect the people on the spot? How can we organize their influx and accommodation over the next weeks and months? And not just in Germany, but across Europe?”

The Europe Prykhystok initiative organized an invaluable time-out from the constant menace of war for children from eastern Ukraine.

Ideas for projects to help Ukrainians come from all parts of the Stiftung. Within a very short period of time, the management board agrees with the trustees to make special funds available for Ukraine. In total, the Stiftung spends 4.5 million euros on some 40 projects. These range from evacuations and protective measures to supplies of medical aid, psychological first aid for refugees, supervision of school students and teachers who have fled to Germany, and support for civil society organizations.

One example is the French initiative “Europe Prykhystok” (from the Ukrainian for “shelter”), which gives Ukrainian children and adolescents time out from the war. The 16-year-old Michail from the Donbas is one of them. When he is invited to southern France together with a group of adolescents from eastern Ukraine, he is traumatized by the events in his home country. His stay in a safe environment gives the shy young man so much self-assurance that he even has the courage to make an appeal on French television: “This war must end, and those responsible must be brought to account.” Robert Bosch Stiftung is helping Europe Prykhystok establish further partnerships with local activists in various countries. This is based on the belief that regional initiatives can play an important part in handling mass refugee movements.

Healthcare: patients benefit from research

In 2022, most of the project grants awarded by Robert Bosch Stiftung again went into healthcare, education, and global issues. In the healthcare field, the focus is on continuing the work of pooling all the Stiftung’s activities and institutions together in the Bosch Health Campus (BHC). Since 2022, the campus has brought together four pillars under one roof: patient care, biomedical research, medical and nursing education, and funding and trialing promising new ideas for better healthcare. The example of a Stuttgart woman with lung cancer shows how patients and the scientific community can benefit from this unusual combination.

The classic forms of cancer treatment she receives show no effect and, one year after her diagnosis, she is barely able to get out of bed. “In effect, we had tried all the treatment options available,” the senior physician recalls. In this situation, the special design of the Bosch Health Campus pays dividends, as medical research can be quickly translated into clinical treatment, true to the principles of translational medicine. Laboratory examinations of the tumor tissue reveal that the patient has an extremely rare kind of tumor that has only been known to researchers for a few years. The patient is given novel medication – which

On the Bosch Health Campus, cancer research and treatment are closely interwoven.

shows an effect. The scientific community also benefits from this close-knit relationship between excellent research and treatment at the BHC, since it gets immediate feedback about its research.

Giving children the chance of a good education

In its education work, Robert Bosch Stiftung advocates an equitable and effective education system that is geared to the well-being of children and young people. For this purpose, it also singles out good schools for the annual "Deutscher Schulpreis" (German school award). One of these is the Ketteler School in Bonn. At half-past nine in the morning, the ten-year-old Hatice is puzzling over a math problem at her computer. In an underwater scene, a plump sunfish swims into the picture. On its belly is the formula: 1Th+8H+0T+5U. Quick as a flash, the young girl types the answer into the box: one thousand, eight hundreds, no tens, and five units. Correct! And right away, the next task swims onto her screen.

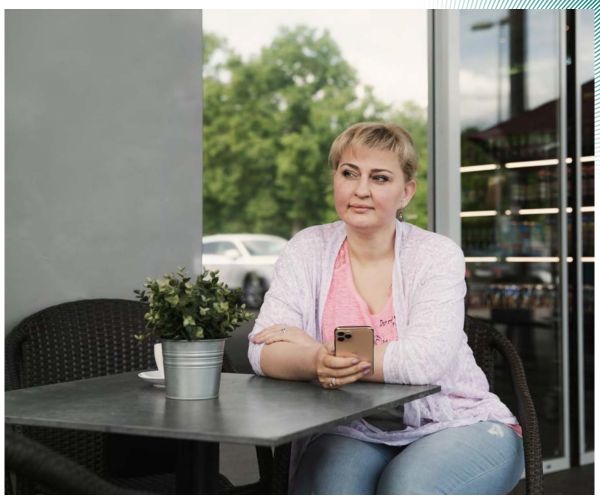
Individual encouragement was key to helping Hatice like school – and to developing into a good pupil.

Hatice was nearly sent to a special-needs school, as her previous school assessed her language skills as "too weak." But her parents enrolled her at the Ketteler School, an integrative comprehensive school. The school encourages pupils to take the initiative themselves, and provides individualized syllabuses. In other words, children are not judged according to uniform targets, but instead to individual ones that are tailored to their abilities and gifts.

Unlike Hatice, many elementary-school children in Germany have insufficient numeracy and literacy skills when they switch to high school. This is why the Stiftung helps elementary schools improve the quality of their teaching. On this subject, it introduced an internationally established approach last year, initially in the state of Baden-Württemberg. The idea of the "Wir.Lernen" (we learn) project, carried out together with the state education ministry, is to bring elementary-school principals and teachers together with the education authorities in regular meetings. Together, they identify the weaknesses in their classroom practice and how to tackle them.

Integration through social media communities

In the global issues field, the Stiftung works to promote peaceful coexistence and dedicates itself to the major social challenges of our age. This includes ensuring that people live together well in societies marked by immigration. The Stiftung does so by drawing attention to the concerns and abilities of migrants and ensuring that they have equal opportunities to participate in society. Kateryna Pysarevych, from Hanau in Germany, illustrates the role social media communities can play in this. When the young mother is at the end of her tether, she goes online. Following the birth of her first child, she is exhausted, and her small son is sleeping badly. To make



Kateryna Pysarevych came from Kyiv to Hanau in 2018. A Facebook group helped her learn a lot about Germany.

things worse, her husband has contracted a severe case of Covid-19, and her son is becoming increasingly feverish. Pysarevych, a native of Kyiv in Ukraine, is left to her own devices in a country that has so far remained alien to her, and whose language she barely knows. Who can she call? On Facebook, she finds the "Russian-speaking mothers in Germany" group, with more than 30,000 members. She describes her situation – and in return receives not only tips and links, but also a crash course about Germany. "In many migrant-community social media spaces, members help each other sort out integration issues," is the conclusion of a study – funded by Robert Bosch Stiftung – researching the links between social media, migration, and social policy. The questions it raises are intriguing: How do migrants help each other manage their lives in Germany? How can citizens advice organizations and public authorities work together with migrant groups? And finally, what are the factors that determine whether a social media group becomes an echo chamber or works as a place where people can get advice on integration?

Giving a voice to the people affected by the climate crisis

The climate crisis is one of the great challenges of our age. At the 27th climate change conference in Sharm el-Sheikh, Egypt, the Stiftung highlights two issues: First, it wants to give African people a greater voice in international climate negotiations, and is doing so by enabling young people, women, farmers, the representatives of civil society organizations, and indigenous groups to take part in the conference. The 23-year-old Evelyn Addor from the Ghanaian EcoCare organization is one such person. As a Climate Youth Negotiator, she takes part in the official negotiations and gives a vivid report about climate changes in her home region. Second, the Stiftung is addressing future migration issues, such as the prospect of great numbers of people fleeing from their homes as a result of climate change. At the climate conference, the Stiftung-funded Africa Climate Mobility Initiative presents a report showing which regions in Africa are particularly affected. This is because most migrants will stay within their country or move to adjacent regions. In this way, local politicians have some hard facts to help them prepare for "climate mobility." This concept is mentioned for the first time in the 27th climate

The Stiftung helps people, like this woman in Niger, to make their land fertile again – as well as to make their voices heard in international climate negotiations.

change conference's final communiqué – a diplomatic success and an important step toward a solution.

International fellows discuss climate crisis and the energy transition

On a study trip as part of the Richard von Weizsäcker Forum, a group of international fellows of the Robert Bosch Academy study the effects of the climate crisis in the Alpine region. Each of the fellows is a leading authority in their respective subject area, and during their stay at the academy they study subjects of future importance outside their regular areas of responsibility and engage in dialog with decision makers. In the Bavarian Alps, the fellows hear from policymakers and representatives of business, science, and civil society how climate change is changing lives and society, and discuss a global energy transition. The fellow Samantha Gross, a U.S. energy-policy expert, sums it up as follows: "The world is not going to solve the problem of climate change by assuming that less energy consumption is the way ahead. This approach will only lead to an unjust, inequitable transformation process. We must find ways to make the energy transition a just one."

On a study trip to Bavaria, some 40 international fellows of the Robert Bosch Academy found out how the climate crisis is affecting the Alpine environment.

Figures in millions of euros **G 01**

Funding 2022

148.93

88.10	**Healthcare**
24.76	**Global issues**
10.62	**Education**
25.44	**Interdisciplinary funding**

Group management report

of Robert Bosch GmbH as of December 31, 2022

The Bosch Group rose well to the considerable, and at times unexpected, challenges of 2022. With an increase of 12.0 percent, sales considerably exceeded expected growth. At 4.3 percent, the EBIT margin from operations was higher than forecast. Yet in addition to the ongoing coronavirus pandemic and chip shortages, the 2022 business year presented considerable extra burdens for the Bosch Group in connection with the war in Ukraine. These include the sharp rise in raw materials and energy prices and the phasing out of all but a few residual business activities in Russia. Nonetheless, all business sectors were able to increase their sales and post a positive result for 2022. At the same time, many strategic projects were driven forward, with considerable upfront investments being made in them. In addition, the new board of management formed at the beginning of 2022 worked intensively to further refine the long-term strategy and organization in light of changes in the market, some of them far-reaching. The focal points are growing electrification in many areas in response to tougher measures to reduce climate change, as well as an even broader international footprint. On top of this, our digitalization and sustainability strategy is being further refined and the company made more robust. One major project is the reorganization of the Mobility Solutions business sector to better address future market, customer, and technology requirements.

The 2023 business year is expected to be very challenging as well. We expect the growth of global economic output to slow further. Nonetheless, our goal is to increase Bosch Group sales and to achieve a better EBIT margin from operations than in 2022, while at the same time further developing and rigorously implementing our strategy.

Fundamental information about the group

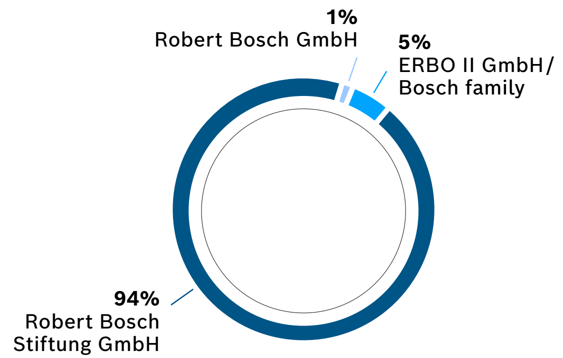
The group

The Bosch Group is a global supplier of technology and services, and generates roughly half its sales outside Europe. The group encompasses around 470 fully consolidated subsidiaries and regional companies in more than 60 countries. The parent company is Robert Bosch GmbH, which is headquartered in Stuttgart, Germany. It started out as "Workshop for Precision Mechanics and Electrical Engineering," founded in Stuttgart in 1886 by Robert Bosch (1861–1942). Robert Bosch Stiftung GmbH has been the majority shareholder in Robert Bosch GmbH since 1964.

Despite holding roughly 94 percent of the share capital of Robert Bosch GmbH, the not-for-profit foundation Robert Bosch Stiftung GmbH has no influence on the strategic or business orientation of the Bosch Group. A further roughly 5 percent of the share capital is held by the not-for-profit ERBO II GmbH, established by the founder's descendants, and 1 percent by Robert Bosch GmbH itself. Of the voting rights, some 93 percent are held by Robert Bosch Industrietreuhand KG, an industrial trust, which performs the entrepreneurial ownership functions. The trust itself holds a capital share of 0.01 percent. The approximately 7 percent of voting rights remaining are held by the founder's descendants. This ownership structure guarantees the Bosch Group's entrepreneurial independence.

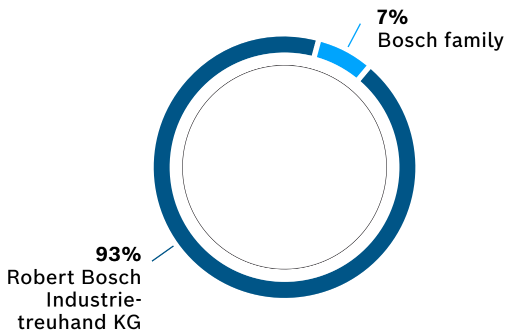
G 02

Shareholders of Robert Bosch GmbH
Shareholding



G 03

Shareholders of Robert Bosch GmbH
Voting rights



Organization and competitive environment

With a workforce of more than 420,000 associates worldwide, the Bosch Group is divided into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods, and Energy and Building Technology. Reporting is segmented in the same way. The group's business activities are shaped by general trends such as increasing electrification, growing digitalization and connectivity, the considerably increased importance of sustainability – especially of climate action – as well as intense global competition. Nonetheless, the business sectors' markets and competitive environments vary, in some cases considerably.

In the case of Mobility Solutions, the Bosch Group has long competed mainly with a small number of major automotive suppliers. Its chief customers have been globally operating automakers and major regional producers. However, this market is changing due to increasing electrification, automation, connectivity, and multimodal mobility, as well as to a rise in the significance and value of software in vehicles. The integration of electronics and software into vehicles, as well as growing complexity, are having an impact on vehicle architectures. In this context, customers in the automotive industry often no longer buy hardware and software as a single package, but independently of each other. At the same time, they expect software to combine and integrate functions that were previously separate. At present, vehicle architectures focus on what can be offered in the car. In the future, however, there will also be a stronger focus on hardware and software outside the vehicle, with the cloud also playing a central role. This will enable software updates throughout the vehicle life cycle and scaling of applications in other markets. The result is shorter time-to-market, end-to-end architectures, and hardware-agnostic software and services. It also means that new business models will arise. The complexity involved in operating systems for vehicles means that many automakers seek support from software providers in the automotive segment.

These trends make the market attractive for additional suppliers, including suppliers from industries such as consumer electronics, semiconductors, and the services and internet sector, as well as for the providers of mobility platforms. In addition, automakers are looking to increase the value they generate themselves in the promising areas of electronics, software, and electromobility. Other important factors for our business are the significant decline in the proportion of diesel-powered passenger cars in the key European and Indian markets and the increasingly stringent statutory standards that combustion engines have to satisfy, which vary greatly from region to region.

Within Industrial Technology, the Drive and Control Technology division supplies hydraulics and factory automation components and systems in fairly fragmented markets with many competitors and customers. The nature of these competitors and customers is changing as a result of trends such as electrification, of the inroads being made by digital solutions, and of market consolidation in areas such as hydraulics.

In the Consumer Goods business sector, the product solutions offered by the Power Tools division and the BSH Hausgeräte GmbH subsidiary align with end-user and consumer requirements. These solutions compete with those from both global and regional providers. In mid-2022, the extraordinary boom in the consumer goods segment due to the coronavirus pandemic, particularly in Europe and especially among private customers, came to an end. Even before the coronavirus pandemic, there was growing evidence of a global shift from traditional brick-and-mortar retail to online commerce. This trend has been reinforced by the pandemic, even though traditional retail is currently regaining ground.

In Energy and Building Technology, the Building Technologies and Thermotechnology divisions compete with a small number of international suppliers and many regional ones. Moreover, the different domains that make up energy and building technology are converging. One key growth market, especially in Europe, is heat pumps as a replacement for current fossil-fuel technologies. This development is receiving government support in the form of subsidy programs, such as those in Germany and Italy. This trend is gaining additional momentum from increases in the price of fossil fuels owing to the war in Ukraine. The Bosch Global Service Solutions division offers its services in a fragmented market featuring both large international rivals and smaller local providers.

Corporate governance

The members of the board of management of Robert Bosch GmbH define the strategy for the entire company and lead the company as a whole. Their responsibilities are set out in the board of management organization chart. With the start of the 2022 business year, the board of management was reduced to six members in the context of a generational change. At the beginning of 2023, Tanja Rueckert joined the board of management, making the role of chief digital officer a firm part of the board's responsibilities. She has also assumed other responsibilities. In addition to his role as chief financial officer, Markus Forschner has also been responsible for the Industrial Technology business sector since the beginning of 2023; Rolf Najork, who was previously responsible for this business sector, left the board as planned at the end of 2022.

The Robert Bosch GmbH supervisory board appoints, monitors, and advises the board of management. In making appointments to the supervisory board, Robert Bosch GmbH is subject to the German "Mitbestimmungsgesetz" (Codetermination Act). In view of the company's size, the supervisory board has 20 members. Ten members are appointed by the shareholders with voting rights; the other ten members are elected by the employee representatives. The industrial trust Robert Bosch Industrietreuhand KG acts as a shareholder. In line with the mission handed down in the will of the company's founder, Robert Bosch, the trust is responsible for safeguarding the company's long-term existence and in particular its financial independence. The aim is to guarantee that the company remains entrepreneurially independent and able to act at all times.

Under German law, the supervisory board of a company subject to codetermination must set targets for the proportion of women in management positions. In December 2021, the supervisory board of Robert Bosch GmbH set Robert Bosch GmbH corresponding targets, which are to be met by the end of 2025. These are 30.0 percent on the supervisory board and 16.67 percent on the board of management of Robert Bosch GmbH (this equates to one woman among the board of management's six members). As of December 31, 2022, six of the 20 members of the supervisory board of Robert Bosch GmbH were women. Women thus account for 30.0 percent. Since January 1, 2023, there have been two women on the board of management of Robert Bosch GmbH in the persons of Filiz Albrecht and Tanja Rueckert, resulting in a 33.3 percent proportion of women among the board of management's six members.

In December 2021, the board of management of Robert Bosch GmbH adopted specific targets for the proportion of women on the two management levels below the board of management. These targets apply to Robert Bosch GmbH in Germany. They are 10.0 percent for the proportion of women on the first management level and 17.0 percent on the second management level. The deadline for achieving both targets was set as December 31, 2025. At the end of 2022, the proportion had reached 9.7 percent on the first management level and 14.6 percent on the second management level.

In addition, subsidiaries in Germany that are subject to statutory codetermination set their own targets for the proportion of women on their respective supervisory boards, management bodies, and first two management levels, as well as a deadline for achieving them. Globally, the share of women executives across all management levels within the group rose to 19.2 percent in 2022 (previous year: 18.4 percent). We intend to keep on increasing this percentage. At present, our aim is 25 percent, which we intend to reach by 2030.

Description of business sectors

Mobility Solutions business sector

As a supplier of original automotive equipment, Bosch is engaged in a wide range of activities organized into six divisions. The Mobility Solutions business sector also includes the Automotive Aftermarket and Bosch eBike Systems divisions. Further activities involve two-wheelers, commercial as well as off-highway vehicles, and engineering and software services. The business sector is in the process of being reorganized. We want to announce this at some point in 2023 and the reorganization to take effect on January 1, 2024.

G 04

Bosch Group business sectors (divisions)

Mobility Solutions	Industrial Technology	Consumer Goods	Energy and Building Technology
Powertrain Solutions	Drive and Control Technology[1]	Power Tools	Building Technologies
Chassis Systems Control		BSH Hausgeräte GmbH	Thermotechnology
Electrical Drives			Bosch Global Service Solutions
Cross-Domain Computing Solutions			
Automotive Electronics			
Automotive Aftermarket			
Automotive Steering			
Bosch eBike Systems			

1. Bosch Rexroth AG (100% Bosch-owned)

Powertrain Solutions

The Powertrain Solutions division offers products and solutions for powertrain technology for passenger cars and commercial vehicles including off-highway vehicles: from gasoline and diesel direct injection to electrified powertrains with battery systems and fuel-cell technologies. Where combustion engines are concerned, the division's portfolio comprises solutions and systems based on diesel, gasoline, natural gas, ethanol, hydrogen, and synthetic fuels. These include engine management systems, fuel supply modules, fuel injectors and pumps, ignition systems, exhaust-gas treatment systems, and sensors.

In the area of electromobility, the product portfolio includes solutions for both passenger cars and commercial vehicles: components and systems for gasoline and diesel hybrid vehicles, for all-electric vehicles, and for vehicles with fuel-cell powertrains. Products range from electric motors, power electronics, battery systems such as the 48-volt battery, and transmission technology to complete e-axles. These compact units comprise electric motor, power electronics, and transmission. For fuel cells, Powertrain Solutions offers individual components – such as electric air compressors, hydrogen injectors, tank valves, control units, and sensors – as well as stacks and complete power modules. It also offers hydrogen injectors, pressure regulators, and tank valves for hydrogen engines and tank systems.

Chassis Systems Control

The Chassis Systems Control division develops, produces, and sells brake systems, occupant protection systems, and vehicle dynamics sensors. Its brake systems include vacuum-based (conventional) and vacuum-independent brake boosters (iBoosters and decoupled power brakes), braking control systems (ABS, ESP®), and combined systems (integrated power brakes), as well as actuators for brake-by-wire systems. Vacuum-free brake boosters, integrated power brakes, and by-wire actuators are also grouped together as "new brake systems." Among other things, these systems support the major mobility trends of electrified and automated driving and new by-wire architectures. The division's occupant protection systems encompass airbag control units and the associated crash sensor technology. Its vehicle dynamics sensors include the sensors that provide vehicle-related signals as input to active safety systems. In addition, the Brake Components business unit (Buderus Guss GmbH, Breidenbach, Germany) supplies brake discs for passenger cars.

Electrical Drives

The Electrical Drives division offers a wide range of electromechanical components and systems. It also has an extensive portfolio of components and systems for thermal management in vehicles featuring powertrains of all kinds. This portfolio consists of products for cooling and refrigerant circuits, including the associated control software, as well as powerful servomotors for ABS and ESP®, drives for e-bikes and e-scooters, and applications for powertrain electrification. The product portfolio also covers wiper systems, including wiper blades, and a wide range of motors and drive systems for convenience features such as window lifters, seat adjustment, and sunroofs.

Cross-Domain Computing Solutions

With its Cross-Domain Computing Solutions division, Bosch is responding to the changing requirements in the automotive sector's rapidly growing market for software-intensive electronic systems. Instead of many individual control units, the electric/electronic architecture is evolving into a cross-domain, centralized architecture featuring a small number of vehicle computers, which are nonetheless very powerful. Since January 2021, the division has pooled Bosch's software and electronics expertise in this field. It is responsible for hardware and software for vehicle computers, sensors, and control units for numerous automotive applications such as driver assistance, automated driving and parking, and infotainment.

Automotive Electronics

The Automotive Electronics division is an in-house manufacturing and engineering service provider for electronic control units and semiconductors (integrated circuits and sensors). At the same time, it manufactures semiconductor products and sensors for the external market. Its semiconductors for automotive applications range from application-specific integrated circuits to power semiconductors and MEMS (microelectromechanical systems) sensors. In consumer electronics, Bosch Sensortec GmbH, based in Kusterdingen, Germany, supplies MEMS sensors for a diverse range of applications.

Automotive Aftermarket

Automotive Aftermarket provides the aftermarket and repair shops with technology and solutions related to workshop processes, automotive diagnosis, and repairs, as well as a range of spare parts for vehicles – from new and remanufactured exchange parts to repair solutions. Its portfolio consists of Bosch original-equipment products, as well as aftermarket-specific products and services, which it either makes itself or sources externally. In addition, the division provides testing and repair-shop technology, diagnostics software, service training, and technical information and services such as repair-shop management systems in connection with regional marketplaces and digital catalogues. It is also responsible for the concept behind the independent repair-shop franchises Bosch Car Service and AutoCrew.

Automotive Steering

Automotive Steering develops, manufactures, and sells steering systems including steering columns for passenger cars and commercial vehicles. For passenger cars, the product portfolio primarily includes electric power steering systems, which are a key technology for partially and highly automated driving. For commercial vehicles, electrohydraulic steering systems are increasingly taking over from hydraulic ones. Electric power steering systems are also being developed for commercial vehicles due to their key role in partially and highly automated driving.

Bosch eBike Systems

The Bosch eBike Systems portfolio ranges from complete drive systems for pedelecs with batteries to control units and digital solutions, and from an ABS to services for specialist bicycle dealers.

Other businesses

For two-wheelers, three-wheelers, and powersports vehicles, the **Two-Wheeler and Powersports** business unit offers assistance systems such as ABS, radar-based assistance systems such as adaptive cruise control, the motorcycle stability control system, powertrain technology, display instruments, and connectivity solutions. The cross-divisional unit can draw on the products and resources of the Mobility Solutions business sector.

The subsidiary **Bosch Engineering GmbH,** based in Abstatt, Germany, develops a wide range of customized solutions based on tried and tested technology used in large-scale production. For example, it provides solutions for sports cars and off-highway vehicles, but also for railcars and other non-automotive applications. Bosch's motor racing activities are also based at Bosch Engineering.

In addition, Bosch Engineering manages the **Commercial Vehicles and Off-Road** unit, which holds cross-divisional responsibility for systems development, product management, and sales for the commercial and off-highway vehicle segment. Bosch Engineering also oversees the operations of **ITK Engineering GmbH,** based in Rülzheim, Germany. The latter complements Bosch Engineering's services by offering customized and bespoke systems- and software-development services under its own brand, with engineering operations separate from Bosch.

The portfolio of the subsidiary **ETAS GmbH** includes basic vehicle software, middleware, development tools, cloud-based services, cybersecurity solutions, and end-to-end engineering and consulting services for making the software-defined vehicle a reality. With its product solutions and services, ETAS enables automakers and suppliers to develop, operate, and secure one-of-a-kind vehicle software.

Industrial Technology business sector

The Industrial Technology business sector comprises the Drive and Control Technology division, the Bosch Manufacturing Solutions unit, which primarily provides in-house assembly services, and the Bosch Connected Industry business unit.

Drive and Control Technology

Our subsidiary Bosch Rexroth AG, based in Lohr am Main, Germany, specializes in drive and control technologies for efficient and powerful movement in machines and systems of any type and size. The company combines global application experience in the market segments of mobile machinery, plant construction and engineering, and factory automation. With intelligent components, customized systems solutions, and services, Bosch Rexroth creates the necessary environment for applications with full connectivity. The division offers its customers hydraulics, electric drives and controls, gear technology, and linear motion and assembly technology, including software and interfaces to the internet of things (IoT).

Other businesses

Robert Bosch Manufacturing Solutions GmbH, a provider of automation and assembly solutions based in Stuttgart, Germany, develops customized and intelligent plans for assembly and testing. These include manufacturing processes and technologies as well as digital and intelligent solutions and services along the entire product life cycle. The **Bosch Connected Industry** business unit is also part of the Industrial Technology business sector. It develops software solutions for internal and external customers with a focus on Industry 4.0.

Consumer Goods business sector

The Consumer Goods business sector comprises two divisions.

Power Tools

Robert Bosch Power Tools GmbH, based in Leinfelden-Echterdingen, Germany, is a supplier of power tools, garden tools, power-tool accessories, and measuring technology. The division's extensive product range is aimed at both professional users in trade and industry and the DIY market. Its range of accessories includes above all abrasive systems, drill bits, and saw blades, which are sold globally under the Bosch brand and regionally and segment-specifically under brands such as Diablo, sia abrasives, and Freud. Precision rotary tools for DIY customers are also sold under the Dremel brand.

BSH Hausgeräte GmbH

The home-appliance manufacturer BSH Hausgeräte GmbH, based in Munich, Germany, has a product portfolio that ranges from washing machines and tumble dryers through refrigerators and freezers, ovens, cooktops, extractor hoods, and dishwashers, to small appliances such as vacuum cleaners, automatic coffee makers, and food processors. It also includes a new product category – a sink solution under the Solitaire brand. The home-appliance specialist sells its products under the global Bosch, Siemens (under license), Gaggenau, and Neff brands, as well as local brands such as Balay in Spain and Thermador in the United States. In addition, there are the Home Connect brand for the BSH ecosystem in the connected kitchen and various service brands, including BlueMovement and Kitchen Stories.

Energy and Building Technology business sector

As well as the Building Technologies, Thermotechnology, and Bosch Global Service Solutions divisions, the Energy and Building Technology business sector includes the Robert Bosch Smart Home unit.

Building Technologies

The Building Technologies division has two areas of business: its global product business for security and communications solutions, and its regional systems integration business. The latter offers solutions and customized services for building security, energy efficiency, and building automation in selected countries. Both units focus on commercial buildings and infrastructure projects. The product portfolio encompasses video-surveillance, intrusion-detection, fire-detection, and voice-alarm systems, as well as access-control and professional audio and conference systems.

Thermotechnology

The Thermotechnology division offers its customers a wide range of products for heating and air conditioning, increasingly based on non-fossil fuels. In the Well-Being business unit, we offer products such as air purifiers that help enhance residents' quality of life. The division also provides connected energy management and water heating for residential buildings, and is active in the business of constructing plants for commercial and industrial steam and hot-water generation, heating, and air conditioning. Its portfolio thus includes heat pumps, hybrid systems, condensing boiler technology, air-conditioning systems, ventilation equipment, air purifiers, solar thermal systems, combined heat and power generation, and industrial boilers. The division's products are sold under international and regional brand names such as Bosch, Buderus, Vulcano, and Worcester.

Bosch Global Service Solutions

The Bosch Global Service Solutions division provides technology-based services primarily for customers in the automotive, financial services, logistics, and pharmaceuticals industries. In communications technology, it also offers services such as emergency-call and monitoring services.

Other businesses

Based in Stuttgart, Germany, **Robert Bosch Smart Home GmbH** offers web-enabled products for the home. They include applications for optimizing indoor climate, improving convenience, and, on the basis of a portfolio of devices such as connected cameras, thermostats, smoke alarms, shutter controls, and access systems, enhancing security.

Selected companies not allocated to business sectors

The subsidiary **Bosch Healthcare Solutions GmbH,** based in Waiblingen, Germany, operates in the medical technology sector, supplying sensors, software, and services. Its product range includes equipment and software solutions for decentralized laboratory diagnostics and the diagnosis of respiratory conditions.

The subsidiary **grow platform GmbH,** based in Ludwigsburg, Germany, offers a platform within the Bosch Group for developing and implementing new business models and incubating in-house startups, supporting them with business know-how in areas such as strategy, organization, controlling, human resources, infrastructure, marketing, and methods.

Through **Robert Bosch Venture Capital GmbH,** based in Gerlingen, Germany, we invest worldwide in technologies with future potential, such as the internet of things, artificial intelligence, and future computer architectures. The company provides capital for startups and industry-specific venture capital funds in Europe, the U.S., Israel, and China. Its “Open Bosch” program also fosters Bosch’s collaboration with third-party startups.


BOSCH

Prospects for the Bosch Group

Fundamental strategic orientation and objectives

The new board of management, which was formed at the beginning of 2022, is working intensively on a new iteration of group strategy that, in light of changing marketplace conditions and the resulting opportunities and risks, will put the Bosch Group on track for enduring success. The starting point for our goals and strategies remains the objective of securing the company's future as enshrined in the will of the company's founder Robert Bosch – in other words, ensuring the company's strong development and securing its financial independence. Our long-term ambition is to continue offering products that are "Invented for life" – products that fascinate, that improve quality of life, and that help conserve natural resources. In this respect, "products" are not only physical products and services, but also the software-based solutions and services that go with them.

Against this backdrop, we aim to position the Bosch Group as a leading technology company. We want this aspiration to be reflected in our financial targets as well. With regard to sales, our aim is average annual growth of 6 to 8 percent between now and 2030, given normal inflation rates of 2 to 3 percent. In this context, we take our lead from the European Central Bank's medium-term inflation target of 2 percent. A further strategic goal is to achieve stronger growth in emerging markets such as India, ASEAN, and Africa, but also in North America, where – in terms of our share in the market we can reach – we have not yet exhausted our market potential. We intend to grow by innovating and by opening up new markets, but also by acquiring companies and entering into partnerships. In our existing businesses, we aim to achieve an overall EBIT margin from operations of at least 7 to 7.5 percent; we want the expansion of adjacent and new high-margin areas of business to increase this margin in the future.

These plans require active portfolio management with a view to both acquisitions and divestments. As a rule, however, we will maintain our broad footprint across diverse business fields. In addition, we will continue our performance program aimed at increasing EBIT margin. This program addresses all business sectors as well as the corporate and service units. To improve their enduring competitiveness, the divisions have used benchmarks to formulate measures for tackling the most important cost categories, and are implementing them. Target budgets have been set for the contribution that corporate departments and service units make to result. In the 2022 business year, we began to reorganize the corporate Global Business Services unit in western Europe as well. Service functions are being pooled with a stronger regional focus and job profiles adapted to new requirements. This will make it possible to standardize processes faster, sustainably reduce complexity, expand digitalization, and continuously make better use of synergy effects.

Ample opportunities

Multiple strategic analyses in the 2022 business year confirmed the presence of considerable growth opportunities in existing areas as well as in adjacent and new areas. The fundamental condition for entering new fields is that the activities be compatible with our skills and expertise. Specifically, these are commercialization and high-quality volume production, broad domain and industry knowledge, as well as technological expertise, also in complex and intelligent systems such as electronic and electromechanical systems with embedded software. Future developments will continue to be driven by the trends of connectivity, electrification, energy efficiency, automation, and emerging markets, which we associate with our "Invented for life" ethos.

Electrification is of particular importance for Mobility Solutions, our biggest business sector. Emissions standards aimed at complying with climate targets and improving urban air quality are reinforcing the trend toward electrification and electromobility, along with customers' desire for driving enjoyment. In our Industrial Technology business sector, the new solutions arising from the increasing convergence of electrical and hydraulic systems are presenting us with opportunities. In building technology, especially in heating and air-conditioning, the use of heat pumps and renewables is growing strongly in importance, and this is presenting market opportunities. In Europe in particular, the switch from fossil fuels to renewables is being driven by the sharp rise in energy prices in 2022, as well as by subsidy programs.

In addition to its significance for the Industrial Technology and Energy and Building Technology business sectors, automation affects the Mobility Solutions business sector in particular. Here, we expect strong market growth in partially and highly automated driving. Where industrial technology is concerned, many opportunities are arising from the increasing flexibility of production and more widespread connectivity. This offers additional ways of enhancing product quality and productivity, adding functionality, and saving energy. It also opens up potential for services such as remote predictive maintenance. In the Consumer Goods and Energy and Building Technology business sectors as well, connectivity and increasingly smart products are creating additional potential for growth as a result of new services such as maintenance.

In view of our expertise in many product areas and our know-how in software and sensor technology, we believe this offers huge potential for the development of Bosch's business operations over the long term, also attuned to differing customer needs in different regions. We are also relying on our proficiency in the areas of connectivity and artificial intelligence, which we view as fundamental for the design of intelligent and user-friendly products, services, and processes. In general, we believe that sustainably manufactured products offer prospects for future market success. In the emerging markets of Asia, South America, central and eastern Europe, and Africa, which are home to much of the world's population, we want to expand our presence in sales and manufacturing operations. In these regions, there is frequently a demand for affordable products – ones that meet the special requirements of the local market with regard to people's lifestyles, robustness, and ease of repair.

Accordingly, we have either expanded our portfolio or done a lot of groundwork for such an expansion. Examples in our existing business include the eLION program for the electronification and electrification of hydraulics in the Drive and Control Technology division, the major expansion in electric heat pumps in the Thermotechnology division, and the expansion of the integrator business in Europe and North America in the Building Technologies division. BSH Hausgeräte's range cooker is an example of the expansion of activities in emerging markets. This stove is designed to meet the needs of emerging markets with its variety of cooktops and spacious oven. Growth areas in the Mobility Solutions business sector include components and systems in electromobility and the driver assistance systems on offer. Further growth areas include semiconductors and the hydrogen economy, whether in the field of fuel cells or of electrolysis. We are also looking at activities related to factory automation and air conditioning, as well as at additional customer segments in the area of power tools and the expansion of our medical technology activities.

When putting our strategy into practice, we continue to build on our high level of innovativeness – also in terms of our research and development spending – on quality, on our broad diversification and global presence, and on the Bosch culture. Our actions are based on the Bosch values: future and result focus, responsibility and sustainability, initiative and determination, openness and trust, fairness, reliability and credibility, legality, and diversity.

Strategy and innovation

Group-wide topics

Digitalization strategy

We are systematically digitalizing our products in our core business, primarily in order to enhance customer benefit. And with connected solutions, we also aim to generate additional services-based revenue and to increase efficiency. By "connected solutions," we mean various combinations of hardware and software, as well as services. It is in pursuit of these goals that we are working to further develop our digitalization strategy. We recently made digitalization issues a board of management responsibility, which underscores the importance we attach to this subject. Essentially, digitalization is about five key areas: fascinating our users and customers with customer-centric solutions, unlocking business potential through software and services, creating additional value by setting up digital ecosystems with partners, making Bosch faster and more efficient, and developing our associates and empowering digital talent. One core element for implementing our strategy is harnessing the power of artificial intelligence with respect to connected, internal processes such as development, production, logistics, and administration, as well as for the expansion of third-party business with digital solutions. To this end, we still need to broaden knowledge within the company of the opportunities and requirements of digital business.

To make our progress transparent, we are working to define new business-specific metrics. These metrics may be things such as software sales, sales from e-commerce and digital services, or cost savings due to digital solutions. The new metrics build on the indicators we have used in recent years for tracking purposes. For example, we have tracked the growth of expertise in making our electronic product classes web-enabled.

In addition, we are working on the organizational setup of our digitalization activities. At the beginning of 2023, we merged corporate IT and our Bosch.IO unit to form a new in-house unit, Bosch Digital. It employs a total of around 9,000 associates. Its goal is to provide benchmark-level, scalable, and competitive IT and software solutions for Bosch's internal customers. We have already been able to achieve significant savings here since 2020 by renegotiating licenses, making structural adjustments, and improving efficiency. In this respect, increasing the proportion of activities in low-cost locations has also played a role, for instance through the transfer of the Bosch IoT Suite to Sofia, Bulgaria. For organization purposes, the Bosch Center for Artificial Intelligence was incorporated into our research sector in 2022. A key part of the digital transformation in the company is the introduction of SAP S/4 HANA. The first go-live took place in Poland in July 2022, with further rollouts to follow over the next few years.

We are also working intensively to build up additional digitalization expertise among executives and specialists. To do this, we are using extensive training measures, especially internal online training courses. We have created the Bosch Club, a global platform for independent, informal learning by associates for associates, and are expanding our collaboration with e-university providers. Attractive career paths for software professionals are equally important. Following widespread implementation in the Cross-Domain Computing Solutions division, we are rolling out these programs in other divisions.

Sustainability

For Bosch, sustainability is the balance between the economic, ecological, and social elements of our business activities as part of responsible corporate governance. Here, we are increasingly going beyond our direct sphere of influence to include supply chains and use of products sold. We want to play a leading part in climate action. In terms of our own value creation, our strategy for this comprises four levers: improving energy efficiency, generating more power in-house from renewables (new clean power), procuring more green electricity (from renewable sources), and – as a final option – offsetting unavoidable carbon emissions. With its more than 400 locations worldwide, the Bosch Group has been carbon neutral in its business operations – in both Scope 1 (direct emissions) and Scope 2 (procured power) – since 2020.

Our goal is to continuously optimize the above-mentioned mix of measures so as to further reduce the burden on the climate. In the 2022 business year, we reduced the proportion of offsets needed to achieve carbon neutrality, among other things by further expanding renewable power generation (new clean power) at our locations. In addition, we are sourcing green electricity for our locations in more and more countries. In 2022, for example, we switched our supply contracts in Turkey and Brazil completely to green power, as we did in Thailand and Vietnam, where we had previously used only gray power (electricity from fossil fuels).

We are also broadening the focus of our activities and aiming to reduce Scope 3 emissions – emissions that occur outside Bosch's direct sphere of influence, such as those generated at suppliers, in logistics, or in product use. For 2030, our aim is to cut these upstream and downstream carbon emissions by 15 percent compared to the absolute figure for emissions in the baseline year of 2018. Like our targets for Scope 1 and Scope 2, this target was reviewed and endorsed by the Science Based Targets initiative (SBTi) for the 1.5-degree pathway. We were the first automotive supplier to be granted "targets set" status. The target we have set for Scope 3 emissions is intentionally a very ambitious one, as these upstream and downstream emissions are many times greater than those from Scope 1 and 2. Moreover, we made the target independent of sales growth, so that the reduction target will increase as the company grows.

In the area of the circular economy, moreover, we want to make our products more sustainable across their entire life cycle – from procurement and manufacturing, through use, return, and remanufacturing, to recycling and reuse. In doing so, we aim to reduce the amount of material used in our products, as well as their carbon footprint. One aim is to create a circular economy either directly within Bosch or outside our company as part of established recycling flows. One example of this is the use of recycled plastics in power tools and home appliances.

In 2023, the Act on Corporate Due Diligence Obligations in Supply Chains ("Lieferkettensorgfaltspflichtengesetz") will come into effect in Germany. It aims to improve the international human rights situation by setting requirements for the responsible management of supply chains and companies' own business activities. Bosch has prepared for the implementation of the new regulations, adjusting processes and responsibilities accordingly as part of a new management system.

Bosch also places great importance on occupational safety. We see preventing accidents and ensuring workplace safety as part of our responsibility. By 2025, we want to reduce the number of workplace accidents to 1.45 per 1 million hours worked.

Robustness

The crises of the past few years have underscored the importance of robust supply chains. The Covid-19 pandemic presented us with major challenges in this respect. Over the course of 2022, the rate of coronavirus infections subsided in many regions, and when infections did occur, they were less severe. This meant we could relax or lift hygiene measures and rules of conduct at Bosch as well. In light of these developments, the task force we formed in 2020 was dissolved in mid-2022. The wide-ranging reporting tools, which provided up-to-date information on how the pandemic was developing in the various countries, on cases of the virus at Bosch, on capacity utilization at the plants, and on safeguarding supplies to customers, have been discontinued for now, but can be reactivated if necessary. That said, China was affected by sharply rising infection rates in the second half of 2022. This impacted our associates as well, some of whom worked from home for long periods of time or lived in our factories and were provided for there. By the end of 2022, most had recovered from the infection and returned to their jobs.

Semiconductor shortages continue to be a major challenge, particularly in the Mobility Solutions business sector, even though the situation in 2022 was better than in 2021. Here, too, we responded to the shortages early on and created several task forces as early as 2020 for areas such as purchasing, logistics, quality assurance, development, and customer support. These task forces focused especially on the situation in Mobility Solutions. Our objective, together with our customers, is to limit the consequences of the bottlenecks as far as possible. In 2022, we especially pushed ahead with technical measures to make additional components available, and we are still in in-depth talks with suppliers to secure capacity. On the manufacturing side, space that became available at short notice at our location in Reutlingen, Germany, was converted to create a clean room. Furthermore, the ramp-up of our 300-millimeter wafer fab in Dresden was accelerated. Nonetheless, bottlenecks are also expected in certain areas in 2023. Demand in the automotive segment is growing significantly faster than the semiconductor market as a whole. Specifications mean that the semiconductor products for this segment are produced using proven technologies, yet semiconductor manufacturers invest disproportionately low amounts in these technologies.

The war in Ukraine has presented us with considerable additional challenges. To coordinate the measures needed to tackle them, we put together a crisis team back in February 2022. Our main priority here is the safety of our associates. Despite the difficult circumstances, most of our locations in Ukraine were able to resume business in the course of the year. As a result of the sanctions, most of Bosch’s business with Russian customers and in Russia has been interrupted or come to a standstill. Given the further exacerbation of the situation and further restrictions due to sanctions, the supply shortages associated with them, and significantly more difficult access to the Russian market, we are scaling back our business in Russia to just a few residual activities.

In addition, we have had to adjust to the strained gas supply situation in Germany and other European countries. A task force was formed for this purpose as well. We have made extensive economies and also made preparations for possible electricity supply shortages. In addition, we have set ourselves the task of defining measures for dealing with controlled power reduction, also in consultation with network operators.

Given the various crises of recent years, we also made modifications to the corporate crisis management team, which has been proving its effectiveness since 2020. In mid-2022, we made it a firm part of the Bosch regulations. These now define the corporate duty of care and ways of minimizing crisis-related risks to result, reputation, and legality. Associated with this, they set out the responsibilities, decision-making powers, and process flows in the event of a crisis. Our goal is to ensure our ability to launch a crisis response to protect life and limb, and to minimize business risks through rapidly effective crisis management that addresses a wide range of issues: leadership in times of uncertainty, customer protection and supply chains, ability to resume operations, compliance with sanctions, pooling of skills, avoidance of duplicate effort, and crisis communication. The new guideline follows the structure of the ISO 22361 industry standard. Among other things, we have a stand-by management team consisting of the heads of the environment, health and safety, and information technology units. A team under the company security services' authority ensures that the stand-by team is able to work at short notice in the event of a crisis, in terms of both organization and personnel.

In view of the crises in recent years, we are working on concepts to make our company more robust in the face of regional pressures. Of particular importance is securing our ability to deliver; this requires greater regional diversification of the value chain, including the establishment of additional supply sources. We also need to improve our market penetration in countries where we still have growth potential. In particular, this means strengthening our activities in the Americas, especially the U.S., but also in countries such as India or regions such as ASEAN and Africa.


#CodeRulesTheWorld

Mobility Solutions

Strategic development

One key focus of the Bosch Group's future strategic alignment is the positioning of the Mobility Solutions business sector. The automotive industry has been in flux for quite some time. Since peaking at some 98 million units in 2017, global vehicle production has been in decline. It was already down to 93 million units in 2019, before the coronavirus pandemic. Moreover, temporary factory closures in the automotive industry in response to the pandemic, especially in 2020, and the peak of the chip shortage in 2021 led to a further significant decline in production figures. Even the 2022 business year brought only a partial recovery to a production volume of some 85 million units, compared with roughly 81 million units in the previous year. In the years ahead as well, we expect only slow growth in global vehicle production. Our planning is based on the assumption that production will not return to its 2019, pre-crisis level before the final years of this decade. Nonetheless, we believe that expanding our share of value creation will present considerable growth opportunities for our company. However, we are bracing ourselves for more chip shortages as well as for further tough negotiations with customers on the price increases that are needed due to the rise in prices of raw materials, energy, semiconductors, and, increasingly, wages and salaries.

At the same time, we need to provide fundamental answers to geopolitical developments, growing regionalization, digitalization, and stricter sustainability requirements, also in the area of mobility. Other important trends are battery-electric powertrains and the fuel cell. Hydrogen engines offer new possibilities as well. The significance of software and data will also continue to grow, and it is obvious that the hardware and software segments will increasingly diverge. For future vehicle software architectures, we must adapt to the different approaches that manufacturers take and position ourselves flexibly. In the future, vehicle platforms with centralized electric/electronic architectures are likely to emerge in several areas. Here, we expect the quantity of electronic components and chips in vehicles to rise further, assisted driving to progress ever faster toward partially and fully autonomous driving, and competition to change due to new market players. We also aim to become a provider of solutions and services for the operation of manufacturer platforms for software-defined vehicles, and are for this reason significantly expanding the activities of our ETAS subsidiary.

Our target is to achieve an average of 6 percent annual sales growth in the Mobility Solutions business sector from 2022 to 2029 and to successively improve EBIT margin from operations despite continuing high levels of upfront investments. Our growth target assumes inflation rates of between 2 and 3 percent. In this context, we take our lead from the European Central Bank's medium-term inflation target of 2 percent. We expect growth opportunities particularly in battery-electric vehicles and fuel cells, vehicle dynamics, driver assistance systems, vehicle computers, software, semiconductors, and sensors. But our activities in eBike Systems, Two-Wheeler and Powersport, Commercial Vehicles and Off-Road, Automotive Aftermarket, and Bosch Engineering also offer bright prospects.

Achieving these targets also requires that our portfolio be systematically aligned to market changes and our competitiveness improved. This is why we announced or implemented further adjustments in 2022, including at the combustion-engine locations in Bari, Italy, and Munich, Germany, and at the Electrical Drives location in Bühl, Germany. We also sold our powertrain technology-related vacuum and hydraulics business to Weifu High-Technology Group Co., Ltd. (Weifu), in Wuxi, China. With this, Weifu has acquired all shares in VHIT S.p.A. in Offanengo, Italy, and its Chinese subsidiary VHIT Automotive Systems (Wuxi) Co., Ltd. in Wuxi, China. In addition, the sale of activities relating to the sorting and preparation of used spare parts for reuse in the Automotive Aftermarket division was completed, as was the sale of the Automotive Steering division's Pump business unit.

With the Mobility Company program launched in 2022, we aim to align the Mobility Solutions business sector with the changing requirements in the market and in technology. Our vision is to jointly shape a new era of mobility – mobility that is sustainable, safe, and exciting. We aim to maintain our role as the go-to partner for automotive systems and the associated hardware and software, and to become a leading provider of technology for the mobility life cycle business. Customer needs are changing ever more quickly, and we want to serve those needs even faster, with customized technologies and solutions from a single source. The goal is an organization that provides the best possible responses to market and technological developments. Currently we are working on the reorganization of the Mobility Solutions business sector. A majority of the divisions are to be assigned to horizontal and vertical domains in order to strengthen collaboration in electrification, vehicle dynamics, driver assistance systems, vehicle computers, and software. The reorganization is scheduled to take effect at the start of 2024. Since the beginning of 2023, Mobility Solutions has been headed up by a sector board.

Business environment in powertrain technology

The changes in powertrain technology reflect ever tighter emissions regulations. As a company, we are committed to the very ambitious Paris climate targets. We continue to pursue all technology paths and offer our customers a wide range of products and services. We want to make any necessary structural changes as socially acceptable as possible and are committed to ensuring that the transformation in powertrain technology harmonizes the interests of ecology, business, and society.

As a matter of principle, we welcome the regulation proposed by the European Commission in fall 2022 regarding the Euro 7/VII emissions standard. The proposal will help further improve air quality by tightening limits and introducing new thresholds for ammonia and particulate-matter emissions from brakes for passenger cars and light commercial vehicles. In certain respects, it remains technically demanding. We advocate a judicious Euro 7/VII standard that will have an appreciable effect on air quality within a minimum time frame. This depends on the required technology being practicable in good time and on any necessary adjustments being affordable. Moreover, the regulation for real driving emissions (RDE) tests should focus on representative driving conditions, which it should define in a legally watertight way.

With regard to the limits for passenger cars, the new European Commission regulations will necessitate the use of additional technologies, but costs will remain reasonable – at least if non-representative extreme situations are excluded. For commercial vehicles with a gross vehicle weight of less than 3.5 metric tons, meeting the new Euro 7/VII emissions standard will be technically demanding. The reason for this can be found in the further lowering of the limits for nitrogen oxides (NO_x), which present a challenge especially in difficult driving conditions. In commercial vehicles with a gross vehicle weight of more than 3.5 metric tons, the planned regulation will lead to significant additional costs for the vehicles and, as a result, to higher delivery costs. For example, the limit for nitrous oxide (N_2O) will make considerable technical adjustments necessary. Furthermore, at least one additional particulate filter may be necessary to meet the proposed target for the number of particulate emissions, depending on the design of the test conditions. We are working on the additional technology required.

Our goal is to help make mobility carbon neutral. Components and systems for electric vehicles that run on green electricity are one part of this. In the transitional phase and in numerous applications (especially in heavy-duty and long-haul traffic), the modern combustion engine will continue to play an important role. It will also feature as part of hybrid configurations. Bosch's aim is to remain a long-term partner for systems and components through efficient application of capital expenditure and engineering work and to systematically exploit opportunities in existing areas of business. Nonetheless, sales in the combustion-engine business are expected to decline from the middle of the decade onward, and there will be regional shifts. This will require further adjustments to employment structures in our combustion-engine business, especially in Europe. Low-carbon and completely carbon-neutral fuels – such as renewable synthetic fuels – can help the existing global vehicle fleet play a role in achieving the climate targets. Moreover, alternative fuels can complement electromobility where purely battery-electric powertrain solutions still face economic or physical challenges, such as in heavy trucks. Furthermore, low-carbon/carbon-neutral fuels can be used in countries in which the introduction of electromobility will be delayed somewhat as a result of the lack of recharging infrastructure. In addition, we supply components for vehicles powered by natural gas and, in the case of countries such as Brazil, bioethanol.

Electromobility and fuel cells

The electromobility market has become even more dynamic. In the electric passenger car segment, nearly all automakers are reporting ambitious sales and fleet-share targets. We expect that one in three new vehicles will be electrified by 2030. In the commercial vehicle segment, manufacturers are also working on electrical systems, both battery- and fuel cell-based.

In electromobility, it remains our strategy to use our broad product portfolio to capture a leading market position in this promising area. Our portfolio comprises components such as electrical machines, e-axles (as an entire powertrain), power electronics, and 48-volt batteries. There is a high level of similarity both between the components used in purely battery-electric vehicles and plug-in hybrids as well as between those used in passenger cars and commercial vehicles. In the 2022 business year, we launched a new electrical powertrain for small trucks that can help improve air quality and reduce noise pollution, especially in inner-city distribution traffic.

China is an important market for electromobility and automated driving. In January 2023, our subsidiary Bosch Automotive Products Co., Ltd., located in Suzhou, and the Suzhou Industrial Park Administrative Committee signed an agreement under which we will expand our engineering and production activities for components in the field of electromobility and automated driving.

Moreover, electrical machines and inverters can not only be used in battery-powered vehicles, but are also suitable in principle for vehicles powered by fuel cells. In addition, we plan to offer a comprehensive portfolio for the fuel-cell powertrain, from individual components to the stack to entire fuel-cell systems. Its ramp-up will also depend on the expansion of hydrogen infrastructure. In the automotive segment, our activities relating to fuel cells with a polymer electrolyte membrane (PEM) are initially focusing on the commercial vehicle sector. We have reached further milestones. In 2022, for example, Bosch Hydrogen Powertrain Systems (Chongqing) Co., Ltd., located in Chongqing, the company we run with our partner Qingling, and which is consolidated in the Bosch consolidated financial statements, was already able to equip some 500 vehicles with a Bosch system for use on the road. We expect this figure to rise to more than 40,000 worldwide by 2025. The rollout with Nikola Corporation in the North American market is planned for 2023. In addition, we are establishing manufacturing capacity close to customers at our locations in Anderson (SC), United States, in Wuxi, China, and in Bamberg, Germany. Also in 2022, in order to improve our systems expertise, we conducted trials with vans equipped with fuel cells. In commercial vehicles, however, hydrogen can be used not only in fuel cells, but in hydrogen engines as well. For this reason, we are working on both port- and direct-injection systems and the necessary control units, and have already won a major order for such a system in India. Among other things, the hydrogen engine is ideal for stationary construction and agricultural machinery that operates under heavy loads.

In mid-2022, in order to harness synergy effects, we also transferred our SOFC (solid-oxide fuel cell)-based business activities in stationary power generation from the Thermotechnology division to the Powertrain Solutions division. In addition, we are examining the market for PEM electrolysis and investing in the development of the associated components. Electrolysis produces hydrogen by using electricity to break water down into hydrogen and oxygen.

Vehicle dynamics as a growth area

The market trends of powertrain electrification, centralized and zone-oriented electric/electronic architectures, software-defined vehicles, and by-wire technologies are opening up potential for new types of vehicle motion management along all three axes. Bosch's new software system solution for vehicle motion management integrates previously independent control strategies for vehicle guidance, vehicle dynamics, and driving mode, and unlocks the systems potential of the actuators in the brakes, steering, powertrain, and chassis. The integration of by-wire systems for brakes and steering offers tangible added benefit. In 2023, vehicle dynamics control 2.0 will go into production as the first module of vehicle motion management. Vehicle dynamics control 2.0 is the latest generation of Bosch systems for driving dynamics, traction control, and antilock braking. The function anticipates likely vehicle behavior and intervenes proactively. The result is a driving experience that is very safe, agile, and relaxed.

Driver assistance and automated driving

By 2030, we expect the number of vehicles equipped with SAE Level 2 or Level 2 hands-free systems to double. We are systematically improving our driver assistance systems for automation levels 1 and 2 and also working on automated driving functions that significantly relieve drivers on freeways and in congested traffic. In addition, we are developing automated driving in line with SAE Levels 3 and 4. In the fall of 2022, we announced that automated valet parking, the SAE Level 4 driverless parking system developed by Bosch and Mercedes-Benz for use in a parking garage at Stuttgart Airport, has been approved by the German authorities for regular use. The fully automated and driverless parking system collects and returns the vehicle completely autonomously. Since the above announcement, Bosch and the parking garage operator APCOA have announced plans to roll out the technology to 15 more parking garages in Germany.

We use partnerships and acquisitions to augment our engineering proficiency. At the beginning of 2022, we announced an engineering alliance with the Volkswagen Group subsidiary Cariad. The aim of this partnership is to make automated driving suitable for volume production, and thus available to the broad mass of consumers. More specifically, these functions are Level 2 hands-free systems for urban, extra-urban, and freeway driving, as well as a system that assumes all driving functions on the freeway (SAE Level 3). We also acquired the map specialist Atlatec GmbH. Based in Karlsruhe, Germany, the company manufactures high-resolution 3D maps for SAE Level 3 and 4 automated driving functions. In all these ventures, we are taking our expertise in highly automated driving beyond actuators, sensors, and software. With the acquisition of the U.S. company Five AI Inc., headquartered in Cambridge, U.K., we aim to accelerate the development of software for automated driving. Five AI has a team of experts in cloud services, security, robotics, and machine learning, and is focusing on the creation of a cloud-based engineering and testing platform for the software used in self-driving cars.

Semiconductors as an investment focus

We are further expanding our capacity in semiconductors, having already opened our new wafer fab in Dresden in 2021, where we process 300 millimeter-diameter wafers. Apart from this, more than 250 million euros are to be invested in expanding the clean-room space in Reutlingen. Starting in 2025, this will give us more manufacturing capacity for processing 200-millimeter wafers. The further expansion of the Reutlingen location will primarily serve the growing demand for MEMS in the automotive and consumer sectors, as well as for silicon-carbide power semiconductors. Volume production of these semiconductors started in December 2021. They are used in the power electronics of electric and hybrid vehicles, where they also help increase range. In 2022, our semiconductor business invested a total of some 450 million euros in the corresponding production facilities and infrastructure. Within the IPCEI ME (“Important Project of Common European Interest on Microelectronics”) funding program alone, Bosch plans to invest some 3 billion euros by 2026 in the development and manufacture of microelectronics and systems based on them, subject to approval.

We strengthened our subsidiary Bosch Sensortec with two acquisitions. In Finland, we acquired the startup Minima Processor Oy, Espoo, a specialist in ultra-low-power technologies for digital sensor signal processing. And with the acquisition of Arioso Systems GmbH in Dresden, Germany, Bosch Sensortec is expanding its expertise in the field of MEMS microspeakers.

Furthermore, we are working on developing new sensor technology fields such as quantum sensors. With a view to sharing in the robust growth expected for this market, we have an in-house startup that has pooled the research results of the past few years and plans to translate them into products. Bosch has also announced a partnership with the U.S. technology company IBM in the field of quantum computing. One of its goals is to use quantum-computing simulation of materials to find surrogates for the precious metals and rare earths in carbon-neutral powertrains – both in the electric motor and the fuel cell – in the next ten years.

Growth in additional areas

Bosch eBike Systems is benefiting from ongoing demand for e-bikes, although the chip shortage is slowing growth in this segment as well. The e-bike market is being driven by the transformation of mobility in many regions and changes in people's leisure behavior. The focal point of our activities is our core European market. Due to high demand, we are planning to build up additional capacity for e-bike drive units, which the Electrical Drives division manufactures for the Bosch eBike Systems division in the Prešov region of Slovakia. They will also continue to be manufactured in Miskolc, Hungary, 130 kilometers away. There is additional growth potential in North America and in certain countries in Asia Pacific, where we are already represented by our own sales organization. In 2023, we will launch the e-bike ABS on the U.S. market. In addition, we are continuously expanding our range of drives, batteries, control units, and digital solutions for e-cyclists, as well as services for specialist bicycle dealers. By downloading an app, for example, some of the displays we offer can be expanded to include navigation functions through which the route is displayed.

The Two-Wheeler and Powersports unit is on track for growth with innovations from previous years, such as engine control units and injectors, motorcycle ABS for high-volume, small motorcycle classes, motorcycle stability control, and the advanced rider assistance system (radar-based functional solutions). New connected displays offer additional functions for motorcyclists, and free programming means that manufacturers are able to customize them to their specific requirements. Moreover, a variant measuring just 5 inches across can be used in various vehicle segments where installation space is tight.

For the Commercial Vehicles and Off-Road unit, in which we are working on innovations for trucks, buses, off-highway vehicles, and digitalized agriculture, we expect a considerable surge in growth over the coming years. In the new field of smart agriculture, in which we are collaborating with BASF, a first major customer was acquired in the United States. In the case of the NEVONEX platform for digital services in agriculture, by contrast, the search for investors for upscaling did not lead to the desired outcome. For this reason, this growth project will not be continued.

In the area of digitalization, Bosch and the U.S. cloud provider Amazon Web Services (AWS) have agreed to collaborate on the digitalization of logistics. The objective is to work with service providers from the logistics sector to improve efficiency and sustainability in the transportation and logistics industry. For this purpose, Bosch will develop a logistics platform on AWS for digital services aimed at freight carriers and forwarders. From a single source, they will in the future be able to receive support in areas ranging from truck-fleet utilization, to monitoring the flow of goods, to order handling. This service platform will pool expertise in mobility, software, and the cloud, enabling transportation and logistics companies to benefit much more from the opportunities of digitalization without having to set up their own resource- and cost-intensive IT projects. The marketplace will also be open to all providers of digital logistics services. AWS will contribute its extensive cloud portfolio and expertise. The first digital services are expected to be rolled out in Europe, India, and the U.S.; in India, we have already launched the L.OS platform.

Industrial Technology

Drive and Control Technology

In the Drive and Control Technology division of our Industrial Technology business sector, we are stepping up our efforts to expand the activities of our Bosch Rexroth subsidiary in its capacity as a provider of mobile and industrial hydraulics and of factory automation and connected manufacturing. The strategic building blocks of these efforts are the further development of the existing portfolio, innovations (particularly in software-based products and services), and the broadening of our international presence through the expansion of our international manufacturing network and acquisitions and partnerships. For the division, acquisitions are also a way of expanding its technological expertise. At the same time, Bosch Rexroth is strengthening its competitiveness. This also includes focusing its portfolio.

In the 2022 business year, Bosch Rexroth started large-scale delivery of solutions for the electrification of mobile machinery in the off-highway segment. Bosch Rexroth's electric eLION platform offers manufacturers freedom when designing the electrification of existing and new vehicle architectures. It includes motors, inverters, transmission, software, and accessories, as well as the hydraulics to go with them. Bosch Rexroth has also acquired a minority interest in BRUSA HyPower AG, Buchs, Switzerland, with a view to intensifying collaboration in the off-highway segment. BRUSA HyPower's DC/DC converters and onboard chargers will complement the eLION product range in the future. As a result, mobile machinery used in construction, agriculture, logistics, and municipal services will be able to operate more quietly and with zero local emissions.

In addition, Bosch Rexroth and Weifu High-Technology Group, Wuxi, China, have established a company for mobile and industrial hydraulics products in the medium-performance segment in China. Since its establishment, it has been included in the Bosch consolidated financial statements.

At the same time, Bosch Rexroth is gradually expanding its range of products and services in factory automation and connected manufacturing. The focus is on the further development of its automation platform ctrlX AUTOMATION. ctrlX OS, the Linux-based operating system with real-time capability previously used exclusively on the ctrlX CORE controller, is now available as a separate solution for the industrial environment. It can be used on all levels, from the field to the cloud, and for different types of hardware.

Bosch Rexroth and third-party software apps for any automation task can be downloaded from the company's own online store. The number of partners is already more than 60. Bosch Rexroth also offers tools and models for energy and performance simulations that help optimize plants' energy efficiency. To expand its competitiveness in factory automation, Bosch Rexroth intends to reorganize its four automation locations in Germany, Slovenia, and China. By the end of 2025, production of control units and motors is to be gradually pooled in Lohr am Main, Germany, and at the future plant in Brnik, Slovenia. The Erbach location, also in Germany, will focus more on the development and production of process control systems for resistance welding. In addition, the supply chain is to be reinforced with a new logistics center in Lohr. To meet local demand in China, the existing plant in Xi'an will also produce the ctrlX AUTOMATION platform.

A significant step toward shoring up the hydraulics business in North America is the acquisition of HydraForce, Inc. in Lincolnshire, Illinois, USA, in February 2023. The acquisition will also help grow business in Asia. HydraForce develops and manufactures compact hydraulic valves and hydraulic solutions in the U.S., Brazil, the U.K., and China.

Bosch Rexroth also wants to expand capacity in order to strengthen its presence in North America and gain proximity to its customers. A plant in Querétaro, Mexico, for products and components in mobile applications and factory automation, is scheduled to open in mid-2023. It will employ some 900 associates when it is fully operational in 2027. The company plans to invest a total of some 160 million euros in the new location. At the existing U.S. location in Fountain Inn, South Carolina, development activities for the electrification of mobile machinery and the associated software activities will be intensified. In addition, the production of variable displacement pumps for closed-loop applications in mobile hydraulics is being expanded there. Beyond this, the division intends to strengthen its factory automation business in North America even more. For this purpose, it will move its linear motion and assembly technology manufacturing operations to a new location in Charlotte, North Carolina, USA, and increase production space.

Technologically, Bosch Rexroth has strengthened its position in factory automation by acquiring a majority stake in Kassow Robots ApS, Copenhagen, Denmark. This company was founded in 2019 and manufactures versatile, collaborative lightweight robots for industrial production. These “cobots” can carry heavy loads, have a long range, and can work in very confined spaces. This acquisition is part of the strategy related to the factory of the future. Bosch has also acquired the motion control specialist Elmo Motion Control Ltd., based in Petach Tikva, Israel. Elmo develops and manufactures high-end electric servo drives and drive controls for industrial automation. The company has a workforce of roughly 330. With this acquisition, Bosch Rexroth intends to supplement its product portfolio relating to the ctrlX AUTOMATION platform.

Bosch Rexroth is also focusing its activities. Among other things, it divested its project business in the stage technology sector in 2022. Ongoing projects in this area will be completed as agreed. The situation in the niche market for stage equipment has become more acute in recent years, not least due to the negative effects of the coronavirus pandemic. In addition, there has been a technological transformation in drive systems, away from hydraulics toward stage-specific electrics. The year 2022 also saw the sale of the major projects business in Boxtel, Netherlands, to the Van Halteren group, Bunschoten, Netherlands, and the completion of the transfer of the Boxtel site. In this business area, Bosch Rexroth developed and produced large cylinders and carried out major projects in areas including shipbuilding, hydraulic steelworks, and motion simulation.

Other businesses

Following its reorganization in 2021, **Bosch Manufacturing Solutions,** our in-house systems provider for automation and assembly solutions, grew significantly in 2022 – in its business with both Bosch plants and third-party customers. The share of sales accounted for by areas of strategic future importance such as electromobility is rising steadily, more than offsetting the steady decline in orders for production equipment in the internal-combustion engine segment. At the same time, it aims to support internal-combustion engine customers, including with regard to services and high investment efficiency.

The **Bosch Connected Industry** business unit is responsible for business with connected industry-related software solutions for in-house as well as third-party customers. In addition to the product areas Nexeed Automation, which essentially comprises development software for mechanical engineers as well as various machine-related software solutions, and Bosch Semantic Stack, which is software for structuring and describing data, the Nexeed industrial application system is a key product group. In the 2022 business year, work continued on the development of solutions for digital twins in Bosch Semantic Stack. To enable the exchange of data across companies, open-source versions of selected software modules for creating digital twins have been published. Bosch Semantic Stack was presented to external customers at the 2022 “Bosch Connected World.” Bosch Connected Industry collaborates closely with the Drive and Control Technology division and with the Bosch Manufacturing Solutions business unit.

Consumer Goods

In the Consumer Goods business sector, we are continuing to rely on our strong international and regional brands and product innovations, and aim to leverage them for further growth in the medium and long term. However, since mid-2022, market developments have been heavily influenced by the end of the extraordinary boom during the coronavirus pandemic. Moreover, both Power Tools and BSH Hausgeräte have been hit hard by the phasing-out of the Russia business. There have also been considerable external effects in the consumer goods sector in recent years, such as rising raw materials prices, freight and energy costs, and changes in exchange rates.

Power Tools

In pursuit of its strategy of growth across its segments, Power Tools continues to use product innovations and modifications as well as novel services. User experience – the focus on user needs when developing products and services – is a decisive success factor in these endeavors. This applies both to the professional segment in manufacturing, construction, and the trades, and to the DIY segment in homes and gardens. As cordless tools offer users greater convenience, the division is constantly expanding its cordless range. In addition, Power Tools is continuously working to strengthen its competitiveness, including improvements with respect to costs.

In 2022 alone, the division debuted over 30 new cordless tools for professional users. A similar number is expected to follow in 2023 – making a total of roughly 100 new cordless tools within three years. These tools are now finding their way into performance classes that were previously reserved for corded models. One of these is a new cordless angle grinder that combines the advantages of small and large angle grinders. With its 180-millimeter cutting disc, it is at least 30 percent lighter and 30 percent smaller than a conventional large angle grinder, but offers a comparable cutting depth of 61 millimeters.

The focus is on expanding partnerships with manufacturers of other brands, which was initiated by opening up the company's own battery technology in 2020. Users save money, space, and time if the rechargeable batteries and chargers for the various products made by numerous manufacturers are compatible. This also promotes greater sustainability, since users require fewer batteries and chargers overall. In the DIY segment, the Power for All Alliance's battery portfolio already includes some 100 devices and 10 different brands. In 2022, Bosch alone expanded its product range by more than 40 percent to around 60 devices. By setting up a battery system that works with multiple manufacturers, we are enhancing user-friendliness even further for a wide range of applications throughout the home: DIY, gardening tools, cleaning and household appliances, and leisure and camping products. With innovations such as our cordless air pump and our cordless fan, we are opening up new segments and significantly increasing flexibility for our customers.

At the end of January 2023, we announced that Bosch has now agreed to acquire a total of some 12 percent of the share capital of the Swedish company Husqvarna AB. In acquiring this stake, Bosch aims to strengthen the battery alliance between the two companies. Husqvarna also includes the Gardena subsidiary and its Flymo brand, both of which are also partners in the Bosch Power Tools division's Power for All Alliance. The acquisition of the shares is subject to approval by the antitrust authorities.

Regarding products for professionals, the formation of the global AmpShare alliance with Fein and Rothenberger has given a boost to our 18-volt battery platform: More than 25 brands – and thus an even broader range of applications – are now available to users in manufacturing and the trades. Together with our partners, we already offer more than 200 cordless tools. As the AmpShare alliance, we aim to scale up to more than 300 compatible devices by the end of 2023. All the partners share a common goal: to offer professional users a standardized battery across many brands, and in this way to maximize their efficiency.

As part of our sustainability strategy for power tools, we strive to save raw materials, conserve resources, and design our products to maximize their recyclability. In this context, the measures we take include increasing the use of recycled materials in packaging and power tools. Current examples include the Ixo cordless screwdriver, relaunched in 2022, and a cordless fan whose product housing – in other words, all parts of the device that are visible from the outside excluding the battery – is made of over 90 percent recycled plastic. We are also continuing to drive forward the digitalization of our sales and marketing processes. In this context, online commerce is an important strategic focus. This is why we are expanding not only our strategic alliances with multichannel and online retailers, but the scope of information and interaction available online as well. We are also broadening our portfolio of professional tools for emerging markets to bring it even better into line with local requirements.

BSH Hausgeräte

Our subsidiary BSH Hausgeräte aims to grow through consumer-oriented innovations, a competitive portfolio, expansion of its portfolio of integrated products and services, solutions for a sustainable future, and direct access to consumers. However, following record sales during the coronavirus pandemic, BSH Hausgeräte's market environment is now plagued among other things by challenges in the value chain, especially supply bottlenecks for electronic components. The company continues to focus on a strong brand presence and on launching innovative products. In 2022, for example, further brand stores were opened, also in Switzerland. In addition, a new premium oven range was launched, and an innovation in sink solutions premiered: the Waterbase under the Solitaire brand.

Since 2014, Home Connect has been connecting home appliances from various brands in one app. This app provides numerous useful extra functions, such as control via smartwatch or voice assistants such as Amazon Alexa or Google Home. As it is an open platform, Home Connect is constantly being expanded to include functions and services in collaboration with new smart home partners. It can also interact with other smart home devices and services in areas such as energy management. With the app, users can control their home appliances remotely, receive status updates, and get use-based recommendations and tips. Currently, appliances enabled for Home Connect can be customized and used conveniently in 64 countries, 30 languages, and with nearly 60 partners.

Launched in fall 2022, the premium oven series features an integrated camera and artificial intelligence. The new ovens provide the desired degree of browning and, once the dish is ready, turn off automatically and send a message to the consumer's mobile device. BSH Hausgeräte is also tapping additional market potential through new business models. Under its BlueMovement service brand, the company rents out washing machines, tumble dryers, washer-dryers, dishwashers, vacuum cleaners, refrigerators, freezers, food processors, and automatic coffee makers. This business model is currently available in the Netherlands and Germany.

With Waterbase, BSH Hausgeräte has created a new appliance category that has been launched in Germany, Austria, and the Netherlands under the new Solitaire brand. By providing an uninterrupted counter top, Waterbase transforms all aspects of kitchen sink design. Waterbase also offers many different options for serving up water, from boiling to hot, sparkling to still, and chilled to room temperature. It also includes an integrated water filter.

Regarding environmental sustainability, BSH Hausgeräte intends to continue improving the energy efficiency of its products and optimizing its entire product portfolio for a more sustainable lifestyle. The new generation of vacuum cleaners is one example. The appliance's motor has a ten-year warranty, and its filters can be washed to prolong their use. Roughly one-third of the appliance is made of recycled plastic, and the packaging consists largely of recycled paper. The inner packaging material is recyclable and compostable.

BSH Hausgeräte has also fleshed out its sustainability targets. The focus is on materials procurement and product use. In addition, the company is striving to make nearly all the materials it uses in the manufacture of its home appliances recyclable by 2030. Moreover, in that same time frame, our subsidiary wants half the materials used to make its products to be recycled. One example of this is SmartGrow Life, a herb garden that is roughly 60 percent recycled plastic.

BSH Hausgeräte is also further strengthening its international presence, especially in North America. In 2022, construction work began on a new factory in Monterrey, Mexico, which will start manufacturing refrigerators for the North American market in 2024. Here, too, our guiding principle is sustainability. The factory's own photovoltaic array, together with the procurement of green electricity, will mean that refrigerator production is carbon-free (Scopes 1 and 2). BSH Hausgeräte is also investing in Asia Pacific and Africa. For example, the company plans to expand capacity at its factory in Chennai, India. It has also decided to build a factory for stoves in Egypt in order to improve access to markets on the African continent and further expand business there.


BOSCH
Thermoteknik

Energy and Building Technology

Building Technologies

The Building Technologies division offers systems, solutions, and services that improve the safety and security of people, buildings, and material assets, and also enhance convenience and energy efficiency. To achieve this, we are further expanding our systems integration business in the regions and strengthening our global product business through product modifications and innovations.

As a systems integrator, Building Technologies offers connected and integrated solutions for security, convenience, and efficiency in commercial buildings. Its activities focus on the markets in Europe and North America, but also extend to Singapore. Further acquisitions are also expected to play a role in its expansion. One of these is the acquisition of Protec Fire Security Group Ltd., headquartered in Nelson, U.K., which had already been concluded at the end of 2021. The company is an integrator of fire detection technology and security solutions in the U.K. and the Netherlands. In 2022, moreover, we acquired Hörburger AG, a company focusing on building automation and energy management based in Waltenhofen, Germany.

Due to changing customer needs and against the backdrop of the increasing pace of digitalization, we are developing new connected services for areas such as facility management. We are working on using digital twins to model technologies, software, systems, and sensors, along with building processes and user behavior. The aim here is to manage processes in buildings more efficiently. With NEXOSPACE, a service suite for digital building management, we have launched a solution to connect and integrate all service solutions on one cloud platform. For the owners and operators of commercial buildings, this makes digital control more convenient and integrated. On top of that, the suite makes it possible to analyze the aggregated data from all building technology systems, which in turn reveals numerous potential improvements and supports high system availability and smoother operating processes.

In our product business, the markets for video systems, intrusion detection, and fire detection in particular are growing. Software, connectivity, artificial intelligence, intuitive operation, and cloud-based services are playing an increasingly important role alongside hardware. Our vision is one of safety and security systems whose predictive warnings help prevent damage or injury. We are working on a large number of new products and business models to establish ourselves in this promising market.

Current solutions include a new camera equipped with a 9-millimeter lens and intelligent video analytics, specifically designed for close-range perimeter security. It provides a full 360-degree panoramic view within 30 seconds and is used, for example, to monitor the fence line at an energy or utility facility, data center, or other high-security sites. One innovation here is a camera family with integrated video analytics based on deep learning. It supports precise detection of unauthorized persons and can accurately count the number of people in busy areas, especially in and around buildings. Operators use real-time data to understand what is happening at a particular location. One application of this is the safe and efficient control of flows of people entering and leaving buildings or assembly areas. Another innovation in communication systems is a cordless, portable, weatherproof loudspeaker with professional sound quality that is suitable for many applications, whether professional or recreational – such as concerts, dance clubs, and fitness centers.

Thermotechnology

The buildings sector will play a crucial role in achieving climate targets. The Thermotechnology division is addressing this with its newly formulated claim “Make. Home. Comfort. Green.” The aim is to create sustainable solutions for heating, cooling, and well-being, in which even greater connectivity is to play a role. Electrification and renewable energy are becoming considerably more important. Two technologies with potential for sustainability are heat pumps and hybrid heating systems comprising a heat pump and a condensing boiler. While heat pumps are used in new buildings and in existing buildings that have been insulated, hybrid heating systems are an alternative option when modernizing the way under-insulated structures use energy. In such systems, the electricity for heat pumps is increasingly being generated from sustainable sources. In addition, the devices can not only heat, but also cool in the summer.

We have already invested some 400 million euros in electrification over the past four years. We will also support the expansion of this business area by offering training courses for professional customers. In the European heat-pump market, which accounts for the lion’s share of the global market, we are represented in northern, central, and southern Europe. In northern Europe, an already very mature heat-pump market, we have an engineering location and a manufacturing plant in Tranås, Sweden. In central Europe, the solutions we offer focus on a systems model in which heat pumps, ventilation units, and photovoltaics are combined to form a single system that uses our energy manager to optimize efficiency and the use of locally generated electricity. With the start of production of indoor heat-pump units in January 2023 at our location in Eibelshausen, Germany, which to date has manufactured hot-water tanks, we are expanding our existing heat-pump production network, which has up to now manufactured in Tranås and in Aveiro, Portugal. In 2022, we also debuted a new generation of heat pumps that use the refrigerant propane. Affordable products are of great importance for southern Europe. With this in mind, the division plans to launch a new air-to-water heat pump in 2023.

We are increasingly offering hybrid solutions that combine heat pumps and gas-fired condensing boilers. These alone are enough to achieve extensive reductions in CO_2. As their energy mix is more than 65 percent renewable energy, they already meet the targets Germany plans to roll out in the future. When the building has been renovated to increase energy efficiency in the medium term, the existing heat pump can also supply it in a completely climate-neutral manner. Over the longer term, the natural gas used in hybrid appliances can be supplemented by green hydrogen.

In addition, demand for air conditioning units is growing across Europe, especially for residential buildings. In all European markets, Thermotechnology offers a varied portfolio of air conditioners for all types of residential units and for the commercial sector. The division is also systematically expanding its business in North America, with a focus on residential buildings. Additional comfort in the home is provided by the air purifiers launched in 2022. They help remove impurities such as pollen, mold spores, dust mites, and pet dander. The division also offers infrared heating systems that work on the principle of radiant heat.

Moreover, we are also pursuing a systematic digitalization strategy in our Thermotechnology division. We had sold around 950,000 connectable devices by the end of 2022. A Bosch energy manager makes it possible to link up the heat pumps and photovoltaic systems in the home. It controls the heat pump according to the photovoltaic power available, thus increasing the amount of locally produced electricity used for heating, cooling, and hot-water generation.

But Thermotechnology is also showing the way in other areas of digitalization. In 2022, for example, the division started to increase the number of international online shops and to continuously improve the customer-friendliness of existing shops. By 2025, customers in other parts of the world will have access to an additional 20 online shops, and thus to more than 30 in total. In addition, the NExTT Frontier project entered the implementation phase in early 2022. This involves restructuring the business units and supply chain organization to put a clear focus on customer orientation and cross-functional collaboration. The next step will be to adjust the structure of the sales regions.

Bosch Global Service Solutions

The Bosch Global Service Solutions division focuses on mobility, IoT, and monitoring services for customers as well as on services involving customer contacts. The eCall emergency notification service for vehicles marked its tenth anniversary in 2022. One strategic focus is on expanding the division's monitoring services. Here, Bosch Global Service Solutions completed the acquisition of Elpro Group AG, Buchs, Switzerland, in April 2022, thus entering the field of monitoring for pharmaceutical products. The Swiss company employs some 220 people and develops monitoring solutions for the pharmaceuticals, biotech, life science, and healthcare industries. These solutions include seamless monitoring of the pharmaceutical cold chain. In addition, the Bosch Secure Truck Parking booking platform for truck parking spaces agreed to a partnership with the TRAVIS Road Services booking platform, Tilburg, Netherlands. The two partners are now pooling their parking space allotments and jointly offering freight forwarders in Europe the largest number of truck parking spaces that can be booked in advance. As of the beginning of 2023, users of Bosch Secure Truck Parking and TRAVIS Road Services will be able to access a total of around 15,000 parking spaces at some 400 locations in 14 European countries.

Other businesses

The vision of our subsidiary **Bosch Smart Home GmbH,** Stuttgart, is to make life easier for users with solutions that improve convenience and security in the home. To achieve this, it is continuously expanding its portfolio of proprietary and partner products and using connectivity to create functions that provide additional benefit. In the 2022 business year, the subsidiary significantly overhauled its portfolio with a new indoor camera, new thermostats, smoke detectors, shutter controls, door-window contacts, and the Smart Home Controller. The new features concern design, sustainable packaging, functions such as facial recognition in the camera and compensation for particulate build-up in the smoke detectors, as well as the services offered for video storage.

Security and Safety Things GmbH, Munich, is to focus its business on use within Bosch. It will be integrated into the organization in the course of 2023. However, the existing platform for external users will remain available for several years. One reason for this is the slower decoupling of hardware and software in the security industry; another is the identification of further potential use cases within the Bosch Group. The related industry body, Open Security and Safety Alliance, will decide on its further strategy at some point in 2023.

Selected companies not allocated to business sectors

Our subsidiary **Bosch Healthcare Solutions GmbH** in Waiblingen, Germany, offers customers connected products and services and is continuously expanding its medical technology portfolio. Besides various SARS-CoV-2 tests, the analyzer for near-patient rapid PCR testing now offers further tests to detect other infections. One of these new tests is for hospital-acquired infections with multidrug-resistant bacteria. Our subsidiary also offers a portfolio of high-precision measurement devices for determining a biomarker in exhaled breath. This biomarker is used in the diagnosis and treatment monitoring of asthma, one of the most common chronic respiratory diseases. The devices help physicians and patients manage the condition. In addition, a connectivity solution manages the devices in the field and keeps the software up to date over the air. Furthermore, a newly developed monitor for the non-invasive determination of hemoglobin levels at the point of examination is poised for market launch. The monitor was developed by our Indian subsidiary Bosch Global Software Technologies Private Limited in Bengaluru, India. At the same time, the Indian subsidiary has been working on other connected healthcare products, particularly in emerging and developing countries, and offers software development services in the field of digital healthcare.

Since 2013, **grow platform GmbH,** based in Ludwigsburg, Germany, has provided a platform within Bosch for developing and implementing new business models. It is part of a global in-house innovation network in which new business models are evaluated and pursued in startup teams. The platform also considers different development opportunities for startups that do not prove enough of a strategic fit with the Bosch divisions, such as involving external investors or operating them as new, discrete units. The latest innovations are a trading platform for printed circuit boards and digital twins for the management of industrial facilities.

Through **Robert Bosch Venture Capital GmbH,** based in Gerlingen, Germany, we invest in external technology startups around the world. This gives us early access to innovative technologies, including potentially disruptive ones. The company's investments focus on projects involving artificial intelligence, digitalization, mobility solutions, and future computer technologies. In the 2022 reporting year, Robert Bosch Venture Capital invested in startups in fields such as battery technology, the latest semiconductor developments (gallium nitride wafers, optoelectronic data processing), electrified commercial vehicles, and AI-based logistics management.


MFC Access
CHPLOG

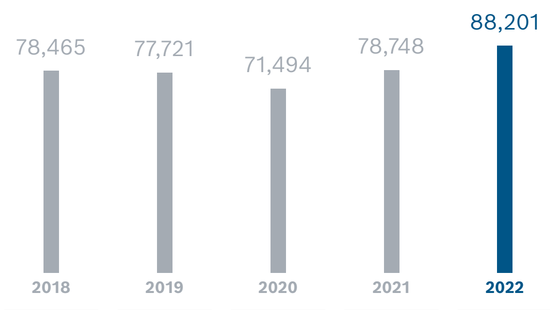
Report on economic position

In the 2022 business year, the Bosch Group had to overcome considerable additional challenges. Besides the lingering coronavirus pandemic and the chip shortages, there were also heavy burdens as a result of the war in Ukraine. We had to absorb a sharp rise in the prices for raw materials and energy as well as the phasing-out of our Russia business. In addition, growth in global economic output was held back by central bank measures to combat inflation. Global automotive production also fell short of forecasts. However, despite the difficult environment, the Bosch Group was able to exceed expectations regarding sales and result. It increased sales by 12.0 percent to 88.2 billion euros, boosted by volume and exchange-rate effects as well as by passing on price increases. With the exception of Consumer Goods, all business sectors achieved double-digit sales growth. Consumer Goods felt the impact of the end of the extraordinary boom in home-related products that prevailed during the height of the coronavirus pandemic.

Against the backdrop of these considerable additional burdens, we consider the increase in the Bosch Group's EBIT margin from operations to 4.3 percent from the previous year's level of 4.0 percent to be encouraging. This figure slightly exceeded our result forecast. EBIT from operations rose to 3.8 billion euros, up from 3.2 billion euros the previous year. This improvement also reflects the further efforts we have made as part of our performance program. At the same time, we incurred considerable research and development expenditure in order to pursue our work on projects of future importance. All our business sectors reported a positive EBIT from operations. Once again, EBIT margin was particularly favorable in Industrial Technology. In addition, Mobility Solutions managed to improve its EBIT margin from operations significantly more than forecast, and Energy and Building Technology exceeded its forecast as well. Given the steep fall in demand and the burdens resulting from the phasing out of business in Russia, EBIT margin in Consumer Goods was lower than both forecast and the previous year's level.

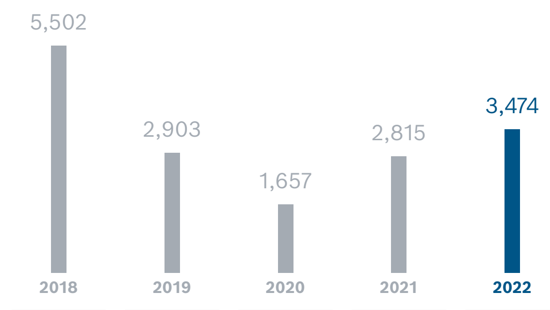
in millions of euros G 05

Development of sales revenue
Bosch Group 2018–2022



in millions of euros G 06

Development of EBIT
Bosch Group 2018–2022



Key performance indicators

For an unlisted company such as the Bosch Group, profitability and efficient use of capital resources are crucial for financing future growth. Accordingly, we use the key performance indicator of EBIT margin (earnings before financial result and taxes as a percentage of sales; essentially corresponds to the EBIT margin from operations disclosed in the group management report) and, as an internal performance indicator, net working capital (NWC) as a percentage of sales, and sales growth.

Unlike EBIT as per income statement, the calculation of EBIT from operations disregards the earnings impact of higher depreciation and amortization from the remeasurement of assets at Automotive Steering and BSH Hausgeräte following the complete acquisition of these former joint ventures in 2015. NWC is calculated from inventories, trade receivables, and contract assets, in each case before valuation allowances, plus capitalized deferred consideration to customers, minus trade payables and contract liabilities. An average value is calculated on the basis of the monthly actual values. NWC is measured as a percentage of sales revenue. The objective of NWC controlling is to keep the amount of capital tied up over the short term as low as possible.

The main basis for monitoring this is our internal reporting, which takes its lead from the International Financial Reporting Standards (IFRS). A monthly business report, which contains an up-to-date overview of the operating units' performance indicators, serves as the central reporting tool. It provides a year-on-year comparison and a plan-versus-actual comparison of selected performance indicators. The report is based on the business plan, which is embedded into longer-term strategic corporate planning. The planning method used is strongly geared toward targets and measures, and the focus is on developing and carrying out measures designed to achieve the planning targets.

The competitor-oriented benchmark values are used to define targets for the relevant performance indicators. They form the basis for the Bosch performance bonus – the short-term variable portion of specialists' and executives' remuneration, from section-manager level to the board of management. In 2022 as in previous years, the bonus is determined on the basis of EBIT margin (weighted at 75 percent), year-on-year organic sales growth (weighted at 15 percent), and average NWC as a percentage of sales (weighted at 10 percent). For some divisions and performance indicators, the benchmark values for 2022 were still heavily impacted by the coronavirus pandemic and therefore not suitable as a basis for comparison. In this case, the company's own planning was temporarily used as a benchmark for determining the variable compensation component. The Bosch performance bonus is complemented by VALUE, a variable bonus program for long-term corporate success at senior executive and board of management level. It is calculated from the average Bosch performance bonus factor of the preceding three years.

Macroeconomic and sector-specific environment

The war in Ukraine, high prices for raw materials and energy, inflation, and rising interest rates put the brakes on economic activity worldwide in 2022. In addition, the improved but still challenging situation in semiconductors had a negative impact. The coronavirus pandemic again had a considerable effect on the economic environment in 2022, although in many places the restrictions on social and economic life were significantly less severe than in the previous two years. Overall, the just under 3 percent growth in global economic output fell short of the forecast increase of 4 to 4½ percent. In our previous year's forecast, however, we had already pointed to considerable uncertainties regarding the consequences of the war in Ukraine, the further course of the pandemic, supply shortages, high inflation rates (some 7.5 percent globally in 2022), and tighter monetary policy on the part of the major central banks. The data for economic output is taken from Feri AG and the International Monetary Fund.

Economic output in the Americas grew 2.4 percent, which was slower than our forecast of some 4 percent. One major reason for this was the lower propensity to consume due to high inflation of roughly 8 percent. The economy in Asia Pacific also fell short of our expectations, expanding by just 3.4 percent instead of the forecast 4½ percent. A major factor was the very weak development in China; the country's protracted strict coronavirus policy and the very high infection figures toward the end of 2022 meant that its 3.0 percent GDP growth fell far short of the 4¾ percent we expected.

In Europe, economic growth of 2.8 percent was also significantly lower than our original forecast of 4 percent, impacted above all by increases in the prices for raw materials and energy in the wake of the Ukraine war. At the same time, the Russian economy contracted by around 2.1 percent. In the European Union, economic output increased 3.6 percent compared with our forecast of 4 percent, and in Germany by 1.8 percent compared with the forecast growth of 3½ percent.

Global automotive production (including heavy commercial vehicles) increased significantly over the course of the year. Nonetheless, the 85 million units produced over 2022 as a whole fell short of the expected 88 million units. Developments also differ from region to region. While production in India and ASEAN disclosed double-digit growth and North America also grew by more than 9 percent, production in China posted only weak growth of 2.8 percent. In the European Union (EU-27), including the U.K., production was up 4.1 percent year on year. In Russia, production figures fell roughly 59 percent from their previous-year level. The sources of the data for global automotive production in our internal mobility forecast process (MP) are the third-party forecasts of IHS Markit Ltd., London, and Bosch in-house marketing analyses in the regions and at headquarters.

The changes in powertrain technology for passenger cars continued. Among passenger vehicles worldwide, the share of all-electric vehicles rose by roughly 12 percent in 2022, up from some 7 percent the previous year. Hybrid vehicles accounted for approximately 13 percent, up from roughly 11 percent. The slight adjustments to the above-quoted figures for 2021 are due to a subsequent revision after the final market figures were presented. The increase in all-electric vehicles was again driven in particular by an increase in China and Europe. In absolute numbers, the biggest market for all-electric vehicles and for hybrid vehicles is China, followed by Europe. The share of diesel-powered passenger cars fell to around 19 percent in the European Union (EU-27), including the U.K., compared with some 23 percent in the previous year; in India it rose slightly to roughly 19 percent, up from some 18 percent the previous year.

Global production in the machinery sector, another important market segment for the Bosch Group, proved comparatively robust in 2022. Production in the most important countries was continuously increased. However, production levels in the U.S. and the European Union were only marginally above their pre-pandemic levels. In China, by contrast, the pace of growth in 2022 was weak. Nonetheless, production there significantly exceeded the level reached before the pandemic.

The construction sector, which influences developments in the Consumer Goods and Energy and Building Technology business sectors, has cooled off in countries important for us, as shown by the trend in construction investment. In China, for example, construction investment fell sharply due to financing problems at construction companies and considerable vacancy levels. In the U.S., it fell as a result of the steep rise in interest rates. In Europe, rising energy prices and interest rates put the brakes on investment. The weakness in construction activity is also likely to have affected demand for household appliances, where the extraordinary boom experienced during the height of the coronavirus pandemic came to an end in mid-2022.

Business developments

Development of sales

Bosch Group sales

In the Bosch Group, we generated sales of 88.2 billion euros in 2022, compared with 78.7 billion euros in the previous year. This means sales are up 12.0 percent year on year, or 9.4 percent after adjusting for exchange-rate effects. We thus exceeded our forecast of 6 percent sales growth. Price increases played a role here as well. In contrast to 2021, effects from changes in the consolidated group in the 2022 business year came to some 130 million euros net; here, deconsolidation effects of 100 million euros are offset by effects of 230 million resulting from newly consolidated companies.

Divestments in the Mobility Solutions business sector in steering pumps, in activities to recondition used spare parts, in the vacuum and hydraulic-pump business of Powertrain Solutions, and in the major project business of our subsidiary Bosch Rexroth in Boxtel, Netherlands, contrast with a whole series of acquisitions. In Mobility Solutions, this relates in particular to Five AI and Atlatec in the area of automated driving. At Bosch Rexroth, Kassow Robots is being consolidated for the first time. In the Energy and Building Technology business sector, Hörburger AG and the Elpro Group have been included in the income statement for the first time. There is also the P&L effect of the first-time consolidation of Protec Fire and Security Group Ltd., Nelson, U.K., which was acquired at the end of 2021.

The positive impact of exchange-rate effects amounts to some 2 billion euros. Burdens resulting from the exchange rate of the euro against the Turkish lira contrast with positive effects, most importantly as a result of the exchange rate against the U.S. dollar and Chinese renminbi. The Russia business was gradually phased out over the course of the year. This affected all business sectors, but hit Mobility Solutions and Consumer Goods the hardest.

Sales by region

In all regions, the Bosch Group was able to post a significant increase in sales in 2022. The strongest growth was recorded in the Americas. In North America, sales grew 25.7 percent to 14.4 billion euros, or an exchange rate-adjusted 12.3 percent. In South America, sales totaled 1.8 billion euros – an increase of 26.0 percent, or 16.7 percent after adjusting for exchange-rate effects. In Europe, sales over the year as a whole amounted to 44.3 billion euros, 7.3 percent up on the previous year, or 9.8 percent after adjusting for exchange-rate effects. The negative exchange-rate effects are the result of the development of the Turkish lira. Sales in Germany rose 11.9 percent to 17.6 billion euros. Sales in Asia Pacific (including other countries, also in Africa) grew 12.8 percent to 27.7 billion euros; the increase was 7.1 percent after adjusting for exchange-rate effects. In China, sales in euros increased at a somewhat slower rate than in Asia Pacific as a whole, due to the temporarily stricter restrictions in the wake of the coronavirus pandemic.

From a regional perspective, the share of sales generated in Europe decreased to 50.3 percent, from 52.5 percent in the previous year. The share of Asia Pacific (including other countries, also in Africa) came to 31.4 percent, following 31.2 percent the previous year, while the share of the Americas rose to 18.3 percent, compared to the previous year's 16.3 percent.

Sales by business sector

Despite an environment that remains challenging, all business sectors increased their sales, in some cases significantly more than forecast. Our biggest business sector, Mobility Solutions, continued to be hit the hardest by the chip supply shortages. Nonetheless, its sales rose 16.0 percent to 52.6 billion euros, or by 12.1 percent after adjusting for exchange-rate effects. This is more than our 8 percent growth forecast, despite the ongoing sluggishness in automotive production. The passing-on of price increases also played a role in this. In particular, we were able to increase sales in the Chassis Systems Control, Cross-Domain Computing Solutions, and eBike Systems divisions. However, a number of other divisions also achieved double-digit sales growth.

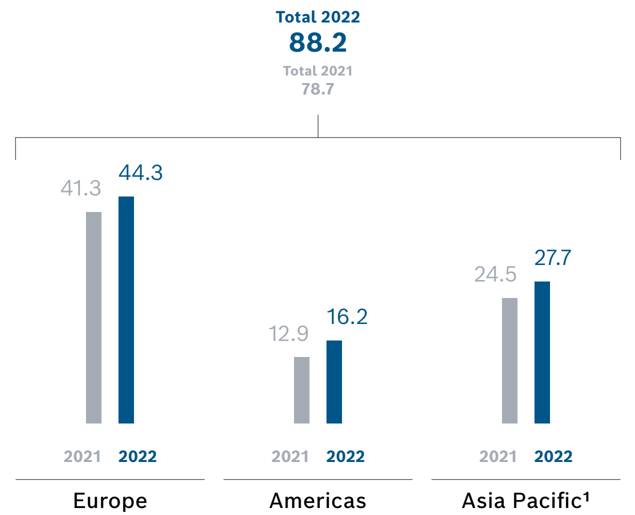
The Industrial Technology business sector benefited from the robust machinery market. Sales rose 13.9 percent to 6.9 billion euros; adjusted for exchange-rate effects, they rose 11.0 percent. In our sales forecast of 2 to 3 percent, we had assumed that the market would cool significantly. In this respect, our forecast was significantly exceeded.

The Consumer Goods business sector suffered from the steep drop in demand for home appliances and power tools. Along with the end of the extraordinary boom that prevailed during the height of the coronavirus pandemic, increasing consumer reticence due to higher energy prices and to the general cost of living is likely to have an effect. Sales (excluding other activities) rose 1.5 percent to 21.3 billion euros. Including other activities (see diagram), they also rose 1.5 percent to 21.7 billion euros. After adjusting for exchange-rate effects, sales were up 1.6 percent in each case. The end of the extraordinary boom affected both the Power Tools division and BSH Hausgeräte. However, we had already planned cautiously for 2022, and had assumed Consumer Goods business sector sales would grow just 2 to 3 percent.

in billions of euros **G 07**

Development of sales revenue, 2021–2022

Bosch Group sales revenue by region

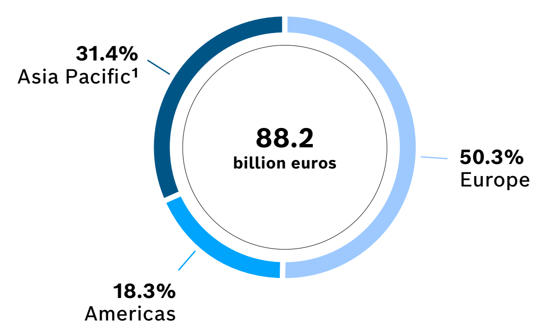


1. Including other countries, also in Africa

G 08

Sales revenue structure, 2022

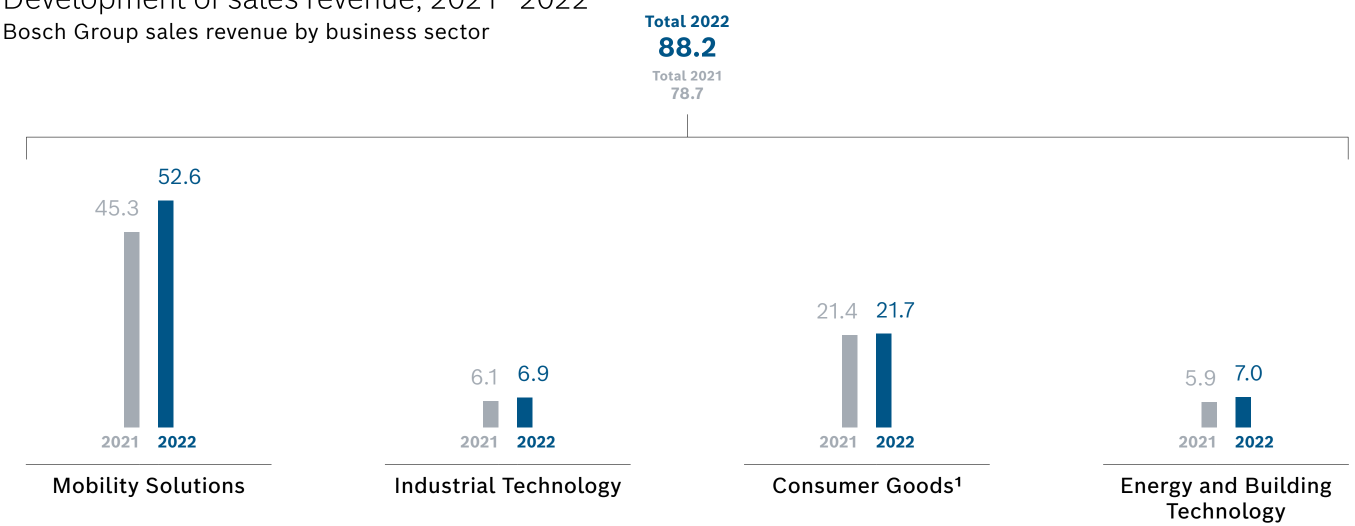
Bosch Group sales revenue by region



1. Including other countries, also in Africa

in billions of euros **G 09**

Development of sales revenue, 2021–2022
Bosch Group sales revenue by business sector

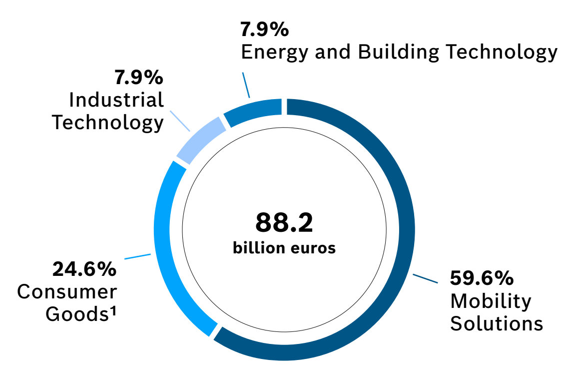


1. Including other activities

The Energy and Building Technology business sector significantly increased its sales in 2022. Sales rose by 17.4 percent to 7.0 billion euros. Adjusted for exchange-rate effects, the increase was 15.9 percent. Here, we had assumed that 2022 would see sales growth of some 4 percent only. Once again, a major driver of this growth was rising demand for climate-friendly heating technology. The Building Technologies and Bosch Global Service Solutions divisions were also able to achieve encouraging sales growth.

G 10

Sales revenue structure, 2022
Bosch Group sales revenue by business sector



1. Including other activities

in millions of euros T01

Most important items of the statement of income

	2022	2021
Sales revenue	88,201	78,748
Cost of sales	–59,742	–52,933
Gross profit	**28,459**	**25,815**
Distribution cost and administrative expenses	–17,812	–16,384
Research and development cost	–7,224	–6,110
Other operating income and expenses	52	–504
Result from companies included at equity	–1	–2
EBIT	**3,474**	**2,815**
Financial result	–561	484
Profit before tax	**2,913**	**3,299**
Income tax expense	–1,075	–800
Profit after tax	**1,838**	**2,499**

The differences in our business sectors' fortunes mean that our sales structure has changed. The share of sales attributable to the Mobility Solutions business sector rose to 59.6 percent, up from 57.6 percent the previous year. The share of Industrial Technology is now 7.9 percent, compared with 7.7 percent in the previous year. The Consumer Goods business sector (including other activities) accounts for 24.6 percent, after 27.2 percent the previous year. The share contributed by the Energy and Building Technology business sector is 7.9 percent, following 7.5 percent in the previous year.

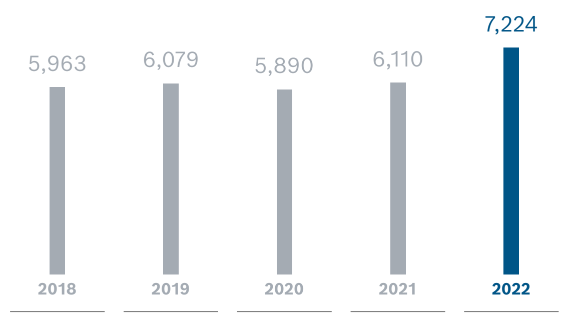
Results of operations

Bosch Group result

In the Bosch Group, we report an improved EBIT of 3.5 billion euros in 2022, compared with 2.8 billion euros the previous year. EBIT from operations, despite considerable burdens from higher prices for raw materials and energy as well as the further adverse effects of supply shortages for chips, the application of IAS 29 (financial reporting in hyperinflationary economies), and the phasing-out of the Russia business, improved to 3.8 billion euros, up from 3.2 billion euros the previous year. The application of IAS 29 led to a burden of result of roughly 0.3 billion euros. The burdens relating to the phasing-out of our Russia business also include extraordinary depreciation of property, plant, and equipment and right-of-use assets. The EBIT margin from operations rose to 4.3 percent of sales, compared with the previous year's figure of 4.0 percent. As a result, we also slightly exceeded our forecast for EBIT margin from operations, which we expected to be on a par with the previous year.

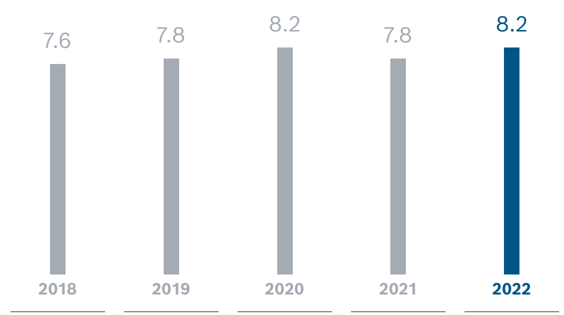
in millions of euros **G 11**

Research and development cost
Total expenditure, Bosch Group, 2018–2022



as a percentage of sales revenue **G 12**

Research and development cost
Total expenditure, Bosch Group, 2018–2022



The reasons for this improved EBIT are the higher than forecast development of sales, the passing-on of price increases, rigorous cost measures, and reduced expenses relating to the recognition of provisions. Restructuring cost also fell significantly year on year. The Mobility Solutions business sector continues to account for the bulk of this cost. However, we are also making adjustments in our other business sectors, as well as in our corporate and service units. Further considerable upfront investments in areas of future importance result in burdens relating either to research and development cost or to increased depreciation and amortization on investments.

As in previous years, the calculation of EBIT from operations, unlike EBIT as per the income statement, disregards the earnings impact of higher depreciation and amortization from the remeasurement of assets at Automotive Steering and BSH Hausgeräte following the complete acquisition of these former joint ventures in 2015. These effects came to around 340 million euros in 2022, and were thus the same as in the previous year.

The above-mentioned factors are reflected in the various income-statement items. In 2022, cost of sales rose 12.9 percent to 59.7 billion euros. It thus rose somewhat faster than sales, which grew 12.0 percent. As a result, gross margin fell slightly to 32.3 percent, from the previous year's level of 32.8 percent. At roughly 3.5 billion euros, depreciation of property, plant, and equipment was higher than the previous year's level of 3.4 billion euros. Distribution cost and administrative expenses rose year on year by 8.7 percent to 17.8 billion euros.

Research and development cost came to 7.2 billion euros in 2022, compared with 6.1 billion euros the previous year; this means research and development intensity, at 8.2 percent, rose from the previous year's figure of 7.8 percent, despite the strong growth in sales.

The Mobility Solutions business sector again accounted for the largest share of research and development cost in 2022, at 73 percent (previous year 74 percent). The main focus of these upfront investments continues to be electrification, fuel cells, driver assistance systems, also with a view to automated driving, automotive electronics, semiconductors, and sensors. The percentage attributable to the Industrial Technology business sector rose to 6 percent, from 5 percent in the previous year. There was no change in the percentages attributable to Consumer Goods (16 percent) and Energy and Building Technology (5 percent). The positive change in other operating income and expenses is a result of lower expenses relating to the recognition of provisions and of a special effect due to a goodwill impairment in the previous year.

On balance, we disclose a negative financial result of 561 million euros in 2022, compared with a positive balance of 484 million euros the previous year. The key factors are a lower result from securities, mainly owing to the negative development of investment funds, and the negative impact of interest-rate developments. Against this backdrop, profit before tax came to 2.9 billion euros, corresponding to a margin of 3.3 percent. Both figures are down from their previous-year levels of 3.3 billion euros and 4.2 percent respectively. The result after tax amounts to 1.8 billion euros, compared with 2.5 billion euros the previous year. Apart from the negative financial result, a high tax burden plays a role here.

At 28.7 percent, our in-house key performance indicator of NWC as a percentage of Bosch Group sales, is both higher than the previous year's comparable internal figure of 26.7 percent, and significantly exceeds forecast. The main reason for this was the development of inventories, which grew faster than sales in 2022 as a result of great uncertainty in the supply chain.

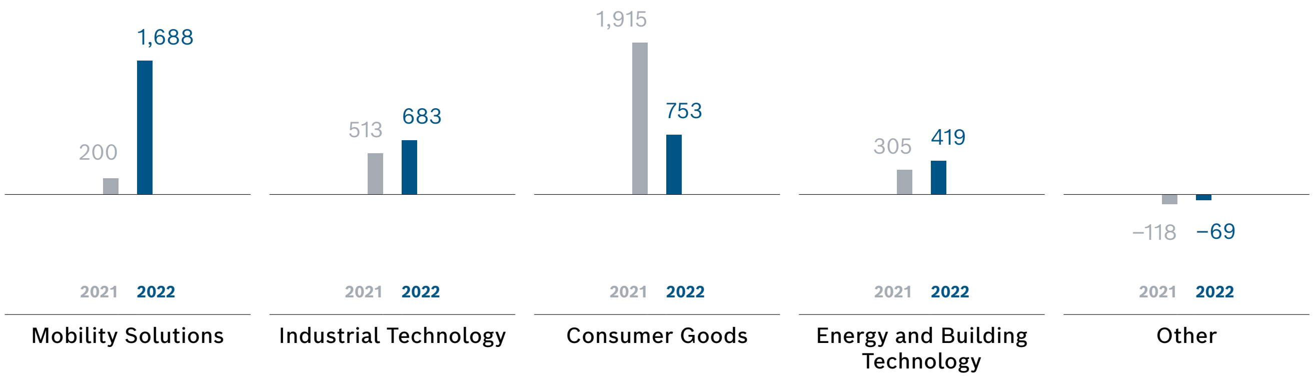
Result situation by business sector

The result situation varies by business sector, even if they all disclose positive EBIT. This is mainly due to differences in the pace of growth and in the negative effects of the chip shortages, of the increases in raw materials prices and energy costs, and of the phasing-out of the Russia business. There are also differences with respect to the scope of restructuring that is needed and to the intensity of upfront investments in promising areas. With the exception of Consumer Goods, all business sectors met or exceeded their EBIT margin forecasts. We had forecast a significant improvement for the Mobility Solutions business sector in 2022. In Industrial Technology, we had expected a slight decline, and in Consumer Goods, a significant slowdown. In Energy and Building Technology, we had assumed a margin from operations on a par with the previous year.

In the Mobility Solutions business sector, we disclose EBIT of 1.7 billion euros for 2022, compared with EBIT of 200 million euros in the previous year. EBIT from operations comes to 1.8 billion euros, compared with the previous year's figure of 317 million euros. This results in a margin from operations of 3.4 percent, compared with 0.7 percent the previous year. The improvement in margin as a result of additional sales is thus stronger than expected. In this context, restructuring cost also fell significantly year on year. However, the pressure on result remains very high. The main reasons for this in millions of euros G 13

EBIT by business sector

Bosch Group, 2021–2022



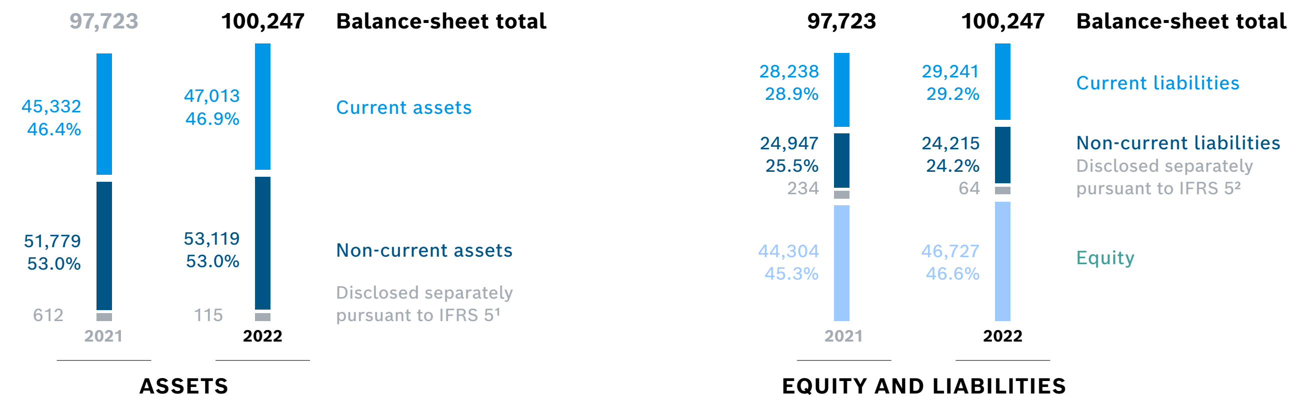
are the heavy upfront investments in projects of future importance, the increased cost of primary products, and burdens resulting from chip shortages.

The Industrial Technology business sector not only achieved strong sales growth but was also able to improve its result, reaching EBIT of 683 million euros (previous year: 513 million euros). It thus achieved an EBIT margin of 9.8 percent (previous year: 8.4 percent), significantly exceeding our forecast. The business sector benefited from strong demand for hydraulics and factory automation.

The Consumer Goods business sector achieved EBIT of some 753 million euros, compared to the previous year's very high level of 1.9 billion euros. At 970 million euros, EBIT from operations was also considerably less than the previous year's 2.1 billion euros. This means the margin from operations fell to 4.5 percent, down from 10.2 percent in the previous year. This fall was steeper than forecast. In Consumer Goods, the decline in earnings was due not only to lower demand in the markets for household appliances and power tools, but also to the negative impact of the phasing-out of the Russia business. The Energy and Building Technology business sector posted EBIT of 419 million euros, compared with 305 million euros the previous year. Margin came to 6.0 percent, compared with 5.1 percent in 2021. This exceeded our forecasts for the business sector. Its Building Technologies division, for example, performed better than planned.

in millions of euros and as a percentage of balance-sheet total **G 14**

Balance-sheet structure
Bosch Group, 2021–2022



1. Assets held for sale
2. Liabilities directly associated with assets held for sale

All business sectors contributed to the year-on-year rise in average NWC as a percentage of sales. With the exception of Industrial Technology, moreover, this indicator was higher than forecast. One main reason for the high NWC in 2022 was the securing of our ability to deliver, and thus of supplies to customers. The figures for NWC by business sector relate to internal sales, which include sales from business with other business sectors. The year-on-year comparison is based on the comparable internal figure for the previous year. In Mobility Solutions, NWC as a percentage of sales revenue rose to 28.7 percent from 27.2 the previous year, and was thus significantly higher than our forecast. Among other things, this is due to inventories, which increased due to considerable uncertainty in the supply chain. In Industrial Technology, the ratio of NWC to sales revenue rose to 33.1 percent, compared with the previous-year figure of 32.1 percent. This means it was slightly lower than forecast. In Consumer Goods, the figure of 28.9 percent was also considerably higher than forecast. The previous-year figure was 25.6 percent. This reflects the effect that the unexpectedly sharp drop in demand from mid-2022 had on inventories. In Energy and Building Technology, the indicator rose to 20.3 percent from the comparable previous-year figure of 18.7 percent, a significant rise over the forecast figure.

Net assets and financial position

Equity ratio and financial statement

The Bosch Group balance-sheet total as of the December 31, 2022, reporting date stood at 100.2 billion euros, exceeding the previous year's level of 97.7 billion euros. Compared to the previous year, the equity ratio rose by 1.3 points to 46.6 percent. The main reasons for the rise in balance-sheet total are the increase in inventories on the assets side and, on the equity and liabilities side, higher equity and an increase in current liabilities.

On the assets side, our liquidity as reported in the statement of financial position fell to 21.1 billion euros as of the reporting date, compared with the previous year's 26.8 billion euros. Apart from cash and cash equivalents, liquidity as per the statement of financial position includes marketable securities and bank balances with a term of more than 90 days. The drop in liquidity was mainly due to a negative free cash flow and capital losses on securities on the financial markets. Due to the application of IFRS 5, assets held for sale and the liabilities connected with them are disclosed separately. These also include assets and liabilities of our Russian subsidiaries. Initial agreements relating to them have been signed. The background to the planned sale of subsidiaries in Russia is the limited possibility of continuing production in view of the sanctions regime.

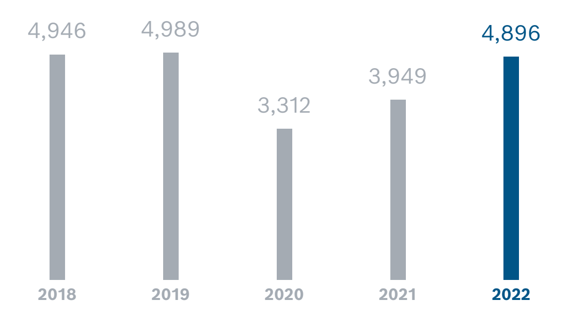
The liabilities side saw changes mainly due to the issue of borrower's note loans. The financing structure is sound. The net financial position (defined as balance-sheet liquidity minus financial liabilities and provisions for pensions and similar obligations) is significantly positive, amounting to 5.3 billion euros, even though it has fallen from its previous-year level of 10.5 billion euros as a result of lower balance-sheet liquidity. The main stabilizing factor was the 2.3-billion-euro reduction in provisions for pensions and similar obligations following changes in the financial assumptions on which they are based.

With a long-term rating of A (with a "stable" outlook) from the credit rating agencies Standard & Poor's and Fitch, Robert Bosch GmbH has good ratings. The financial liabilities of the Bosch Group include borrower's note loans and registered debentures with a nominal value of 3.7 billion euros and bearing interest between 0.582 percent and 4.893 percent, as well as bonds with a nominal value of 2.0 billion euros and bearing interest between 1.75 percent and 2.979 percent. The average interest rate has risen to 2.353 percent from the previous year's rate of 1.746 percent. The average residual term to maturity of the borrower's note loans and registered debentures is 5.27 years, compared with 5.99 years the previous year. The bonds' average residual term to maturity is 5.96 years, compared with 6.90 years the previous year.

We have increased an existing syndicated loan facility with an ESG component from 3 to 5 billion euros. In doing so, its term was extended by one year. In addition, there are bilateral U.S. loan facilities with a volume of 950 million dollars. These facilities have not been used. In 2022, new borrower's note loans totaling 1.5 billion euros were issued. Furthermore, we repaid 25 million euros of a borrower's note loan. In the reporting year, we issued up to 350 million dollars under our revolving 2.0-billion-dollar commercial paper program. In addition, we took out a syndicated loan facility totaling 1.2 billion U.S. dollars. However, we did not use this facility in 2022.

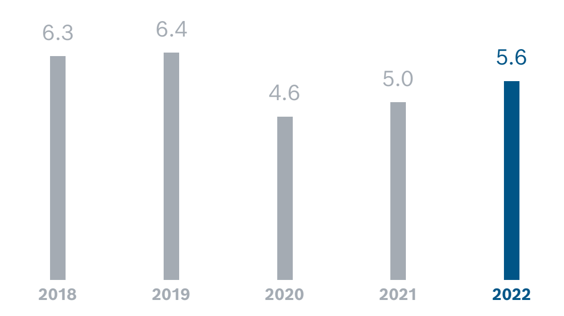
in millions of euros **G 15**

Capital expenditure
Bosch Group, 2018–2022



as a percentage of sales revenue **G 16**

Capital expenditure
Bosch Group, 2018–2022



Capital expenditure

As a result of many projects of future importance, we increased capital expenditure on property, plant, and equipment to 4.9 billion euros in 2022 from 3.9 billion euros the previous year. The capex ratio is 5.6 percent of sales, compared with 5.0 percent in the previous year. Capital expenditure thus reached 141 percent of depreciation and amortization. As of the reporting date, existing investment commitments resulting from orders already placed total 1.3 billion euros, following a previous-year figure of 801 million euros. Thanks to our comfortable liquidity position, we have ample financial resources at our disposal. We invested 647 million euros in intangible assets, compared with 455 million euros the previous year. Much of this related to capitalized development projects in the Mobility Solutions business sector.

By business sector, the lion's share – 3.3 billion euros, following 2.9 billion euros the previous year – once again went to Mobility Solutions. The focus was on increased capital expenditure for electric motors, e-axles, fuel cells, and power electronics in the area of electromobility, for replacement investments in new injection systems in internal combustion engines and in ABS, ESP®, and new braking control systems in Chassis Systems Control, for expanding capacity in the area of semiconductors and sensors in Automotive Electronics, for driver assistance systems in Cross-Domain Computing Solutions, for the construction of the new Automotive Steering plant for electric power steering systems in Maklar, Hungary, and for expanding capacity in eBike Systems. Other focal points were the engineering center in Budapest, Hungary, completed in 2022, and the extension of the IT campus in Adugodi, India.

in millions of euros **T02**

Bosch Group, statement of cash flows

	2022	2021
Liquidity at the beginning of the year (Jan. 1)	**6,196**	**8,955**
Cash flows from operating activities	+1,859	+6,890
Cash flows from investing activities	−2,336	−7,379
Cash flows from financing activities	+701	−2,560
Other	+39	+290
Liquidity at the end of the year (Dec. 31)	**6,459**	**6,196**

Capital expenditure in Industrial Technology rose to 316 million euros, compared with 198 million euros the previous year. At Drive and Control Technology, investment focused mainly on increasing capacity, especially in mobile hydraulics, the continuation of modernization measures, localization in the regions, and the reorganization of the foundry in Lohr, Germany.

In the Consumer Goods business sector, capital expenditure was 845 million euros, compared with 656 million euros in the previous year. The focus of investment at BSH Hausgeräte was on a new factory for refrigerators in Monterrey, Mexico, and on investments in new generations of refrigerators in Çerkezköy, Turkey, in dishwashers and refrigerators in Łódź and Wrocław, Poland, in refrigerators in Giengen, Germany, and in dishwashers in Chuzhou, China. The focal points of capital expenditure at Power Tools were on expanding production in the Accessories business unit as well as on cordless power tools and the associated batteries at various locations worldwide. In addition, the regional distribution center in Miskolc, Hungary, is being extended.

In Energy and Building Technology, capital investment came to 123 million euros, compared with 85 million euros the previous year. The main investment focus at Thermotechnology was on the manufacture of heat pumps, including heat-pump storage units, and on logistics infrastructure.

Other capital expenditure not related to business sectors includes energy-efficiency projects at various locations, the completion of the new supply-chain campus in Feuerbach, Germany, expansion of manufacturing capacity at Bosch Healthcare Solutions, and a new building for our regional company in Morocco.

From a regional viewpoint, we invested 3.1 billion euros in our European locations, compared with 2.7 billion euros the previous year. Of this amount, we invested 1.6 billion euros in Germany, as in the previous year. We invested 1.3 billion euros in Asia Pacific, compared with 875 million euros in the previous year. In North and South America, we invested 519 million euros, compared with 368 million euros in 2021.

Liquidity

The Bosch Group is financially strong. Liquidity at year-end as per the consolidated statement of cash flows (cash and cash equivalents) stood at 6.5 billion euros, compared with 6.2 billion euros the previous year. However, cash flow from operating activities fell to 1.9 billion euros or 2.1 percent of sales in 2022; the previous-year figure was 8.7 percent. The main reasons for this decrease are the considerable additional tie-up of funds in current assets, particularly the sales-related increase in trade receivables, and the smaller year-on-year increase in liabilities.

Cash flows from investing activities amounted to 2.3 billion euros, and are thus significantly lower than the previous-year figure of 7.4 billion euros. This is mainly due to the release of funds from the sale of securities and the termination of bank deposits with terms of more than 90 days. Running contrary to this, other investment activity increased, mainly as a result of greater investment in property, plant, and equipment, intangible assets, and acquisitions.

Cash flows from financing activities, including repayments of lease liabilities, disclosed an inflow of 0.7 billion euros in 2022, as opposed to an outflow of 2.6 billion euros the previous year. While we borrowed funds in 2022, we had repaid a substantial quantity of financial liabilities in 2021.

For 2022, we disclose a negative free cash flow of 4.0 billion euros, compared with the positive sum of 2.1 billion euros in the previous year. Free cash flow is calculated by adding cash flows from operating activities, cash flows from investing activities (without participating interests and other financial investments), and the repayment of lease liabilities. The main reasons for the negative free cash flow were the significant, sales-related growth in receivables, the development of inventories, and the marked increase in capital expenditure.

Non-financial indicators

CO_2 emissions

Once again in 2022, we were carbon neutral in our own value chain (Scopes 1 and 2). The majority of our company's CO_2 emissions are a result of energy consumption. Bosch requires energy primarily in the form of power for manufacturing plant and machinery, and in the form of thermal energy to heat and air-condition buildings and to operate facilities such as foundry furnaces.

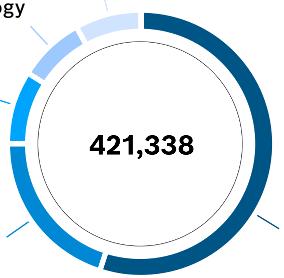
In total, the companies in the Bosch Group consumed 7,696 gigawatt-hours (GWh) of energy in 2022 (previous year: 8,042 GWh). The 0.7 million metric tons of CO_2 that we emitted despite our varied measures were offset in the course of making the company carbon neutral. Year on year, this is a decrease of roughly 0.2 million metric tons of CO_2, or 21 percent. Above all, this decrease was achieved by switching from gray to green electricity. The calculation of emissions is based on the standards of the International Energy Agency (IEA) and the Intergovernmental Panel on Climate Change (IPCC).

Occupational safety

The accident rate was around 1.6 accidents per million hours worked, as in the previous year. In the reporting year, there were no fatal work-related accidents. The total number of workplace accidents in 2022 was 1,153, compared with 1,123 in 2021.

year-end figure G 17

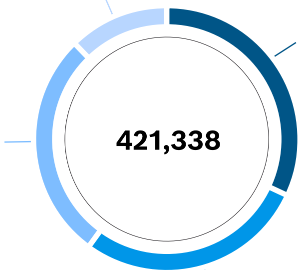
Bosch Group headcount, 2022
by business sector



1. Corporate functions and research

year-end figure G 18

Bosch Group headcount, 2022
by region



1. Excluding Germany
2. Including other countries, also in Africa

Headcount

The total number of Bosch Group associates rose to 421,338 at the end of 2022, compared with 402,614 at the end of 2021. Headcount thus increased at a slower rate than sales. The number of Bosch associates increased by 18,724. Changes in the consolidated group play only a minor role.

The workforce in the Mobility Solutions business sector rose to 233,077, compared with 223,592 at the end of 2021. The number of associates in the Industrial Technology business sector increased to 34,143, compared with 32,686 at the end of 2021. In the Consumer Goods business sector, the number of associates grew to 83,006, compared with 82,840 at the end of 2021. The number of associates in the Energy and Building Technology business sector rose to 34,437, compared with 31,650 at the end of the previous year. A total of 36,675 associates are employed in other activities, compared with 31,846 in the previous year.

The number of associates in research and development across all units worldwide grew again by 9,422 to stand at 85,543 at the end of the year. The expansion of the global research and development network affects almost all regions, and Asia Pacific (including other countries, also in Africa) most strongly. Regions outside Germany account for 62 percent of associates in research and development, with Asia Pacific accounting for 42 percent. At 1,536, the number of associates worldwide in the corporate sector for research and advance engineering (“Other activities”) at year-end was roughly on a par with the previous-year figure of 1,524.

Headcount increased in all regions, but at different rates. As a result, the percentage distribution of Bosch Group associates by region has changed slightly year on year. While the shares accounted for by Germany and Europe (without Germany) have each fallen by one point, they have increased by one point in both the Americas and Asia Pacific.

Outlook

We expect a challenging business year in 2023 as well. We have to assume enduringly high prices for raw materials and energy and increasing wages, as well as further price rises owing to those increases. High inflation will dampen consumer demand. In addition, the measures taken by many central banks to combat inflation will brake economic development. We are following the war in Ukraine with unabated concern. Furthermore, there may be localized restrictions in certain countries as a result of Covid-19 infections. Despite this difficult environment, we are still aiming for sales growth in the range of 6 to 9 percent, as well as a significantly improved EBIT margin from operations.

We will continue to drive forward our growth strategy in 2023. This will once again include considerable upfront investments in areas of future importance, in the form of both high research and development spending and capital expenditure. In addition, we will continue to rigorously strengthen our portfolio through acquisitions, partnerships, and fine-tuning.

Macroeconomic and sector-specific environment

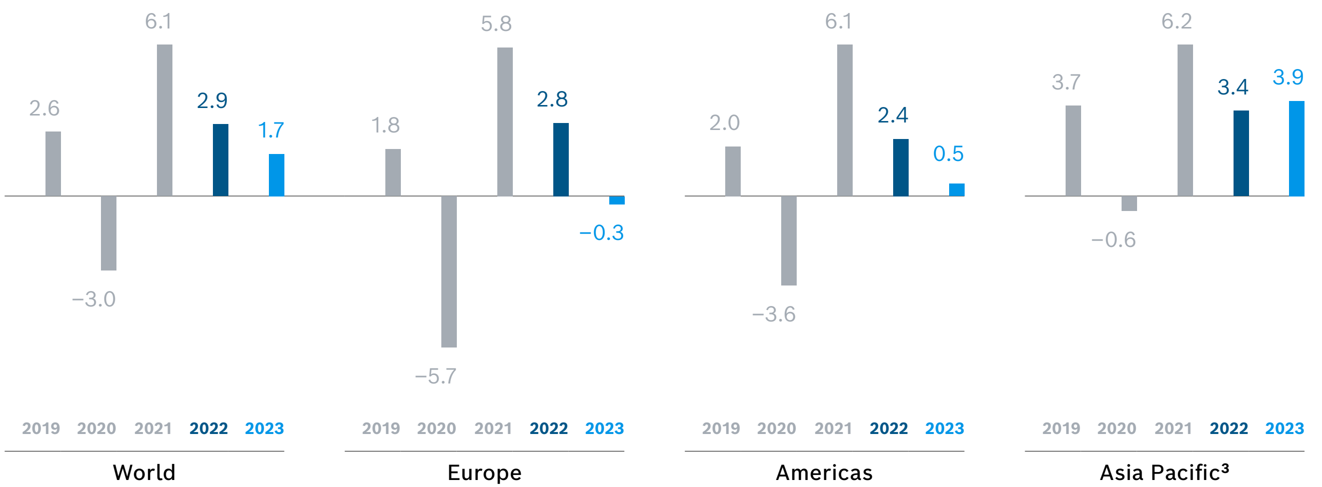
Our plans are based on the assumption that global economic growth will again slow. For 2023, we forecast that global economic output will grow by 1¾ percent. Even so, there are uncertainties here, above all with regard to the further development of inflation, especially in North America and Europe. For example, central banks' endeavors to combat inflation will likely have an effect on construction investment, and not just on consumption. Our assessment of the machinery market is that it is relatively stable. For 2023, we assume that the global rate of inflation will be 5¾ percent. As their point of reference, our forecasts are based on the data sources of Feri AG and the IMF, as well as on our own assessments.

For the Americas, we expect that economic output will rise ½ percent year on year in 2023. Our assumption here is that North America will grow ½ percent, and South America by ¾ percent. On the basis of current data, our forecast for Europe is a ¼ percent decrease in economic output. In this context, we also expect to see a ¼ percent year-on-year decrease in the European Union. For Germany, we currently expect a ¾ percent decline. Growth rates in Asia Pacific (including other countries) will likely be slightly better than in the previous year, in the region of 4 percent. In this context, catching-up effects will likely mean that the pace of growth in China will quicken to 5½ percent following the removal of restrictions related to Covid-19 infections.

percentage figures **G 19**

Economic growth by region, 2019–2023[1, 2]

Real GDP, percentage change on previous year



1. Some previous-year figures changed from the 2021 annual report following an audit
2. Forecast figures for 2023
3. Including other countries

In automotive production, our most important market, we so far expect total production of passenger cars and commercial vehicles to grow to some 87 million vehicles in 2023, from roughly 85 million vehicles in 2022. For our forecasts for global automotive production in our internal mobility forecast process (MP), we draw on third-party forecasts of IHS Markit Ltd., London, and Bosch in-house marketing analyses in the regions and at headquarters. As concerns the global scarcity of semiconductors, we expect this to ease further over the course of 2023. However, this does not rule out temporary disruptions.

Bosch Group and business sectors

Sales forecast

In 2023, we expect that Bosch Group sales will rise in nominal terms within a range of 6 to 9 percent. As in previous years, we do not disclose exchange-rate effects in our forecast. Apart from volume effects, price increases will also contribute to growth.

Turning to the business sectors, we expect product rollouts and price increases to generate year-on-year growth of 12 percent in Mobility Solutions. The Industrial Technology business sector intends to increase its sales – including effects from HydraForce and Elmo Motion Control, acquired in 2022 – by as much as 10 percent. In Consumer Goods, the weak market environment means that we only expect a slight increase in sales of up to 3 percent. Given the continuing high demand for efficient heating technology, we expect Energy and Building Technology to grow by as much as 8 percent.

Result forecast

Despite all the burdens of supply shortages, high inflation rates, and upfront investments in growth areas, and given the planned development of sales, it is our aim to significantly increase the Bosch Group's EBIT margin from operations. More specifically, for the Mobility Solutions business sector we also expect a significant improvement in the EBIT margin from operations. In the Industrial Technology business sector, we again expect the EBIT margin from operations to be roughly 8 percent. In Consumer Goods, we expect a slight improvement, and in Energy and Building Technology a significant improvement in EBIT margin from operations.

Expectation for NWC

We want the average net working capital-to-sales ratio (indicator used in internal accounting) to fall further. To achieve this, we are working hard to normalize inventories, which grew faster than sales in 2022 owing to great uncertainty in the supply chain. For the Bosch Group and the Mobility Solutions and Energy and Building Technology business sectors, we expect a significant year-on-year reduction. In Industrial Technology, we expect an NWC-to-sales ratio on a par with the previous year, and in Consumer Goods a considerable improvement. In Mobility Solutions, this is due to the reduction in inventories – inventories which are no longer needed given more stable supply chains. In Consumer Goods, we want to bring inventories, which rose last year due to the decline in demand, back to a normal level.

Report on opportunities and risks

Opportunities

On the whole, we see good growth opportunities for the Bosch Group. For us as a supplier of technology, additional sales opportunities are opening up through changes in markets and technology – especially as a result of connectivity, automation, and electrification, of the growing importance of sustainability, and of the growth potential of emerging regions such as ASEAN and Africa. For the sake of greater clarity, the “Outlook for the Bosch Group” section describes in detail the opportunities and specific strategies we derive from them for the company as a whole and the business sectors.

Risk report

Risk management system

In the Bosch Group, risk management encompasses the entire company, including all essential operations, functional areas, divisions, and business sectors. It is thus a core responsibility for all managers on every level of the Bosch Group. As far as possible, risks are identified and managed where they arise: in other words, above all in the divisions and their regional subsidiaries. The latter are also primarily responsible for introducing measures to reduce or control risks.

While the corporate departments for compliance, risk management, and internal control system exercise a governance function for their respective systems, specialist departments such as the legal services and tax departments support, govern, and monitor directives and focal points. Internal auditing also helps assess the appropriateness and effectiveness of these tasks, and where necessary submits proposals for the introduction of appropriate improvements to the board of management and the heads of the specialist departments.

The Bosch Group risk management system takes its lead from the ISO 31000, COSO III (ERM), and IDW PS 340 standards. It includes the systematic recording and follow-up of relevant risks and, where necessary, the identification and follow-up of measures to deal with those risks. In this context, the corporate coordinating office for the risk management system is responsible for continuously improving the system. This includes further fine-tuning its analyses of risk-bearing capacity and measures to bolster risk culture.

A corporate risk management directive sets out principles and responsibilities. In addition, a cross-functional risk committee is tasked with identifying significant risk areas across the operating units and pinpointing potentially disruptive technological and strategic risks.

Overall risk assessment

We are not currently aware of any risks, beyond those listed in this report, which could materially affect the net assets, financial position, and results of operations of the Bosch Group in 2023. From a current perspective, there are no risk exposures that could jeopardize the Bosch Group's continued existence as a going concern.

Risk assessment on the basis of the risk management system

Fundamental remarks

For **risk assessment** on the basis of the risk management system, which covers risks up to 2026, there have been no appreciable changes since the previous year. Nor have there been any changes in principle in the risk situation. The number of reported risks (at year-end 2022) has fallen compared with the previous year. The financial risk ("monetary risk") is calculated from a risk matrix of probability of occurrence and potential loss, and thus gives an indication of how high any likely losses are. This risk has risen 22 percent year on year. While the likelihood of occurrence has fallen, the potential loss has increased significantly.

Here, the potential scale of loss is based on a three-point estimate for the worst-case, realistic, and best-case scenarios, in a ratio of 1:4:1. Risk reporting uses the residual method.

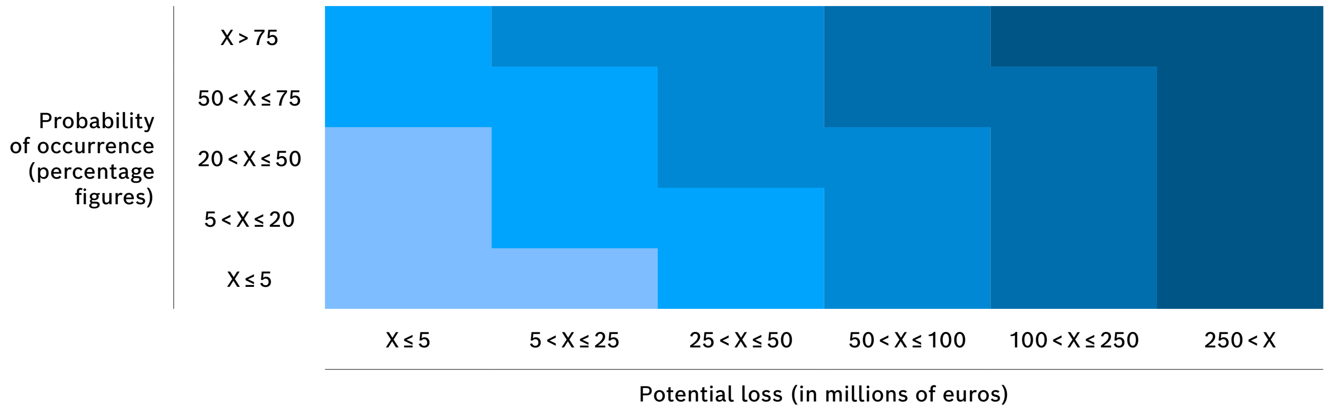
Risks with a probability of occurrence of at least 50 percent are still considered in our annual or interim sales and income forecasts as a matter of principle. The assessment is based on our current planning.

As in the previous year, the **five greatest risks** include above all cyber-risks with respect to core IT processes, risks related to connected products, and the danger of business processes being interrupted. The two other risks result from a potential escalation of international trade conflicts, especially between the United States and China, and from the risk of possible bankruptcies and liquidity bottlenecks at critical suppliers. The latter concerns the Mobility Solutions business sector in particular. The monetary risk associated with each of the five greatest risks is in excess of 330 million euros.

The digital transformation is resulting in growing challenges for Bosch in the areas of data protection and cybersecurity, and also as concerns conformity with internationally heterogeneous laws, regulations, and certifications. In 2022, to be able to react better to the growing risk of cyberattacks, we brought together the disparate departments dealing with cyberdefense and strengthened them. This allows us to respond better to the global threat and to set up defense capacities across the company. We have modified our cybersecurity strategy accordingly. On the one hand, this allows us to ensure appropriate protection across all systems and, on the other, to protect especially business-critical systems with additional measures. A systems failure caused by external attacks or internal errors could lead to considerable problems in product development and manufacturing, in the continued operation of software-based products, as well as in administrative processes, resulting in significant financial losses.

G 20

Risk matrix of potential loss



We apply comprehensive directives, valid throughout the company, to provide organizational and technical protection against system outages, data loss, and data manipulation. For the operation of our computing centers and cloud solutions, we apply security concepts which we continuously update in line with the state of the art. We verify their effectiveness with extensive security tests, among other things. Our planning and directives already anticipate the grave foreseeable changes that technologies such as quantum computing and artificial intelligence will mean for cybersecurity. For our IT infrastructure, the necessary high level of availability is achieved by providing a redundant, location-independent systems architecture.

Risks from the use of software-based products and solutions may arise from connected hardware products, software, or data being misused or wrongly used. With connected products featuring AI, there is a risk of external attacks. We address these by means of a group-wide cybersecurity management system, which is continuously revised and updated. Aspects of cybersecurity are considered right from the product design stage. We also address the issue of security vulnerabilities by upgrading the update capability of Bosch products and by introducing company-wide processes for remedying weaknesses.

Furthermore, we are devising a group-wide data strategy that lays down uniform rules for the responsibilities and processes involved in handling data. At the contract stage, we counter any liability risks in connection with the outage or disruption of complex systems relating to our products and services, such as manufacturing equipment and components for automated driving.

Geopolitical conflicts may have a negative impact on Bosch business activities, as the war in Ukraine currently illustrates. Its consequences, such as the largely discontinued Russia business and the economic sanctions that are continuously being tightened, are hampering global free trade. We are keeping a close watch on developments and are designing scenario-based measures, also with respect to trade relations between the United States and China. These include making our supply chains more robust and avoiding critical dependencies. At the same time, we are working to balance our business internationally, and to grow more strongly in markets that have so far been under-represented.

Risks by business sector

Of the business sectors, Mobility Solutions has the highest financial risk. Above all, this concerns the above-mentioned major risk of critical suppliers going bankrupt. We limit this risk by having our purchasing and logistics units extensively monitor our suppliers' commercial situation as well as through detailed, regular reporting to the chief financial officer. The business sector is especially affected by the enduring chip supply shortages. Here, we are taking extensive measures to keep the impact on customers to a minimum.

We are also preparing ourselves for further considerable burdens resulting from changes in powertrain technology. In October 2022, the European Commission, the European Parliament, and the EU member states agreed on a de facto end to new passenger cars and light trucks featuring combustion engines from 2035. However, it has still not been decided whether combustion engines running on renewable fuels will still be approved in the EU after 2035. The Council of Ministers has made the formal approval it needs to give dependent on a proposal to this effect by the EU Commission. Even so, there is still no planning certainty concerning the new emissions standard, as the draft legislation governing the Euro 7/VII standard, which was presented at the end of 2022, has still not been finalized, as it is still being negotiated by the European Commission, European Council, and European Parliament.

The financial risk in the Industrial Technology and Energy and Building Technology business sectors is comparatively low. In Industrial Technology, the highest risk concerns the impact of the bankruptcy of critical suppliers. In Energy and Building Technology, the availability of qualified workers is the greatest risk, as this may limit growth opportunities.

In the Consumer Goods business sector, where the financial risk is disproportionately lower than the business sector's share of Bosch Group sales, the risk of disruption to supply chains and, concomitantly, to the availability of raw materials and primary products is highly relevant. There also continue to be risks due to changes in the markets, particularly for household appliances with respect to digitalization.

Hedging policy and financial risks

Hedging policy principles and financial derivatives

The business operations of the Bosch Group are impacted in particular by fluctuations in exchange and interest rates and, on the procurement side, by commodity price risks. Business policy aims to limit these risks by means of hedging. Hedging transactions are managed at corporate level. Internal regulations and guidelines set down a mandatory framework and define the responsibilities related to investment and hedging transactions. According to these regulations, derivatives may only be used in connection with business operations, financial investments, or financing transactions; speculative transactions are not allowed. Trader limits are an important component of the guidelines. Hedges are generally concluded via banks with good credit ratings from leading agencies and taking into account current risk assessments in financial markets. The creditworthiness of the Bosch Group's banking partners is closely monitored, and the risk mitigated by counterparty limits.

To reduce the credit risk of the bank, fixed-term deposits are in some cases also entered into as secured deposits in tri-party repo transactions. In such cases, the bank provides predefined securities as collateral. The transaction settlement, as well as the management and valuation of the securities, are managed by a clearing center. The decision-making bodies are committees for commodities, foreign currencies, and investments that meet at regular intervals. There is a functional segregation of trading, settlement, and control functions. Key tasks of the control function include determining risks using the value-at-risk method as well as the basis-point-value method, and ongoing compliance checks with instructions and guidelines.

Each month, the risk of financial investments is calculated using the value-at-risk concept. Risks relating to financial assets are monitored using asset allocation studies conducted as needed and limited by diversifying investment. The board of management is informed about risk analyses and the results of investments and hedges on a monthly basis in the foreign-currency and investment committee.

Currency risks

Currency risks from cash flows in business operations are mitigated by the central management of invoicing and purchasing currencies. The currency risk is determined on the basis of the worldwide consolidated cash flows in the respective currencies. Based on the business plan, estimated inflows and outflows in the various currencies for the planning period are aggregated in a foreign exchange balance plan. The resulting net position is used for the central management of currency exposures.

The largest net currency positions of the planned cash flows are in Chinese renminbi, U.S. dollar, British pound, and Hungarian forint.

Hedging largely takes the form of forward exchange contracts; currency options and currency swaps are used to a lesser extent. These transactions, which are only entered into with banks, are subject to minimum requirements with respect to nature and scope. The risk attaching to material foreign currency items from operations is determined using the cash-flow-at-risk concept. These risk analyses and the hedge result are determined monthly and also presented to the board of management in the foreign-currency and investment committee.

A sensitivity analysis in the notes to the financial statements shows the effect of a 10 percent change in the euro exchange rate on the profit before tax. The analysis includes the major currencies. In the case of the Chinese renminbi, the British pound, the Hungarian forint, and the Japanese yen, the effect of such a change on profit before tax would in each case run into a low eight-figure sum. With respect to the U.S. dollar, the effect would be in the medium eight-figure range. The effects on earnings shown here result both from operative foreign currency positions and loans within the Bosch

Group if, by way of an exception, the loan was granted in a currency other than the local currency of the borrower – for example, because it can be repaid from expected cash flows in this currency. The currency risk as per the statement of financial position deviates from the purely economic currency risk, as the latter is determined solely on the basis of the planned cash flow from operating activities.

Interest-rate risks

Risks from anticipated changes in interest rates on investments and borrowings are limited by select use of derivative financial instruments. These are mainly interest rate swaps and interest rate futures. In a sensitivity analysis, the assets and liabilities subject to floating interest rates, fixed-rate securities, pension and money-market funds, and interest derivatives were considered. The effect of a change in the market interest rate on the profit before tax would be a seven-figure sum.

Other price risks

Derivatives are used to limit the risks of fluctuating commodity prices. The analysis of the commodity-price risk took into account commodity-price derivatives measured as of the reporting date. The effect on the profit before tax of a change in the forward-rate level of 10 percent (starting from forward rate on the reporting date) would be roughly on the same level as in the previous year. Apart from this, the Bosch Group is not aware that it is exposed to any significant other price risks as of the reporting date.

Share-price risks

The Bosch Group holds stock as a part of its financial investments used to cover long-term pension obligations, as well as investments in publicly quoted companies. The analysis of the share-price takes into account share portfolios, quoted investments, equity funds, and share derivatives. In the 2022 financial statements, these had a carrying amount of 4,863 million euros. A decrease or increase in the share price of 10 percent (taking the share price on the reporting date as the baseline) would lead to gains/losses on financial instruments recognized in equity of roughly 350 million euros. For the profit before tax, the gains/losses would be some 130 million euros. To reduce share-price risks, a broadly diversified investment strategy is pursued across various regions and sectors.

Credit risks

The credit risk from customer receivables is recorded and monitored on an ongoing basis. Responsibilities and duties relating to credit risks are governed by an internal directive. This mainly concerns the stipulation of payment terms, fixing of credit limits, release of deliveries, and receivables monitoring.

The credit risk for trade receivables is reduced by processing invoices with the corresponding credit notes in a single work step; the net amount is reported in the statement of financial position. This procedure is only performed if there is a legal right to offset and the customer intends to settle the receivable on a net basis or to settle the receivable by offsetting against the corresponding liability. Moreover, trade receivables are partly secured by retention of title. For some trade receivables, collateral has been additionally provided in the form of guarantees, property liens, and mortgages. Due to the measures that have been taken, we do not see any material credit risk.

Liquidity risks

Changes in financial assets and liabilities are monitored on an ongoing basis. Internal directives regulate the duties and responsibilities of liquidity management and planning. The liquidity risk is reduced by processing invoices for trade payables with the corresponding credit notes received in a single work step. This procedure is only performed if there is a legal right to offset and there is an intention to settle the liability based on the net amount or to settle the liability by offsetting against the corresponding receivable. Moreover, collateral is provided in the form of guarantees.

Thanks to our comfortable liquidity position, presented above in the section on net assets and financial position, we have ample financial resources at our disposal. We therefore evaluate the liquidity risk as low.

Risks pursuant to the compliance management system

In 2022, we did not register any unusual corruption-related risks within the organization. The general corruption-related risks mainly concern the handling of special payments to our customers and business partners whose risk profile is high. The trend toward even more and even tighter national and international laws and official requirements with respect to effective compliance, data protection, and information security management systems continues. Above all, the focus is on whistleblower protection and more stringent prosecution of companies and natural persons.

The corporate compliance organization was further modified in 2022, in terms of both content and staffing. On this subject, we are also continuing to digitalize our core compliance processes. To further minimize risk, we have introduced a new IT tool that checks integrity and monitors selected business partners. In the data protection and information security area, we have largely concluded the link-up of regional data protection teams to headquarters, and revised and audited our central directive. We have begun to implement the European directives relating to whistleblower systems and protection. To enhance awareness and increase use of the whistleblower system, and to reinforce trust in internal investigations, we have started a group-wide sensitization campaign. In addition, we have extended our mandatory web-based training program and revised our training courses.

Geopolitical developments such as the war in Ukraine are leading internationally to new and tighter rules that restrict global free trade. These include export controls and sanctions regulations in many countries. These are backed up by sanctions of their own, and past or future violations may lead to penalties, claims for damages, and damage to reputation. With respect to the resulting economic, legal, and reputational risks, Bosch is continuously developing its export-control organization.

Legal risks

With respect to emissions from diesel vehicles, various automakers are being investigated by German and non-German authorities. In some cases, these authorities are also investigating Bosch in its capacity as a supplier of engine control units. To our knowledge, no new investigative proceedings were instituted against Bosch in 2022. With respect to the events concerning various automakers' diesel vehicle emissions, Bosch also remains a defendant in a number of class and individual civil-law actions around the world. Among other things, in the United States, in a civil action brought by the California attorney-general, Bosch was able to reach a settlement of 25 million dollars in 2022. In doing so, Bosch neither acknowledges the validity of the claims brought forward, nor does it concede any liability.

Although these pending actions, as well as possible further actions, pose risks, we do not believe that these risks have grown in severity. In all these proceedings, Bosch is asserting its rights.

Bosch is also engaged in compensation discussions with customers in respect of potential civil-law claims associated with closed antitrust proceedings. Investigations by the antitrust authorities into the automotive supplier business, also against Bosch, are continuing in certain countries. In addition, the French antitrust authority has completed its investigations of BSH Hausgeräte in France for a possible violation of antitrust law, and has notified BSH France of the allegations made as part of the ongoing proceedings.

On the basis of the facts relating to antitrust law and engine control units that were available when the financial statements were prepared and that the board of management has assessed, the board of management believes that sufficient precautions have been taken in the form of provisions for legal risks. For the various legal risks outlined above, provisions throughout the group amount to 505 million euros. From the 2022 business year, the board of management is not aware of any further legal risks that could, from a present perspective, materially impair the company's net assets, financial position, or results of operations.

Consolidated financial statements
of Robert Bosch GmbH
as of December 31, 2022

Consolidated income statement

for the period from January 1 to December 31, 2022

in millions of euros **T03**

	Note	2022	2021
Sales revenue	7	**88,201**	**78,748**
Cost of sales	8	−59,742	−52,933
Gross profit		**28,459**	**25,815**
Distribution and administrative cost	8	−17,812	−16,384
Research and development cost	8	−7,224	−6,110
Other operating income	9	2,634	2,336
Other operating expenses	10	−2,582	−2,840
Result from entities included at equity		−1	−2
EBIT		**3,474**	**2,815**
Financial income	11	3,829	2,728
Financial expenses	11	−4,390	−2,244
Profit before tax		**2,913**	**3,299**
Income taxes	12	−1,075	−800
Profit after tax		**1,838**	**2,499**
of which attributable to non-controlling interests		538	484
of which attributable to parent company		1,300	2,015

Consolidated statement of comprehensive income

for the period from January 1 to December 31, 2022

in millions of euros T04

	2022	2021
Profit after tax	**1,838**	**2,499**
Change in debt instruments, measured at fair value	–483	–216
reclassified to profit or loss	169	–80
Currency translation of entities outside the euro zone	23	808
reclassified to profit or loss	–289	–12
Items that will be reclassified to profit or loss	**–460**	**592**
Change in equity instruments, measured at fair value	–985	608
Remeasurement of pension provisions	2,040	802
Items that will not be reclassified to profit or loss	**1,055**	**1,410**
Other comprehensive income	**595**	**2,002**
Comprehensive income	**2,433**	**4,501**
of which attributable to non-controlling interests	478	690
of which attributable to parent company	1,955	3,811

Consolidated statement of financial position

for the year ended December 31, 2022

in millions of euros T05

Assets

	Note	12/31/2022	12/31/2021
Current assets			
Cash and cash equivalents	14	6,459	6,196
Trade receivables	15	16,528	14,034
Other financial assets	16	3,803	7,897
Contract assets	17	1,006	955
Income tax receivables		267	450
Other assets	18	2,422	2,148
Inventories	19	16,528	13,652
		47,013	**45,332**
Non-current assets			
Financial assets	16	14,021	15,864
Contract assets	17	567	434
Income tax receivables		255	183
Property, plant, and equipment	20	23,014	21,404
Right-of-use assets	32	2,068	2,000
Intangible assets	21	10,254	9,150
Investments measured at equity	6	66	24
Other assets	18	871	964
Deferred taxes	12	2,003	1,756
		53,119	**51,779**
Assets held for sale	6	**115**	**612**
Total assets		**100,247**	**97,723**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 108

in millions of euros **T05**

Equity and liabilities

	Note	12/31/2022	12/31/2021
Current liabilities			
Trade payables	22	10,761	9,948
Lease liabilities	32	532	510
Other financial liabilities	23	2,210	1,370
Contract liabilities	24	1,644	1,359
Income tax liabilities	12	738	728
Other liabilities	25	8,506	7,802
Other provisions	25	4,850	6,521
		29,241	**28,238**
Non-current liabilities			
Financial liabilities	23	5,457	4,395
Lease liabilities	32	1,635	1,556
Contract liabilities	24	806	614
Other liabilities	25	45	31
Pension provisions	26	9,384	11,663
Other provisions	25	6,316	6,056
Deferred taxes	12	572	632
		24,215	**24,947**
Liabilities directly associated with assets held for sale	6	**64**	**234**
Equity	27		
Issued capital		1,200	1,200
Capital reserve		4,557	4,557
Retained earnings		38,483	36,180
Equity attributable to parent company		**44,240**	**41,937**
Non-controlling interests		2,487	2,367
		46,727	**44,304**
Total equity and liabilities		**100,247**	**97,723**

Consolidated statement of changes in equity

in millions of euros **T06**

Note 27

			Retained earnings								
					Other comprehensive income						
	Issued capital	**Capital reserve**	**Earned profit**	**Treasury stock**	**Currency translation**	**Financial instruments**	**Pensions**	**Total**	**Equity parent company**	**Equity non-controlling interests**	**Group equity**
1/1/2021	**1,200**	**4,557**	**37,632**	**−62**	**−1,937**	**2,141**	**−5,302**	**−5,098**	**38,229**	**1,937**	**40,166**
Profit after tax			2,015						2,015	484	2,499
Other comprehensive income					604	391	801	1,796	1,796	206	2,002
Comprehensive income			**2,015**		**604**	**391**	**801**	**1,796**	**3,811**	**690**	**4,501**
Dividends			−67						−67	−283	−350
Changes in ownership interests in subsidiaries			−2						−2	2	
Other changes			250			−285	1	−284	−34	21	−13
12/31/2021	**1,200**	**4,557**	**39,828**	**−62**	**−1,333**	**2,247**	**−4,500**	**−3,586**	**41,937**	**2,367**	**44,304**
Restatements from IAS 29 and IAS 37			228		266			266	494		494
1/1/2022	**1,200**	**4,557**	**40,056**	**−62**	**−1,067**	**2,247**	**−4,500**	**−3,320**	**42,431**	**2,367**	**44,798**
Profit after tax			1,300						1,300	538	1,838
Other comprehensive income					84	−1,470	2,041	655	655	−60	595
Comprehensive income			**1,300**		**84**	**−1,470**	**2,041**	**655**	**1,955**	**478**	**2,433**
Dividends			−143						−143	−367	−510
Changes in ownership interests in subsidiaries			−1						−1		−1
Other changes			380			−403	21	−382	−2	9	7
12/31/2022	**1,200**	**4,557**	**41,592**	**−62**	**−983**	**374**	**−2,438**	**−3,047**	**44,240**	**2,487**	**46,727**

Consolidated statement of cash flows

in millions of euros T 07

	Note 28	2022	2021
EBIT		3,474	2,815
Depreciation and amortization[1]		5,045	4,995
Gains/losses on disposal of non-current assets		17	61
Result from investments measured at equity		1	2
Other expenses and income, not cash effective		–133	24
Change in inventories		–2,256	–2,840
Change in receivables and other assets		–2,338	–186
Change in liabilities		887	2,117
Change in pension provisions and other provisions		–1,532	1,053
Interest paid		–240	–208
Interest and dividends received		507	451
Other financial expenses and income, cash effective		–224	–140
Income taxes paid		–1,349	–1,254
Cash flows from operating activities (A)		**1,859**	**6,890**
Acquisition of subsidiaries		–1,152	–322
Disposal of subsidiaries		–21	103
Additions to non-current assets		–5,985	–4,660
Proceeds from disposal of non-current assets		743	487
Change in securities and time deposits (term of more than 90 days)		4,079	–2,987
Cash flows from investing activities (B)		**–2,336**	**–7,379**

1. After offsetting write-ups of EUR 2 million (previous year: EUR 4 million).

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 111

in millions of euros **T 07**

	Note 28	2022	2021
Acquisition of non-controlling interests		–1	20
Borrowing		2,042	232
Repayment of financial liabilities		–240	–1,902
Repayments of lease liabilities		–590	–560
Dividends paid		–510	–350
Cash flows from financing activities (C)		**701**	**–2,560**
Change in liquidity (A+B+C)		**224**	**–3,049**
Liquidity at the beginning of the period (January 1)		**6,196**	**8,955**
Exchange-rate related change in liquidity		23	302
Change in liquidity due to changes in the consolidated group		17	9
Change in liquidity held for sale		–1	–21
Liquidity at the end of the period (December 31)		**6,459**	**6,196**

Notes to the consolidated financial statements

Principles and methods

1. General information

Robert Bosch Gesellschaft mit beschränkter Haftung (Stuttgart Local Court, HRB 14000; referred to in the following as Robert Bosch GmbH) is headquartered in Stuttgart, Germany. Its business address is Robert-Bosch-Platz 1, 70839 Gerlingen, Germany. The shareholders of Robert Bosch GmbH are Robert Bosch Stiftung Gesellschaft mit beschränkter Haftung, Stuttgart (93.99 percent of the shares), ERBO II Gesellschaft mit beschränkter Haftung, Stuttgart (5.36 percent of the shares), and Robert Bosch Industrietreuhand KG, Stuttgart (0.01 percent of the shares), which performs the entrepreneurial ownership functions. Robert Bosch GmbH holds treasury stock equivalent to 0.64 percent of capital. For further information on the Bosch Group's business activities, please refer to the group management report.

The consolidated financial statements of Robert Bosch GmbH as of December 31, 2022, have been prepared in accordance with the International Financial Reporting Standards (IFRSs) and International Accounting Standards (IASs) and the corresponding Interpretations of the IFRS Interpretations Committee (IFRS IC) as adopted by the EU at the end of the reporting period in accordance with Regulation (EC) No. 1606/2002 of the European Parliament and of the Council on the application of international accounting standards. In addition, the provisions of Sec. 315e (3) HGB [*Handelsgesetzbuch*: German Commercial Code] have been observed. The previous-year figures have been determined using the same principles.

To enhance the clarity and transparency of the consolidated financial statements, individual items of the consolidated income statement and the consolidated statement of financial position have been combined. These items are explained separately in the notes to the consolidated financial statements. The income statement has been prepared using the function of expense method.

The group currency is the euro (EUR). Unless otherwise stated, all figures are in millions of euros (EUR million).

The consolidated financial statements prepared as of December 31, 2022, were authorized for publication by the board of management on March 15, 2023. The consolidated financial statements and group management report will be filed with the Company Register [*Unternehmensregister*] and published there.

2. Changes in financial reporting

Accounting standards applied for the first time in the fiscal year 2022

The following amendments became effective for the first time in the fiscal year:

- IFRS 3 *Business Combinations* (References to the Conceptual Framework),
- IAS 16 *Property, Plant and Equipment* (Proceeds before Intended Use),
- IAS 37 *Provisions, Contingent Liabilities and Contingent Assets* (Onerous Contracts – Cost of Fulfilling a Contract),
- Annual Improvements to IFRS, 2018–2020 Cycle.

The amendments to IFRS 3, IAS 16, and the Annual Improvements had no material effects on the consolidated financial statements of Robert Bosch GmbH. The effects arising from the amendments to IAS 37 are presented under the heading "Transitional effects from adopting accounting standards" within this note.

Accounting standards not adopted early

In November 2021, the EU endorsed IFRS 17 *Insurance Contracts*.

In addition, the EU endorsed amendments to the following accounting standards in 2022:

- IAS 1 *Presentation of Financial Statements* (Disclosure of Accounting Policies),
- IAS 8 *Accounting Policies, Changes in Accounting Estimates and Errors* (Definition of Accounting Estimates),
- IAS 12 *Income Taxes* (Deferred Tax related to Assets and Liabilities arising from a Single Transaction),
- IFRS 17 *Insurance Contracts* (Initial Application of IFRS 17 and IFRS 9 – Comparative Information).

All the above amendments will become effective for fiscal years beginning on or after January 1, 2023. The Bosch Group has not adopted the above amendments early.

First-time adoption of the above amendments is not expected to have any material effects on the consolidated financial statements of Robert Bosch GmbH.

Transitional effects from adopting accounting standards

The requirements of IAS 29 *Financial Reporting in Hyperinflationary Economies* were applied for the first time in the reporting year in preparing the financial statements of the subsidiaries in Argentina and Turkey. In the past, the effects of hyperinflationary reporting were immaterial. The effects arising from restating the non-monetary items in the statement of financial position as of January 1, 2022, were recognized directly in equity in the revaluation reserve from currency translation; previous-year figures were not restated.

In addition, the amendments to IAS 37 relating to the cost of fulfilling a contract in the case of onerous contracts were adopted for the first time as of January 1, 2022, in accordance with the transitional provisions. The effects arising from first-time adoption led to a decrease in other provisions in the sales and marketing area and were recognized under retained earnings from earned profit as of the date of first-time adoption; previous-year figures were not restated. Further information is provided in note 25 "Other liabilities, other provisions, and contingent liabilities."

The effect of the above amendments on items in the statement of financial position as of January 1, 2022, is presented in the following table:

in millions of euros **T08**

Assets

	12/31/2021	IAS 29	IAS 37	1/1/2022
Current assets				
Other assets	2,148	1		2,149
Inventories	13,652	54		13,706
Non-current assets				
Property, plant, and equipment	21,404	290		21,694
Right-of-use assets	2,000	6		2,006
Intangible assets	9,150	2		9,152
Other assets	964	4		968
Deferred taxes	1,756	−63	−6	1,687

Equity and liabilities

	12/31/2021	IAS 29	IAS 37	1/1/2022
Current liabilities				
Other provisions	6,521		−124	6,397
Non-current liabilities				
Contract liabilities	614	13		627
Other provisions	6,056		−110	5,946
Deferred taxes	632	15		647
Equity				
Retained earnings				
Earned profit	39,828		228	40,056
Accumulated other comprehensive income	−3,586	266		−3,320

3. Currency translation

In the separate financial statements of the group companies, monetary assets and liabilities denominated in currencies other than the euro are measured at the closing rate, regardless of whether they are hedged or not. Exchange-rate gains and losses from revaluations are recorded in profit or loss.

Financial statements prepared in foreign currency are translated into euros in accordance with IAS 21 *The Effects of Changes in Foreign Exchange Rates*. Assets and liabilities are translated at the closing rate, while equity is translated at historical rates. The line items of the income statement are translated into euros at the annual average exchange rates. Any resulting exchange-rate differences are recorded directly in equity as a separate line item until the disposal of the subsidiaries.

For the most important non-euro currencies of the Bosch Group, the following exchange rates apply:

T09

		Closing rate		Average rate	
	EUR 1 =	**12/31/2022**	12/31/2021	**2022**	2021
Australia	AUD	1.57	1.56	1.52	1.57
Brazil	BRL	5.64	6.37	5.44	6.38
Canada	CAD	1.44	1.45	1.37	1.48
China	CNY	7.36	7.22	7.08	7.63
Czech Republic	CZK	24.12	24.92	24.56	25.64
Hungary	HUF	400.87	369.00	391.37	358.57
India	INR	88.17	84.26	82.72	87.45
Japan	JPY	140.66	130.44	137.99	129.89
Korea	KRW	1,344.09	1,347.56	1,357.94	1,353.99
Mexico	MXN	20.86	23.24	21.20	23.99
Poland	PLN	4.68	4.60	4.69	4.56
Russian Federation	RUB	75.66	84.89	72.50	87.16
Switzerland	CHF	0.98	1.04	1.00	1.08
Turkey	TRY	19.96	14.72	19.96	10.50
United Kingdom	GBP	0.89	0.84	0.85	0.86
United States	USD	1.07	1.13	1.05	1.18

The financial statements of consolidated entities in hyperinflationary economies are prepared in accordance with IAS 29 *Financial Reporting in Hyperinflationary Economies*. In the reporting year, this concerns the subsidiaries in Argentina and Turkey. To identify economies as hyperinflationary, reference is made to the pronouncements issued by the Center for Audit Quality's International Practices Task Force (ITPF). In accordance with IAS 29, non-monetary assets and liabilities, equity, and all items of the income statement and statement of comprehensive income are indexed to the respective country's general price index. In Turkey, the consumer price index issued by the Turkish Statistical Institute TURKSTAT is used. On December 31, 2022, this stood at 1,128.45 (previous year: 686.95). Argentina uses the consumer price index set by the FACPCE, which stood at 1,134.59 (previous year: 582.46) on December 31, 2022. Monetary items of the statement of financial position are not restated. The gain or loss on the net monetary position is recognized in the financial result under expenses or income from exchange-rate fluctuations. Information on the first-time adoption of IAS 29 is provided in note 2 "Changes in financial reporting" in the section "Transitional effects from adopting accounting standards."

4. Accounting policies

The accounting policies used in the preparation of the consolidated financial statements of Robert Bosch GmbH are presented in the notes to the individual items of the income statement and the statement of financial position. The accounting policies applicable to financial instruments are presented together in note 30 "Additional disclosures on financial instruments."

In general, the accounting policies applied are unchanged from the previous year, with the exceptions outlined in note 2.

5. Assumptions and estimates

The preparation of consolidated financial statements in accordance with IFRSs requires that assumptions and estimates be made for some line items. These assumptions and estimates have an effect on the amount and presentation of the assets and liabilities, income and expenses, and contingent liabilities disclosed in the reporting period. Uncertainty involved in these assumptions and estimates could result in actual outcomes that require a restatement to the carrying amount of assets or liabilities concerned in future periods. Assumptions and estimates mainly concern the following:

The determination of loss allowances on receivables and contract assets is based on estimates and assumptions with respect to the credit standing of individual customers. The measurement of inventories requires assumptions and estimates to be made, including for determining the net realizable value. The discounted future cash flows used as a basis for testing goodwill, other intangible assets, and property, plant, and equipment for impairment are based on estimates. Assumptions are also made in the determination of the discount rates and growth rates used. Determining lease terms requires assumptions and estimates with respect to the likelihood of options to terminate or extend the lease being exercised. The recognition of deferred tax assets is premised on their future recoverability being probable. Consequently, assumptions have to be made regarding future taxable income and the expected timing of the reversal of temporary differences. Further assumptions are required to determine the useful lives of items subject to wear and tear within property, plant, and equipment, as well as of intangible assets. The determination of carrying amounts of investments also involves making assumptions and estimates. Pension provisions and similar obligations are measured using actuarial methods. This requires various assumptions, including with respect to life expectancy, salary trends, the pension growth rate, and the discount factor. The recognition and measurement of other provisions is based on estimates of amounts and the probability of future events. To the extent possible, such estimates are based on past experience, and are regularly reviewed and adjusted as necessary.

Macroeconomic trends in the reporting year, such as the development of inflation and rising interest rates, were appropriately taken into account in impairment testing of goodwill and other non-current assets, but also when calculating provisions.

With respect to the consideration of climate-related issues in the preparation of the consolidated financial statements, the relevant legislation is continuously monitored. Effects arising from legislation relating to internal-combustion engines, as well as the increasing electrification in many fields, the transition to electromobility, the increasing use of renewable energies, and other current developments are already considered in medium-term planning. These factors may above all have an impact on impairment testing of assets, since medium-term planning is the basis for determining the future cash flows of the cash generating units. In the reporting year, climate-related issues had no effects on the recognition and measurement of assets and liabilities.

The uncertainties prevailing since 2020 due to the Covid-19 pandemic eased considerably in the reporting year. As in previous years, the assumptions and estimates used for recognition and measurement purposes when preparing the consolidated financial statements did not have any material effects on the net assets, financial position, and results of operations of the Bosch Group.

The credit risk for receivables from entities domiciled in Russia, Belarus, and Ukraine was reassessed on account of the war in Ukraine and the sanctions and trade restrictions imposed as a result. This reassessment led to write-downs that were immaterial in scope. Further effects resulted with respect to the planned sale of individual subsidiaries based in Russia and necessary impairments on items of property, plant, and equipment and right-of-use assets. Details of this are presented in notes 6 “Consolidation,” 20 “Property, plant, and equipment,” and 32 “Leases.”

6. Consolidation

Basis of consolidation

Besides Robert Bosch GmbH, the consolidated financial statements include all subsidiaries over which Robert Bosch GmbH has control pursuant to the criteria set out in IFRS 10 *Consolidated Financial Statements*. These entities are included in the consolidated financial statements from the date on which the Bosch Group obtains control. Conversely, subsidiaries are no longer fully consolidated when control of the entity is lost.

The capital of the entities consolidated in the reporting year for the first time is accounted for pursuant to IFRS 3 *Business Combinations*, using the acquisition method of accounting. The acquisition-date cost of the investment is offset against the proportionate share of revalued equity. As a matter of principle, assets, liabilities, and contingent liabilities are carried at fair value. Remaining debit differences are accounted for as goodwill. Negative goodwill is recognized in profit or loss after reassessment. Any difference resulting from the purchase and disposal of non-controlling interests is offset against equity.

All intercompany profits and losses, sales, expenses, and other income, as well as receivables and liabilities or provisions, are eliminated. In the case of consolidation measures with an effect on profit or loss, income tax effects are considered and deferred taxes recognized.

Consolidated group

Besides Robert Bosch GmbH, the consolidated group comprises a further 468 (previous year: 440) fully consolidated entities. The group developed as follows:

T10

	Germany	Outside Germany	Total
Included in consolidation at January 1, 2021	**84**	**355**	**439**
Additions/formations in fiscal year 2021	3	19	22
Disposals/mergers in fiscal year 2021	−6	−14	−20
Included in consolidation at December 31, 2021	**81**	**360**	**441**
Additions/formations in fiscal year 2022	3	40	43
Disposals/mergers in fiscal year 2022	−6	−9	−15
Included in consolidation at December 31, 2022	**78**	**391**	**469**

The consolidated group includes four special funds, as well as other investments.

In fiscal year 2022, the following companies were consolidated for the first time:

- Bosch (Shanghai) Smart Life Technology Ltd., Shanghai, China,
- Bosch Building Technology B.V., Nieuwegein, Netherlands,
- Bosch Charging Solutions GmbH, Stuttgart, Germany,
- Bosch grow platform LLC, Wilmington, DE, United States,
- BSH Home Appliances S.A. de C.V., Mexico City, Mexico,
- Elmo Motion Control Ltd., Petach Tikva, Israel,
- Elmo Motion Control Inc., Nashua, NH, United States,
- Elpro Group AG, Buchs, Switzerland (the sub-group consists of nine entities),
- ETAS S.A.S., Saint-Ouen, France,
- Five AI Inc., Wilmington, DE, United States,
- Five AI Limited, Bristol, United Kingdom,
- Gas Alarm Systems Limited, Nelson, United Kingdom,
- Hacousto Group B.V., Berkel en Rodenrijs, Netherlands,
- Hacousto Holland B.V., Berkel en Rodenrijs, Netherlands,
- Hacousto Protec B.V., Amsterdam, Netherlands,
- Hacousto Protec Projects B.V., Berkel en Rodenrijs, Netherlands,
- Hacousto Security Systems B.V., Berkel en Rodenrijs, Netherlands,
- Hacousto Videotechniek B.V., Berkel en Rodenrijs, Netherlands,
- Halin Communication Technology B.V., Best, Netherlands,
- Hörburger AG, Waltenhofen, Germany,
- ItoM Services B.V., Eindhoven, Netherlands,
- Kassow Robots ApS, Copenhagen, Denmark,
- KB Wiper Systems Co., Ltd., Daegu, Korea,
- Le-AutomatiX (Shanghai) Co., Ltd., Shanghai, China,
- Le-HydrauliX BoWei (Shanghai) Co., Ltd., Shanghai, China,
- Lynteck Limited, Nelson, United Kingdom,
- Minima Processor Oy, Oulu, Finland,
- MoTeC Holdings Pty Ltd., Docklands, Australia,
- MoTeC Pty Ltd., Croydon South, Australia,
- Protec Brandbeveiliging B.V., Berkel en Rodenrijs, Netherlands,
- Protec Camerfield Limited, Nelson, United Kingdom,
- Protec Fire Detection Pty. Ltd., Sydney, Australia,
- Protec Fire Detection (Export) Limited, Nelson, United Kingdom,
- S.C. Hörburger s.r.l., Sibiu, Romania,
- United Automotive Electronic Systems (Liuzhou) Co., Ltd., Liuzhou, China.

Due to changes to the consolidated group, sales revenue increased by EUR 130 million in the reporting year and total assets as of December 31, 2022, by EUR 1,038 million.

Condensed financial information on fully consolidated subsidiaries with material non-controlling interests

in millions of euros **T11**

	Bosch Powertrain Systems Co., Ltd., Wuxi, China		United Automotive Electronic Systems Co., Ltd., Shanghai, China	
	2022	2021	**2022**	2021
Current assets	2,117	2,046	2,436	2,205
Non-current assets	475	469	1,555	1,456
Current liabilities	1,195	1,202	1,667	1,486
Non-current liabilities	7	4	252	214
Sales revenue	1,972	2,115	4,313	3,434
Profit after tax	426	445	476	406
Comprehensive income	397	564	431	615
Cash flows from operating activities	406	285	582	559
Cash flows from investing activities	–73	–70	–353	–152
Cash flows from financing activities	–333	–215	–210	–276
Share of capital attributable to non-controlling interests	34.0%	34.0%	49.0%	49.0%
Profit/loss after tax attributable to non-controlling interests	145	151	233	199
Equity attributable to non-controlling interests	473	445	1,015	961
Dividends paid to non-controlling interests	108	73	159	130

in millions of euros **T12**

	Bosch HUAYU Steering Systems Group, Shanghai, China		Bosch Ltd., Bengaluru, India	
	2022	2021	2022	2021
Current assets	1,204	1,287	1,032	964
Non-current assets	627	601	951	979
Current liabilities	1,058	1,103	558	559
Non-current liabilities	1	12	40	39
Sales revenue	1,836	1,529	1,695	1,303
Profit after tax	209	176	176	143
Comprehensive income	195	255	114	230
Cash flows from operating activities	144	106	211	48
Cash flows from investing activities	–110	–76	–49	–19
Cash flows from financing activities	–168	–218	–96	–41
Share of capital attributable to non-controlling interests	49.0%	49.0%	29.5%	29.5%
Profit/loss after tax attributable to non-controlling interests	102	86	52	42
Equity attributable to non-controlling interests	378	379	409	397
Dividends paid to non-controlling interests	69	61	22	12

The condensed financial information of the respective entities corresponds to the figures before consolidation entries.

Joint ventures and joint operations

The accounting for joint arrangements in accordance with IFRS 11 *Joint Arrangements* is based on whether they are classified as a joint operation or a joint venture, which in turn depends on the contractually agreed rights and obligations of the parties to the arrangement. With regard to joint operations, the Bosch Group recognizes, in relation to its interest, its rights to the assets, liabilities, expenses, and revenue in the related line items in the consolidated financial statements. Investments in joint ventures within the meaning of IFRS 11 are accounted for using the equity method in accordance with IAS 28 *Investments in Associates and Joint Ventures*. The carrying amount of these interests is subsequently measured in accordance with the change in equity of the jointly controlled entity attributable to the Bosch Group, less any impairment, where appropriate.

The following joint ventures are subject to joint control in accordance with IFRS 11 and were recognized in the consolidated financial statements as of December 31, 2022, using the equity method in accordance with IAS 28:

- Bosch BASF Smart Farming GmbH, Cologne, Germany (50 percent),
- BS Systems GmbH & Co. KG, Zusmarshausen, Germany (50 percent),
- MAGURA Bosch Parts & Services GmbH & Co. KG, Bad Urach, Germany (50 percent),
- North America Fuel Systems Remanufacturing LLC, Kentwood, MI, United States (50 percent).

The share of capital indicated corresponds to the share of voting rights. On materiality grounds, BS Systems GmbH & Co. KG, MAGURA Bosch Parts & Services GmbH & Co. KG, and North America Fuel Systems Remanufacturing LLC are accounted for using the equity method for the first time as of December 31, 2022. The carrying amounts of the investments in the above-mentioned three entities were determined on the basis of the most recent available financial statements as of December 31, 2021.

Condensed financial information on individually immaterial joint ventures

in millions of euros T13

	2022	2021
Carrying amount of the investments	27	3
Group share of profit after tax	0	–2
Group share of other comprehensive income of the period		0
Group share of comprehensive income	0	–2

The carrying amount of the investments in the above-mentioned individually immaterial joint ventures corresponds to the proportionate share in these entities' equity.

Since the beginning of the reporting year, a cooperation arrangement has been in place between Robert Bosch GmbH and the Volkswagen group entity CARIAD SE, Wolfsburg, Germany, for the development of a software platform for partially and highly automated driving. The principal place of business of the joint operation is Ingolstadt, Germany. The development costs incurred are shared equally between the parties. Each party is granted rights to use and market the jointly developed results; the results of the development efforts are not marketed jointly.

Associated entities

Pursuant to IAS 28, investments are also included in the consolidated financial statements using the equity method if significant influence can be exercised.

The following associated entities are accounted for using the equity method in accordance with IAS 28 as of December 31, 2022:

- ads-tec Energy plc, Dublin, Ireland (21.4 percent),
- BOXT Limited, Leeds, United Kingdom (20 percent),
- plc2 Design GmbH, Endingen am Kaiserstuhl, Germany (25 percent),
- ZF Steering Gear (India) Ltd., Pune, India (25.8 percent).

On materiality grounds, BOXT Limited and ZF Steering Gear (India) Ltd. are accounted for using the equity method for the first time as of December 31, 2022; the investments' carrying amounts were determined on the basis of the most recent available financial statements as of March 31, 2022.

To determine the carrying amount of ads-tec Energy plc, the most recent available financial statements as of December 31, 2021, were used.

Condensed financial information on individually immaterial associated entities

in millions of euros **T14**

	2022	2021
Carrying amount of the investments	39	21
Group share of profit after tax	–1	0
Group share of other comprehensive income of the period		0
Group share of comprehensive income	–1	0

Business combinations

Business combinations in the reporting year

On March 31, 2022, the group acquired 100 percent of the shares in Elpro Group AG, Buchs, Switzerland, including its eight subsidiaries. The purchase price for the shares came to EUR 198 million and was paid by transferring cash. The entity is included in the consolidated financial statements of Robert Bosch GmbH as of April 1, 2022, and allocated to the Energy and Building Technology business sector. From the date of first-time consolidation, Elpro contributed EUR 37 million to the group's sales revenue and EUR 2 million to the group's profit after tax.

Elpro Group AG develops monitoring solutions for the pharmaceuticals and healthcare industries. The acquisition marks the Bosch Service Solutions division's entry into the pharmaceuticals services sector. The acquisition gave rise to goodwill of EUR 122 million, which is not tax deductible and mainly represents part of the expected synergy potential and the value of the workforce.

Effective June 27, 2022, 100 percent of the shares in Five AI Inc., Wilmington, DE, United States, were acquired. The acquisition also includes a subsidiary and an investee domiciled in the United Kingdom. The purchase price for the shares came to EUR 120 million and was settled by transferring cash. Allocated to the Mobility Solutions business sector, the entity is included in Robert Bosch GmbH's consolidated financial statements as of July 1, 2022. From the date of first-time consolidation, Five AI contributed a loss of EUR 1 million to the group's profit after tax.

Five AI is one of Europe's leading startups for autonomous driving. The acquisition strengthens the group's software development expertise for automated driving. The goodwill arising from the acquisition amounted to EUR 103 million and is not tax deductible. It is allocated to the Cross-Domain Computing Solutions division and essentially represents the value of the workforce.

On November 30, 2022, the group acquired 100 percent of the shares in Elmo Motion Control Ltd., Petach Tikva, Israel, including its nine subsidiaries. The provisional purchase price for the shares came to EUR 661 million and was paid by transferring cash. On materiality grounds, the entity was included for the first time in Robert Bosch GmbH's consolidated financial statements as of December 31, 2022; the entity is allocated to the Industrial Technology business sector. Elmo Motion Control develops and manufactures high-end electric servo drives and motion controllers for industrial automation. The acquisition is intended to strengthen the Drive and Control Technology division's factory automation business.

The analysis and measurement of the assets, particularly intangible assets, and liabilities of the acquired entity had not yet been completed when the consolidated financial statements were released for publication. For this reason, the purchase price allocation is not final, and the fair values of acquired assets and liabilities should be regarded as provisional.

The provisionally recognized goodwill of EUR 502 million is not tax deductible and represents part of the expected synergy potential and the value of the workforce.

The fair values acquired in the above business combinations are presented in the following table:

in millions of euros **T15**

	Elmo Motion Control Ltd. (provisional figures)	Elpro Group AG	Five AI Inc.	Total of fair values
Current assets	**67**	**25**	**3**	**95**
of which cash	19	7	1	27
of which trade receivables	14	11	1	26
Non-current assets	**670**	**195**	**146**	**1,011**
Financial assets	5			5
Property, plant, and equipment	3	12	0	15
Intangible assets	662	183	146	991
of which goodwill	502	122	103	727
Current liabilities	**55**	**9**	**21**	**85**
Non-current liabilities	**21**	**13**	**8**	**42**
Provisions	1	2	0	3
Liabilities including deferred taxes	20	11	8	39

Other minor business combinations were completed in the reporting year. Individually, they are immaterial. Current assets of EUR 67 million (including cash of EUR 9 million and trade receivables of EUR 30 million) and non-current assets of EUR 100 million were acquired, and current liabilities of EUR 124 million and non-current liabilities of EUR 47 million were assumed. The total purchase price came to EUR 221 million and was mainly financed by transferring cash. Goodwill of EUR 225 million in total was recognized, which is not deductible for tax purposes and mostly represents part of the expected synergy potential, the value of the workforce, as well as intangible assets to an immaterial extent.

The individually immaterial business combinations are listed in the table below:

T16

Company	Activity	Absorbing business sector	First-time consolidation	Share of voting rights
Arioso Systems GmbH, Dresden, Germany	MEMS microspeakers	Mobility Solutions	6/1/2022	100%[1]
Atlatec GmbH, Karlsruhe, Germany	High-resolution digital maps for driver assistance and automated driving	Mobility Solutions	4/1/2022	100%[2]
Hörburger AG, Waltenhofen, Germany	Building automation and energy management	Energy and Building Technology	3/1/2022	100%
ItoM Services B.V., Eindhoven, Netherlands	High-frequency integrated circuits	Mobility Solutions	12/1/2022	100%
Kassow Robots ApS, Copenhagen, Denmark	Collaborative industrial robots	Industrial Technology	5/1/2022	100%
KB Wiper Systems Co., Ltd., Daegu, Korea	Wiper systems for windshields and rear windows	Mobility Solutions	6/1/2022	100%[3]
Minima Processor Oy, Oulu, Finland	Technology for reducing sensors' power consumption	Mobility Solutions	7/1/2022	100%
MoTeC Holdings Pty. Ltd., Croydon, Australia	Motorsports technology for the customer racing market	Mobility Solutions	9/1/2022	100%

1. The entity was merged into Bosch Sensortec GmbH in the reporting year.
2. The entity was merged into Robert Bosch GmbH in the reporting year.
3. Business combination achieved in stages.

On aggregate, as of the acquisition date the business combinations listed in the table contributed EUR 137 million to the group's sales revenue and incurred negative earnings after tax of EUR 10 million.

Assuming that the business combinations had already taken place as of January 1, 2022, the Bosch Group's sales revenue would have amounted to EUR 88,517 million and earnings after tax to EUR 1,853 million.

The acquisition of HydraForce Inc., Lincolnshire, IL, United States, was announced in July 2022, and the transaction was closed on February 3, 2023, following the approval of the antitrust authorities. The provisional purchase price for 100 percent of the shares amounts to EUR 974 million. Current assets of EUR 188 million (including cash of EUR 18 million and trade receivables of EUR 66 million) and non-current assets of EUR 458 million were acquired, and current liabilities of EUR 147 million and non-current liabilities of EUR 102 million were assumed. Measurement of the acquired assets and liabilities and the purchase price allocation had not yet been completed when the consolidated financial statements were released for publication, the amounts indicated should therefore be regarded as provisional.

The acquisition of HydraForce is intended to strengthen the Drive and Control Technology division's presence (Industrial Technology business sector) in North America and expand its global hydraulics business. The transaction resulted in provisional goodwill of EUR 577 million, which is partly deductible for tax purposes and represents part of the expected synergy potential and the value of the workforce.

Business combinations in the previous year

On November 30, 2021, the group acquired 100 percent of the shares in Protec Fire and Security Group Ltd, Nelson, United Kingdom, including its 19 subsidiaries. The entity was included in the consolidated financial statements of Robert Bosch GmbH for the first time as of December 31, 2021, and is allocated to the Energy and Building Technology business sector. The final purchase price came to EUR 354 million and was settled mainly by transferring cash. Protec Fire and Security Group Ltd. operates as a systems integrator for security and fire alarm technology, primarily in the United Kingdom and the Netherlands. The acquisition has strengthened the European business of the Building Technologies division.

Measurement of the acquired entity's assets and liabilities and the purchase price allocation had not been completed by the date the consolidated financial statements for the previous year were released for publication. The final amounts of the acquired assets and liabilities as of the date of first-time inclusion in the consolidated financial statements are presented in the table below:

in millions of euros T17

	Protec Fire and Security Group Ltd.
Current assets	**120**
of which cash	20
of which trade receivables	15
Non-current assets	**288**
Property, plant, and equipment	18
Intangible assets	270
of which goodwill	174
Current liabilities	**30**
Non-current liabilities	**24**
Provisions	4
Liabilities including deferred taxes	20

The goodwill arising from the acquisition of EUR 174 million is allocated to the Building Technologies division and is not tax deductible. It represents the value of the workforce and part of the expected synergy potential.

In relation to the provisional carrying amounts, the following adjustments were made: assets increased by EUR 90 million compared with the provisional amount, mainly due to intangible assets identified in the course of the purchase price allocation. This was partially offset by liabilities increasing by EUR 29 million to EUR 54 million, primarily due to the initial recognition of deferred tax liabilities. Taking into account the EUR 9 million increase in the provisional purchase price to EUR 354 million, goodwill is now stated at EUR 174 million in contrast to the provisional figure of EUR 226 million.

Non-current assets held for sale and disposal groups

Non-current assets and disposal groups are classified as held for sale if their carrying amount will be recovered principally through a sale transaction. The corresponding assets and disposal groups are available for immediate sale and the sale is highly probable. In accordance with IFRS 5 *Non-current Assets Held for Sale and Discontinued Operations*, they are measured at the lower of carrying amount or fair value less costs to sell, unless another standard prescribes a different measurement method. Any impairment loss in excess of the balance of non-current assets is recognized by recording current provisions.

As of December 31, 2022, the following operations meet the criteria for classification as a disposal group within the meaning of IFRS 5:

The planned divestment of the passenger-car brake disc business, allocated to the Mobility Solutions business sector, had already been announced in the previous year. The sale concerns shares held in the entities Buderus Guss GmbH, Breidenbach, and Robert Bosch Lollar Guss GmbH, Lollar, both in Germany. The transaction was not completed in the reporting year as originally intended, primarily because of delays in the negotiations for the transaction. These delays were caused by the effects the unexpected rise in electricity and gas prices had on both entities' energy-intensive business. It is still highly probable that the transaction will be closed. Closure is scheduled for the second quarter of 2023.

In the reporting year, the decision was made to sell the shares held in the Russian subsidiaries OOO Robert Bosch Samara, Samara, and OOO Robert Bosch Saratov, Engels. Both entities, which are allocated to the Mobility Solutions business sector, produce automotive components. The divestments are expected to be completed in the first and second quarter of 2023 respectively. In addition, it was decided in the reporting year to sell the shares held in OOO Bosch Power Tools, Engels, Russia. Allocated to the Consumer Goods business sector, the entity produces power tools for professional applications. The transaction is to be closed in the second quarter of 2023. Agreements relating to the sale of OOO Robert Bosch Saratov and OOO Bosch Power Tools were signed on February 8, 2023. The reason for the planned disposal of the subsidiaries in Russia is to be seen in the only limited possibility of continuing manufacturing operations in view of the sanctions regime.

As part of the classification of the above operations as a disposal group, an expense of EUR 162 million was recognized in sundry other operating expenses in the reporting year. Of that amount, EUR 48 million is attributable to the impairment of non-current assets and EUR 114 million to the recognition of current sundry other provisions.

As of December 31, 2022, the main groups of assets held for sale and related liabilities are as follows:

in millions of euros **T18**

	2022
Cash and cash equivalents	22
Trade receivables	19
Inventories	56
Other financial and non-financial assets	18
Assets held for sale	**115**
Trade payables	12
Pension provisions	21
Other provisions	17
Other financial and non-financial liabilities	14
Liabilities directly associated with assets held for sale	**64**

The accumulated decrease in equity through other comprehensive income related to non-current assets held for sale and disposal groups amounts to EUR 20 million. Of this amount, EUR 3 million relates to the revaluation reserve from pensions and EUR 17 million to currency translation differences.

Divestments completed in the reporting year

On January 31, 2022, the sale of the steering and gear pumps business, which is part of the Mobility Solutions business sector, was closed. The companies affected by the disposal were Pump Technology Solutions PS GmbH, Berlin, Germany, Pump Technology Solutions (US) LLC, Wilmington, DE, United States, Tecnologia de Bombas Automotivas do Brasil Ltda., Sorocaba, Brazil, and Bosch Automotive Steering Jincheng (Nanjing) Co., Ltd, Nanjing, China.

On March 31, 2022, divestment of the entity Robert Bosch Aftermarket Solutions GmbH, Göttingen, Germany, which is assigned to the Mobility Solutions business sector, was completed. The entity sorts and reconditions used spare parts and produces components such as vehicle starters and electrohydraulic brakes.

On June 1, 2022, the sale of Van Halteren Technologies Boxtel B.V. (formerly: Bosch Rexroth B.V.), Boxtel, Netherlands, was closed. The large-scale project business sold together with the entity had been assigned to the Industrial Technology business sector.

On November 2, 2022, the divestment of the vacuum and hydraulics business, which is part of the Mobility Solutions business sector, was completed with the sale of the entities VHIT S.p.A., Offanengo, Italy, and VHIT Automotive Systems (Wuxi) Co., Ltd., Wuxi, China.

In total, current assets of EUR 309 million (including cash and cash equivalents of EUR 72 million) and non-current assets of EUR 68 million were sold, and current liabilities of EUR 215 million and non-current liabilities of EUR 63 million transferred. The loss of EUR 65 million resulting from the transactions was recorded in other operating expenses. The purchase-price sum of EUR 34 million was mainly settled by transferring cash.

On December 7, 2022, the investments in Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, Munich, Germany, and Knorr-Bremse Commercial Vehicle Systems Japan Ltd., Saitama, Japan, were sold to Knorr Bremse AG, Munich, Germany. The investments had been allocated to the Mobility Solutions business sector. In the course of the sale, EUR 347 million was reclassified from the reserve from financial instruments to earned profit.

Notes to the income statement

7. Sales revenue

In accordance with IFRS 15 *Revenue from Contracts with Customers*, sales revenue is recognized when the customer obtains control of the goods or services and is thus able to direct the use of, and obtain substantially all the remaining benefits from, the goods or services. This is based on the assumption that there is a contract that creates enforceable rights and obligations; in addition, it must be probable that the Bosch Group will collect the consideration for the goods and services transferred. Revenue is recognized at the amount of the transaction price, i.e. the amount of consideration that the Bosch Group is expected to collect in exchange for the transfer of goods and services arranged. IFRS 15 sets forth a consistent, five-step model for determining the amount of revenue to be reported, which is generally applicable for all customer contracts.

In the sale of goods, control is typically transferred to the customer on delivery. Invoicing usually takes place at the same time. Revenue from services is mostly recognized once the service has been rendered in its entirety and invoiced. In the case of development services, milestone payments or downstream separate remuneration are also agreed. When invoicing the sale of goods, services, and development work, country- and industry-specific payment terms are granted; these are 46 days on average. For customer-specific products that are allocable to the Mobility Solutions business sector and do not create an asset with an alternative use for the group, revenue is recognized over time; the same applies to plant engineering contracts in the Industrial Technology business sector and the Energy and Building Technology business sector. Revenue is recognized according to the percentage of completion, which can be determined using input or output methods. Output methods recognize revenue on the basis of the value to the customer of the goods or services transferred relative to the remaining goods or services promised under the contract. Input methods recognize revenue on the basis of costs incurred relative to the estimated total costs. Depending on the underlying business model, the Bosch Group uses input methods as well as output methods in determining the percentage of completion.

Sales revenue comes to EUR 88,201 million (previous year: EUR 78,748 million). Of this amount, EUR 52,573 million (previous year: EUR 45,319 million) is attributable to the Mobility Solutions business sector, EUR 6,946 million (previous year: EUR 6,099 million) to the Industrial Technology business sector, EUR 21,342 million (previous year: EUR 21,022 million) to the Consumer Goods business sector, EUR 6,964 million (previous year: EUR 5,934 million) to the Energy and Building Technology business sector, and EUR 376 million (previous year: EUR 374 million) to other activities.

Sales revenue includes an amount of EUR 1,287 million (previous year: EUR 1,093 million) that had been included in the balance of current contract liabilities at the beginning of the reporting year.

In relation to performance obligations not satisfied in full or in part as of the reporting date, an amount of EUR 118 million (previous year: EUR 11 million) is expected to be realized as sales revenue within the next two years and an amount of EUR 24 million (previous year: EUR 4 million) thereafter. These amounts relate to long-term construction contracts.

Sales revenue recognized over time amounts to EUR 44,484 million (previous year: EUR 38,789 million) in the Mobility Solutions business sector, EUR 35 million (previous year: EUR 39 million) in the Industrial Technology business sector, and EUR 429 million (previous year: EUR 225 million) in the Energy and Building Technology business sector.

A breakdown of sales revenue by region is provided in note 29 “Segment reporting.”

8. Functional costs

Cost of sales contains the cost of internally manufactured goods sold and the cost price of resold merchandise. The cost of internally manufactured goods sold contains materials and production cost that can be allocated directly, the allocable parts of indirect production overheads, including depreciation of production equipment and amortization of other intangible assets, and write-downs of inventories. Cost of sales also includes development work charged directly to customers and amortization of capitalized development work.

The **distribution and administrative cost** breaks down as follows:

in millions of euros T19

	2022	2021
Distribution cost	13,374	12,492
Administrative cost	4,438	3,892
	17,812	**16,384**

The distribution cost includes personnel and non-personnel costs, depreciation charged in the distribution function, customer service, logistics, market research, sales promotion, shipping, advertising, and warranty costs.

Research and development cost contains both research cost and development cost that cannot be capitalized.

in millions of euros T20

	2022	2021
Total research and development cost	7,483	6,328
Development cost capitalized in the reporting period	–271	–219
Impairment losses on capitalized development cost	12	1
	7,224	**6,110**

Cost of materials amounted to EUR 42,145 million in the reporting year (previous year: EUR 36,622 million).

9. Other operating income

in millions of euros T21

	2022	2021
Income from exchange-rate fluctuations	1,172	1,032
Income from derivatives	441	215
Income from the reversal of loss allowances on trade receivables and other financial assets	58	72
Income from the disposal of non-current assets	99	69
Income from rent and leases	8	8
Income from the reversal of provisions	216	327
Sundry other operating income	640	613
	2,634	**2,336**

The income from exchange-rate fluctuations is offset by expenses that are disclosed in other operating expenses.

Income from derivatives includes income from foreign exchange and commodity derivatives allocated to operating activities.

Government grants are recognized pursuant to IAS 20 *Accounting for Government Grants and Disclosure of Government Assistance* only if it is sufficiently certain that the assistance will be granted and the conditions attached to the assistance are satisfied. Grants related to income are presented as part of profit or loss in the period in which the related expenses are incurred. They are offset against the respective expenses. If there are no such expenses, the grants are disclosed in sundry other operating income. In the reporting year, grants related to income totaled EUR 207 million (previous year: EUR 206 million).

10. Other operating expenses

in millions of euros **T22**

	2022	2021
Expenses from exchange-rate fluctuations	1,245	931
Expenses from derivatives	400	295
Loss allowances on trade receivables and other financial assets	129	94
Expenses from the disposal of non-current assets	108	130
Other taxes	19	45
Expenses from the recognition of provisions	302	854
Impairment of goodwill		108
Sundry other operating expenses	379	383
	2,582	**2,840**

“Expenses from derivatives” includes expenses from foreign exchange and commodity derivatives allocated to operating activities.

11. Financial result

in millions of euros **T23**

	2022	2021
Interest and similar income	482	437
Interest and similar expenses	–404	–299
Interest result	**78**	**138**
Investment income	58	84
Income from securities	141	541
Expenses from securities	–802	–117
Income from exchange-rate fluctuations	1,819	1,074
Expenses from exchange-rate fluctuations	–1,130	–683
Income from derivatives	1,321	571
Expenses from derivatives	–2,002	–1,096
Other income	8	21
Other expenses	–52	–49
Other financial result	**–639**	**346**
Financial result, total	**–561**	**484**
of which financial income	3,829	2,728
of which financial expenses	–4,390	–2,244

The line item “interest and similar income” contains dividend income from shares of EUR 73 million (previous year: EUR 67 million) and income from investment funds of EUR 30 million (previous year: EUR 27 million). The line item “interest and similar expenses” includes negative interest income of EUR 7 million (previous year: EUR 20 million).

Investment income comprises dividend income as well as changes in the fair value of investments measured at fair value through profit or loss.

Income and expenses from securities include the changes in the fair value of securities measured at fair value through profit or loss, gains and losses on the disposal of securities measured at fair value through other comprehensive income, as well as impairment losses and income from the reversal of impairment losses on such securities.

The line items “income from derivatives” and “expenses from derivatives” contain transactions to hedge financial assets, mainly from foreign-currency derivatives.

Interest income and expenses are attributable to financial instruments not measured at fair value through profit or loss as follows:

in millions of euros **T24**

	2022		2021	
	Interest income	**Interest expenses**	**Interest income**	**Interest expenses**
Financial assets measured at amortized cost (AC)	135	7	105	20
Financial assets measured at fair value through other comprehensive income (FVOCI wR)	167		152	
Financial liabilities measured at amortized cost (AC)		176		125
	302	**183**	**257**	**145**

12. Income taxes

Income tax obligations comprise income tax liabilities and uncertain income tax liabilities.

In accordance with IAS 12 *Income Taxes*, deferred tax assets and liabilities are recorded for temporary differences between the tax carrying amounts and the carrying amounts in the consolidated statement of financial position unless they arise from the initial recognition of an asset or liability in a transaction that is not a business combination and that, at the time of the transaction, affected neither the profit before tax nor the taxable income. Deferred tax assets arising from unused tax losses and tax credits are recognized as an asset only if it is sufficiently certain that they can be utilized. The deferred tax item equals the estimated tax expense or relief in later periods. The tax rate applicable at the time of realization is taken as a basis. If it is uncertain whether recognized deferred taxes can be realized, they are adjusted accordingly.

Income taxes are classified according to their origin as follows:

in millions of euros **T25**

	2022	2021
Current taxes	1,478	1,149
Deferred taxes	–403	–349
	1,075	**800**

Current taxes contain tax expenses not related to the reporting period totaling EUR 32 million (previous year: tax income of EUR 139 million).

Deferred taxes break down as follows:

in millions of euros **T26**

	2022	2021
Temporary differences	–394	–434
Tax losses and tax credits	–9	85
	–403	**–349**

Deferred taxes are calculated on the basis of the tax rates that apply or are expected to apply given the current legislation in the individual countries at the expected time of realization. The corporate income tax rate for German companies is 15 percent. Taking into account the solidarity surcharge of 5.5 percent and the trade tax levied on profits recorded in Germany, the total tax rate is 30 percent (previous year: 29 percent). As in the previous year, the tax rates outside Germany range between 9 percent and 35 percent.

As of December 31, the deferred tax assets and liabilities presented in the statement of financial position are attributable to the following items:

in millions of euros T27

	2022		2021	
	Assets	Liabilities	Assets	Liabilities
Receivables, other assets, and inventories	1,160	680	948	585
Securities, investments	22	67	14	221
Property, plant, and equipment	229	673	219	646
Right-of-use assets		424		415
Intangible assets	203	1,019	195	1,028
Other assets	270	71	111	58
Liabilities	1,194	132	1,152	142
Lease liabilities	446		412	
Provisions	1,164	90	1,351	51
Other liabilities	10	276	1	262
Unused tax losses and tax credits	165		129	
Total	**4,863**	**3,432**	**4,532**	**3,408**
Netting	−2,860	−2,860	−2,776	−2,776
	2,003	**572**	**1,756**	**632**

Of the reported deferred tax assets, EUR 120 million (previous year: EUR 42 million) relates to entities that incurred losses in the reporting year or in the previous year. It is assumed that sufficient taxable income or taxable temporary differences will be available in subsequent years to permit the deferred tax assets to be realized.

No deferred tax assets were recognized in the statement of financial position for the items presented in the table below as it is not probable that sufficient taxable profit will be available in the future:

in millions of euros **T28**

	2022	2021
Temporary differences	3,078	6,079
Tax losses	10,745	9,289
Tax credits	3	140
	13,826	**15,508**

The utilization of unused tax losses and tax credits for which no deferred tax assets have been recognized to date resulted in a reduction of the current tax expense in the reporting year of EUR 7 million (previous year: EUR 23 million).

The unused tax losses for which no deferred taxes were recognized expire as follows:

in millions of euros **T29**

	2022	2021
Within one year	37	52
Later than one year and no later than two years	64	31
Later than two years and no later than three years	68	79
Later than three years	440	464
Without expiry date	10,136	8,663
	10,745	**9,289**

Deferred tax liabilities are recognized on temporary differences relating to investments in subsidiaries if the reversal is expected in the following year due to planned dividend distributions. No further deferred tax liabilities were recognized on temporary differences in this connection as it is not probable that the temporary differences will reverse in the foreseeable future. As of the reporting date, retained profits of subsidiaries amount to EUR 8,244 million (previous year: EUR 7,331 million). If these profits are distributed, this could lead to an income tax or withholding tax burden at Robert Bosch GmbH or at the level of intermediate holding entities.

The change in deferred taxes recognized directly in equity is presented in the following table:

in millions of euros **T30**

	2022	2021
Reserve from financial instruments (equity instruments)	20	24
Reserve from financial instruments (debt instruments)	42	96
Reserve from pensions	–27	–131
	35	**–11**

Deferred tax income of EUR 73 million (previous year: tax expense of EUR 33 million) is attributable to the change in debt instruments measured at fair value through other comprehensive income, which was reclassified to profit or loss in the reporting year.

The basis for the expected income tax expense is the German tax rate of 30 percent (previous year: 29 percent). The difference between expected and disclosed income tax expense is attributable to the following factors:

in millions of euros **T31**

	2022	2021
Profit before tax	2,913	3,299
Expected income tax expense	874	957
Variances due to tax rate	–178	–168
Non-deductible expenses	320	229
Zero-rated income	–438	–294
Recognition/measurement of deferred tax assets	92	251
Tax effects not related to the reporting year	81	–282
Other differences	324	107
Income tax expense disclosed	**1,075**	**800**
Effective tax rate	37%	24%

“Variances due to tax rate” includes effects resulting from changed tax rates. In the reporting year, these resulted in deferred tax income of EUR 2 million (previous year: EUR 11 million).

“Other differences” mainly relates to withholding taxes and the change in permanent differences.

13. Personnel expenses and headcount

Disclosures on personnel expenses

Personnel expenses break down as follows:

in millions of euros T32

	2022	2021
Remuneration	20,297	19,732
Social security costs	3,547	3,274
Post-employment benefit costs	978	760
	24,822	**23,766**

Headcount

T33

	Annual average 2022	Annual average 2021
EU countries	217,499	218,679
Rest of Europe	33,666	26,691
Americas	47,540	45,935
Asia, Africa, Australia	115,106	108,398
	413,811	**399,703**

Notes to the statement of financial position

14. Cash and cash equivalents

in millions of euros T34

	2022	2021
Bank balances (term up to 90 days)	6,459	6,195
Cash and reserve bank deposits	0	1
	6,459	**6,196**

Disclosures on restricted cash and cash equivalents are provided in note 28 “Statement of cash flows.”

15. Trade receivables

The accounting policies applicable to trade receivables are explained in note 30 “Additional disclosures on financial instruments.”

In the reporting year, trade receivables came to EUR 16,528 million (previous year: EUR 14,034 million). As in the previous year, there are no trade receivables which are due in more than one year.

Information about loss allowances on trade receivables is contained in the credit risk section of note 31 “Capital and risk management.”

16. Other current and non-current financial assets

in millions of euros T35

	2022		2021	
	up to 1 year	more than 1 year	up to 1 year	more than 1 year
Securities	2,365	11,602	3,888	13,138
Investments		2,003		2,235
Bank balances (term of more than 90 days)	636	83	3,454	76
Loan receivables	95	14	93	15
Derivatives	285	33	72	71
Receivables from finance leases	36	147	36	143
Sundry other financial assets	386	139	354	186
	3,803	**14,021**	**7,897**	**15,864**

The securities classified as current assets are listed securities with a residual term of less than one year as well as securities which are intended for sale within a year.

Non-current securities consist of interest-bearing and other securities, investment funds, and shares. In the reporting year, shares and investments in corporations with a fair value of EUR 1,256 million (previous year: EUR 1,386 million) were sold. Related to this, EUR 398 million (previous year: EUR 285 million) were reclassified from the reserve from financial instruments to earned profit. Disposals of investments in corporations are carried out based on business-policy decisions.

The pledged securities have a carrying amount of EUR 1,366 million (previous year: EUR 1,527 million). The pledged securities satisfy the legal requirement to secure obligations to associates and bank guarantees. Fund units equivalent to at least the value of the claims were pledged as collateral.

The bank balances are partly invested as secured deposits in tri-party repo transactions. The bank provides collateral of the same amount in the form of securities. As of the reporting date, there were no secured deposits in tri-party repo transactions (previous year: EUR 1,000 million).

Disclosures on loss allowances on loan receivables, sundry other financial assets, and finance lease receivables are contained in the credit-risk section of note 31 “Capital and risk management.”

Note 32 “Leases” contains additional disclosures on receivables from finance leases.

17. Contract assets

In accordance with IFRS 15, any performance surpluses at contract level are presented as contract assets. The asset constitutes the Bosch Group's right to consideration in exchange for goods or services it has transferred to the customer.

The contract assets from revenue recognition over time present the excess of the Bosch Group's performance, presented as sales revenue, over consideration already received from the customer. At the point in time when control is transferred to the customer, contract assets from development work have to be disclosed for all separate consideration to be subsequently reimbursed by the customer for separately commissioned research and development work.

in millions of euros **T36**

	2022		2021	
	up to 1 year	**more than 1 year**	up to 1 year	more than 1 year
From revenue recognition over time	562	9	581	1
From development work	444	558	374	433
	1,006	**567**	**955**	**434**

18. Other current and non-current assets

in millions of euros **T37**

	2022		2021	
	up to 1 year	**more than 1 year**	up to 1 year	more than 1 year
Prepaid expenses	257	81	225	57
Receivables from tax authorities (without income tax receivables)	1,718	62	1,451	125
Deferred consideration to customers	112	432	105	392
Sundry other assets	335	296	367	390
	2,422	**871**	**2,148**	**964**

19. Inventories

Inventories include raw materials, consumables, and supplies; work in process, finished goods, and merchandise; and prepayments. Inventories are stated at purchase cost or cost of conversion using the average cost method, or at net realizable value if lower. In addition to direct cost, cost of conversion includes an allocable portion of necessary materials and production overheads as well as production-related depreciation that can be directly allocated to the production process. Appropriate allowance is made for risks of slow-moving goods or obsolescence associated with holding and selling inventories.

In the Mobility Solutions business sector, development cost incurred for research and development work separately commissioned and separately charged is recognized as work in process under inventories until the date when control is transferred (revenue recognition at a point in time), and not as research and development cost through profit or loss. This development work in process is generally measured on the same basis as all other work in process, except that no allowances for slow-moving goods or obsolescence are applied.

Inventories break down as follows:

in millions of euros **T38**

	2022	2021
Raw materials, consumables, and supplies	6,390	5,121
Work in process	3,635	2,846
Finished goods and merchandise	6,378	5,591
Prepayments	125	94
	16,528	**13,652**

Of the total amount of inventories, an amount of EUR 1,665 million (previous year: EUR 1,413 million) is carried at net realizable value. The previous year's figure has been restated.

In the reporting year, the change in impairment losses of EUR 140 million was recognized as an expense in profit or loss (previous year: EUR 255 million). No inventories were pledged as collateral.

20. Property, plant, and equipment

Property, plant, and equipment are measured at cost less depreciation and, if necessary, impairment losses. Depreciation is charged on a straight-line basis over the economic useful life.

Depreciation is based on the following ranges of useful lives:

T39

	Useful life
Buildings	10–50 years
Plant and equipment	8–11 years
Other equipment, fixtures, and furniture	3–25 years

In accordance with IAS 36 *Impairment of Assets*, impairment losses are recorded on property, plant, and equipment if their recoverable amount has fallen below their carrying amount. Impairment losses are reversed if the reasons for the impairment loss from previous years no longer apply. Repair costs are recognized in the income statement.

In accordance with IAS 23 *Borrowing Costs,* **borrowing costs** are capitalized if they are directly attributable to the acquisition, construction, or production of a qualifying asset. All other borrowing costs are expensed in the period in which they are incurred. Write-downs on capitalized borrowing costs are reported in cost of sales. In the reporting year, borrowing costs of EUR 9 million (previous year: EUR 7 million) were capitalized. The underlying borrowing rate is 2.0 percent (previous year: 1.5 percent).

Government grants are recognized pursuant to IAS 20 only if it is sufficiently certain that the assistance will be granted and the conditions attached to the assistance are satisfied. Grants related to assets are deducted in order to calculate the carrying amount of the asset.

in millions of euros **T40**

	Land, buildings belonging to operating assets	Investment property	Plant and equipment	Other equipment, fixtures, and furniture, leased assets	Prepayments and assets under construction	Total
Gross values 1/1/2021	**11,786**	**30**	**27,356**	**12,500**	**2,591**	**54,263**
Changes in consolidated group	11		–6	19	2	26
Additions	234		872	804	2,039	3,949
Reclassifications	443	8	1,104	401	–1,956	
Disposals	–110	–4	–999	–643	–42	–1,798
Exchange-rate differences	216	1	504	188	50	959
Assets held for sale	–79		–453	–127	–11	–670
Gross values 12/31/2021	**12,501**	**35**	**28,378**	**13,142**	**2,673**	**56,729**
Depreciation 1/1/2021	**5,026**	**9**	**18,991**	**9,454**	**32**	**33,512**
Changes in consolidated group	3		–1	12		14
Additions	354		1,845	1,188	6	3,393
Reclassifications	5	7		–12		
Disposals	–59	–1	–861	–599		–1,520
Write-ups	–2		–1	–1		–4
Exchange-rate differences	67		325	150		542
Assets held for sale	–62		–433	–109	–8	–612
Depreciation 12/31/2021	**5,332**	**15**	**19,865**	**10,083**	**30**	**35,325**
Carrying amounts 12/31/2021	**7,169**	**20**	**8,513**	**3,059**	**2,643**	**21,404**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 144

in millions of euros **T40**

	Land, buildings belonging to operating assets	Investment property	Plant and equipment	Other equipment, fixtures, and furniture, leased assets	Prepayments and assets under construction	Total
Gross values 12/31/2021	**12,501**	**35**	**28,378**	**13,142**	**2,673**	**56,729**
Restatements from IAS 29	181	1	810	70	20	1,082
Gross values 1/1/2022	**12,682**	**36**	**29,188**	**13,212**	**2,693**	**57,811**
Changes in consolidated group	92		35	63	−1	189
Additions	319	2	961	921	2,693	4,896
Reclassifications	426	−1	1,215	397	−2,037	
Disposals	−143	−9	−1,235	−770	−40	−2,197
Exchange-rate differences	45	1	324	39	5	414
Assets held for sale	−18		−54	−20	−7	−99
Gross values 12/31/2022	**13,403**	**29**	**30,434**	**13,842**	**3,306**	**61,014**
Depreciation 12/31/2021	**5,332**	**15**	**19,865**	**10,083**	**30**	**35,325**
Restatements from IAS 29	88	1	656	51	−4	792
Depreciation 1/1/2022	**5,420**	**16**	**20,521**	**10,134**	**26**	**36,117**
Changes in consolidated group	8		29	51		88
Additions	384		1,914	1,170	6	3,474
Reclassifications	8		−51	44	−1	
Disposals	−83	−6	−1,024	−728	−8	−1,849
Write-ups	−1		−1			−2
Exchange-rate differences	15	1	229	26		271
Assets held for sale	−18		−54	−20	−7	−99
Depreciation 12/31/2022	**5,733**	**11**	**21,563**	**10,677**	**16**	**38,000**
Carrying amounts 12/31/2022	**7,670**	**18**	**8,871**	**3,165**	**3,290**	**23,014**

The depreciation charge for the reporting year contains the following impairment losses:

- Land and buildings: EUR 23 million (previous year: EUR 7 million),
- Plant and equipment: EUR 19 million (previous year: EUR 64 million),
- Other equipment, furniture, and fixtures, assets under construction: EUR 17 million (previous year: EUR 30 million).

The corresponding expenses are recognized in functional costs.

The impairment losses of the reporting year contain an amount of EUR 48 million attributable to land and buildings, to plant and equipment, to other equipment, fixtures, and furniture, as well as to assets under construction of the BSH Hausgeräte division (Consumer Goods business sector). The impairment losses are recognized on assets of the subsidiary in Russia on account of the applicable sanctions and the associated changes in the economic and legal environment.

Purchase commitments for items of property, plant, and equipment amounted to EUR 1,325 million (previous year: EUR 801 million); there were no restrictions on title in either the reporting year or the previous year. Government grants for assets of EUR 25 million (previous year: EUR 42 million) were deducted from the additions in the reporting year.

Investment property comprises rented land and buildings which were measured at amortized cost in accordance with IAS 40 *Investment property*. Measured at fair value, the portfolio comes to EUR 24 million (previous year: EUR 39 million). The fair values were calculated at corporate headquarters by the competent specialist department. The residential property in Germany and Asia allocated to level 3 of the fair-value hierarchy pursuant to IFRS 13 *Fair Value Measurement* is measured using the discounted earnings or comparative method based on the ImmoWertV [*Verordnung über die Grundsätze für die Ermittlung der Verkehrswerte von Grundstücken*: Ordinance on principles to assess the market value of land] and taking the current fabric and market values of the individual properties into account. Rental income from investment property came to EUR 3 million (previous year: EUR 3 million), maintenance expenses totaled EUR 2 million (previous year: EUR 2 million).

21. Intangible assets

Acquired and internally generated intangible assets are recognized pursuant to IAS 38 *Intangible Assets* if a future economic benefit will flow to the entity from the use of the asset and the cost of the asset can be reliably determined. These assets are generally carried at cost and amortized using the straight-line method over their economic useful life. The useful life of acquired and internally generated intangible assets is generally four years. Intangible assets accounted for in the course of business combinations have a useful life of up to 50 years.

Goodwill is tested annually for impairment. Intangible assets subject to wear and tear are only tested for impairment if there is an indication that they may be impaired. Impairment losses are recorded in accordance with IAS 36 if the recoverable amount of the asset concerned has fallen below its carrying amount. Impairment losses are reversed if the reasons for the impairment loss from previous years no longer apply.

in millions of euros T41

	Acquired intangible assets (without goodwill)	Acquired goodwill	Internally generated intangible assets	Total
Gross values 1/1/2021	8,881	5,489	1,847	16,217
Changes in consolidated group		246	1	247
Additions	186	5	264	455
Disposals	–254		–419	–673
Exchange-rate differences	249	94		343
Assets held for sale	–23			–23
Gross values 12/31/2021	**9,039**	**5,834**	**1,693**	**16,566**
Amortization 1/1/2021	**5,022**	**698**	**1,209**	**6,929**
Changes in consolidated group			1	1
Additions	689	108	224	1,021
Disposals	–254		–421	–675
Exchange-rate differences	155	2		157
Assets held for sale	–17			–17
Amortization 12/31/2021	**5,595**	**808**	**1,013**	**7,416**
Carrying amounts 12/31/2021	**3,444**	**5,026**	**680**	**9,150**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 147

in millions of euros **T41**

	Acquired intangible assets (without goodwill)	Acquired goodwill	Internally generated intangible assets	Total
Gross values 12/31/2021	**9,039**	**5,834**	**1,693**	**16,566**
Restatements from IAS 29	2	1		3
Gross values 1/1/2022	**9,041**	**5,835**	**1,693**	**16,569**
Changes in consolidated group	368	900	29	1,297
Additions	328		319	647
Disposals	–76		–295	–371
Exchange-rate differences	23	24	1	48
Assets held for sale				
Gross values 12/31/2022	**9,684**	**6,759**	**1,747**	**18,190**
Amortization 12/31/2021	**5,595**	**808**	**1,013**	**7,416**
Restatements from IAS 29	1			1
Amortization 1/1/2022	**5,596**	**808**	**1,013**	**7,417**
Changes in consolidated group	11		17	28
Additions	717		233	950
Disposals	–171		–293	–464
Exchange-rate differences	5	–1	1	5
Assets held for sale				
Amortization 12/31/2022	**6,158**	**807**	**971**	**7,936**
Carrying amounts 12/31/2022	**3,526**	**5,952**	**776**	**10,254**

Amortization of internally generated and acquired intangible assets is recognized in functional costs.

The amortization charge for the reporting year contains the following impairment losses:

- Acquired intangible assets (without goodwill): EUR 1 million (previous year: EUR 1 million),
- Internally generated intangible assets: EUR 12 million (previous year: EUR 1 million).

The impairment losses recognized on internally generated intangible assets relate to capitalized development projects and are attributable to the Mobility Solutions business sector and the Energy and Building Technology business sector. They are recognized in research and development cost. The impairment losses were charged because an economic benefit was no longer expected.

Goodwill from business combinations represents the difference between the purchase price on the one hand and the proportionate share of equity at acquisition-date fair value on the other. Goodwill is allocated to the divisions (cash-generating units) and tested annually for impairment. In accordance with the requirements of IAS 36, an impairment loss is recorded when the recoverable amount is below the carrying amount of the net assets of a cash-generating unit (including the goodwill allocated to it). An asset's recoverable amount is the higher of its fair value less costs of disposal and its value in use. As of the reporting year, the recoverable amount for all cash-generating units is determined based on fair value less costs to sell, which is derived from the future cash flows. Fair value is largely determined by the present value of the perpetual annuity, which in turn is influenced above all by the applicable discount rate and the growth rate assumed. This is based on a risk-free interest rate, a market-risk premium, as well as business sector-specific beta factors and leverage ratios. Fair value less costs to sell is assigned to level 3 of the fair value hierarchy in accordance with IFRS 13. The cash flows are determined by reference to business plans with a planning period of five years and based on the medium-term planning approved by management. Planning reflects expectations concerning future market shares, growth in the respective markets, and the profitability of products and services. It is based on past experience and the group's internal assessments as well as market studies, if available. This is used to derive the factors relevant for determining future cash flows, such as EBIT, change in net working capital, and planned capital expenditure. Cash flows after the detailed planning period are determined by reference to an expected long-term growth rate.

The parameters used in impairment testing are presented in the following table:

percentage figures **T42**

	Mobility Solutions		Industrial Technology		Consumer Goods		Energy and Building Technology	
	2022	2021	**2022**	2021	**2022**	2021	**2022**	2021
Growth rate	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
After-tax discount rate	10.2	9.0	10.0	8.8	9.2	7.9	9.2	7.6

As of the reporting year, the recoverable amount has to be determined based on fair value less costs to sell. For this reason, after-tax discount rates are disclosed. The previous-year figures have been restated accordingly.

A risk-free interest rate of 2.0 percent (previous year: 0.3 percent) and a market-risk premium of 6.5 percent (previous year: 7.0 percent) are assumed. The standard tax rate used is 30 percent (previous year: 29 percent).

In the reporting year, the annual impairment test did not result in any need to recognize an impairment loss on goodwill (previous year: impairment loss of EUR 108 million). The impairment loss in the previous year was attributable in full to the Automotive Steering division (Mobility Solutions business sector). The impairment loss was recognized on account of delays achieving the restructuring gains due to a tense competitive situation combined with additional price pressure, as well as the cost-intensive introduction of innovative technologies required at the same time as part of portfolio expansions.

The sensitivity analysis of the cash-generating units to which goodwill is allocated considered the following assumed changes: an increase in the after-tax discount rate of 1.0 percentage points, a reduction in the growth rate of 0.5 percentage points, or a reduction in EBIT of 5 percent. For the goodwill allocated to the Cross-Domain Computing Solutions division (Mobility Solutions business sector), an increase in the discount rate would have resulted in an impairment loss of EUR 123 million and a decrease in EBIT in an impairment loss of EUR 119 million.

Goodwill of EUR 5,952 million (previous year: EUR 5,026 million) is attributable to the divisions (cash-generating units) as follows:

in millions of euros **T43**

Division	Reportable segment	2022	2021
Powertrain Solutions	Mobility Solutions	400	400
Automotive Aftermarket	Mobility Solutions	371	350
Cross-Domain Computing Solutions	Mobility Solutions	123	
Drive and Control Technology	Industrial Technology	2,074	1,550
Power Tools	Consumer Goods	428	415
BSH Hausgeräte GmbH	Consumer Goods	548	548
Building Technologies	Energy and Building Technology	673	698
Thermotechnology	Energy and Building Technology	997	1,000
Bosch Global Service Solutions	Energy and Building Technology	137	9
Other		201	56
		5,952	**5,026**

The changes in goodwill are attributable to business combinations and currency effects. Further information about entities acquired is contained in the section on business combinations in note 6 “Consolidation.”

22. Trade payables

in millions of euros T44

	2022	2021
Trade payables	10,729	9,927
Notes payable	32	21
	10,761	**9,948**

The Bosch Group has concluded reverse factoring agreements for a share of the trade payables amounting to EUR 522 million (previous year: EUR 521 million). Under these programs, suppliers can assign their receivables from Bosch Group companies to the commercial bank offering the program in return for a discount and thus receive the discounted invoice amount early. The companies of the Bosch Group settle the invoice amount with the bank on the originally agreed due date. Due to the connection with the operating business, it was decided not to reclassify the corresponding liabilities to financial liabilities.

As in the previous year, in the reporting year there were no trade payables due in more than one year.

Further disclosures on trade payables are contained in the liquidity-risk section of note 31 “Capital and risk management.”

23. Other current and non-current financial liabilities

in millions of euros **T45**

	2022		2021	
	up to 1 year	**more than 1 year**	up to 1 year	more than 1 year
Bonds		1,992	21	1,990
Promissory loans, registered notes	500	3,198	25	2,200
Liabilities to banks	328	75	227	8
Commercial papers	328		132	
Loans	102	49	72	40
Derivatives	182	6	230	9
Sundry other financial liabilities	770	137	663	148
	2,210	**5,457**	**1,370**	**4,395**

Sundry other financial liabilities also include financial liabilities to members of the workforce.

Further disclosures on other financial liabilities are contained in the liquidity risk section of note 31 “Capital and risk management.”

24. Contract liabilities

In accordance with IFRS 15, performance obligations to customers at contract level are presented as contract liabilities. Contract liabilities break down as follows:

in millions of euros T46

	2022		2021	
	up to 1 year	more than 1 year	up to 1 year	more than 1 year
From revenue recognition over time	35	53	23	0
From development work	1,050	419	764	334
From other items	559	334	572	280
	1,644	**806**	**1,359**	**614**

Contract liabilities from development work include advance payments from customers for separately contracted research and development work. Contract liabilities from other items mainly include advance payments from customers for deliveries of goods and other outstanding performance obligations.

25. Other liabilities, other provisions, and contingent liabilities

Other liabilities

in millions of euros **T 47**

	2022		2021	
	up to 1 year	more than 1 year	up to 1 year	more than 1 year
Accruals in the personnel area	3,190		2,919	
Accruals in the sales and marketing area	2,809		2,532	
Other accruals	1,244		1,112	
Tax liabilities (without income taxes)	824		819	
Deferred income	73	17	81	8
Sundry other liabilities	366	28	339	23
	8,506	**45**	**7,802**	**31**

The accruals in the personnel area mainly relate to vacation and salary entitlements as well as accrued special payments, while those in the sales and marketing area mainly pertain to bonus and commission payments.

Other provisions

Pursuant to IAS 37 *Provisions, Contingent Liabilities, and Contingent Assets*, other provisions are recognized if there is a current obligation from a past event which will probably lead to an outflow of resources embodying economic benefits in the future. In addition, it must be possible to reliably estimate the amount of this outflow. Other provisions are measured at full cost. Provisions due in more than one year are stated at their discounted settlement amount if the effect is material. Discounting is based on a current pre-tax market interest rate with matching maturities. Individual provisions in the personnel area are recognized and measured in accordance with IAS 19 *Employee Benefits*.

A breakdown of other provisions is presented in the following table:

in millions of euros **T48**

	2022		2021	
	up to 1 year	**more than 1 year**	up to 1 year	more than 1 year
Tax provisions (without income taxes)	31	22	30	16
Provisions in the personnel area	1,008	2,720	1,243	3,239
Provisions in the sales and marketing area	2,178	1,452	2,416	1,710
Sundry other provisions	1,633	2,122	2,832	1,091
	4,850	**6,316**	**6,521**	**6,056**

Provisions in the personnel area relate to obligations from personnel adjustment measures, long-service bonuses, early phased retirement, and from other special benefits. Provisions in the sales and marketing area mainly take account of losses from delivery and warranty obligations, including risks from recall, exchange, and product liability cases.

Sundry other provisions are recognized, among other things, for risks from purchase commitments, environmental protection obligations, litigation risks, and legal risks.

Other provisions developed as follows:

in millions of euros **T49**

	1/1/2022	**Changes in consolidated group**	**Amounts used**	**Amounts reversed**	**Amounts added**	**Other changes**	**12/31/2022**
Tax provisions (without income taxes)	46		−16	−3	24	2	53
Provisions in the personnel area	4,482	−19	−959	−280	485	19	3,728
Provisions in the sales and marketing area	3,892	−12	−1,287	−616	1,649	4	3,630
Sundry other provisions	3,923		−639	−347	794	24	3,755
	12,343	**−31**	**−2,901**	**−1,246**	**2,952**	**49**	**11,166**

Of the increase in provisions, an amount of EUR 21 million (previous year: EUR 11 million) relates to the reversal of discount. This was offset by interest-rate changes of approximately EUR 613 million.

The balance of provisions in the sales and marketing area was reduced by EUR 234 million through other comprehensive income as of January 1, 2022, applying the amendment to IAS 37.

Other changes include effects from currency translation and reclassification to liabilities directly associated with assets held for sale.

With respect to emissions from diesel vehicles, various automakers are being investigated by German and non-German authorities. In some cases, these authorities are also investigating Bosch in its capacity as a supplier of engine control units. To our knowledge, no new investigative proceedings were instituted against Bosch in 2022. Regarding various automakers' diesel vehicle emissions, Bosch also remains a defendant in a number of class and individual civil-law actions around the world. Among other things, in the United States, in a civil action brought by the California attorney-general, Bosch was able to reach a settlement of USD 25 million in 2022. In doing so, Bosch neither acknowledges the validity of the claims brought forward, nor does it concede any liability.

Although these pending actions, as well as possible further actions, pose risks, we do not believe that these risks have grown in severity. In all these proceedings, Bosch is asserting its rights.

Bosch is also engaged in compensation discussions with customers in respect of potential civil-law claims associated with closed antitrust proceedings. Investigations by the antitrust authorities into the automotive supplier business, also against Bosch, are continuing in certain countries. In addition, the French antitrust authority has completed its investigations of BSH Hausgeräte in France for a possible violation of antitrust law and has notified BSH France of the allegations made as part of the ongoing proceedings.

On the basis of the facts relating to antitrust law and engine control units that were available when the consolidated financial statements were prepared and that the board of management has assessed, the board of management believes that sufficient precautions have been taken in the form of provisions for legal risks. For the various legal risks outlined above, provisions throughout the group amount to EUR 505 million (previous year: EUR 606 million).

The increased demand from the automotive industry and the high demand for semiconductors from the consumer electronics, IT, and communications sectors caused bottlenecks in the global supply of semiconductors, which were exacerbated by disruptions of production at certain semiconductor manufacturers. The commercial risk expected from the global supply bottlenecks in the semiconductor industry was assessed taking into account the necessary assumptions and estimates and was reflected in the consolidated financial statements. In accordance with IAS 37.92, no further disclosures are made.

Contingent liabilities

No provisions were recognized for the following contingent liabilities, as it is more likely than not that they will not occur:

in millions of euros **T50**

	2022	2021
Contingent liabilities related to notes issued and transferred		12
Contingent liabilities from guarantees	130	50
Other contingent liabilities	11	13
	141	**75**

26. Pension provisions and similar obligations

Pursuant to IAS 19 *Employee Benefits*, pension provisions are recognized using the projected unit credit method, taking estimated future increases in pensions and salaries into account, among other things. The expense from unwinding the discount on pension provisions is reported in the financial result under interest expenses.

The workforce of the companies included in the consolidated financial statements have certain rights in connection with the company pension scheme, depending on the conditions existing in the various countries. The benefit obligations include both currently claimed benefits and future benefit obligations of active associates or associates that have left the company.

The group's post-employment benefits include both defined contribution plans and defined benefit plans. In the case of defined contribution plans, the company pays contributions to state or private pension or insurance funds, either based on legal or contractual provisions or on a voluntary basis. The payment of these contributions does not give rise to any further payment obligations for the company. The defined benefit plans are funded or unfunded pension systems, as well as systems financed by insurance premiums.

Plan assets are invested based on the underlying defined benefits granted. Asset-liability studies are performed regularly for this purpose. The funding status is an important controlling variable in this context. Bosch continuously monitors it with the involvement of external experts. The investment strategy is derived from the corresponding governance guidelines. External asset managers are tasked with investing the assets.

The major defined benefit plans and post-employment medical-care plans operated by the Bosch Group are described below. These plans are subject to actuarial risks such as longevity risks, interest fluctuation risks, and capital market risks.

Germany

The company pension scheme ("*Bosch bAV Plan*"), introduced on January 1, 2006, is a defined contribution plan with salary-based contributions for accumulating retirement benefits. The *Bosch bAV Plan* is partly funded via an external pension fund, Bosch Pensionsfonds AG. The value of the assets of the external pension fund is offset against the pension obligation calculated using the projected unit credit method.

During the vesting period, employer and employee contributions are added to the assets of Bosch Pensionsfonds AG up to the tax-allowed ceiling in accordance with Sec. 3 No. 63 EStG [*Einkommensteuergesetz*: German Income Tax Act]. Contributions that exceed the tax-allowed ceiling are allocated to the unfunded obligation. Irrespective of whether contributions are allocated to Bosch Pensionsfonds AG or to direct commitments, the amount of the total entitlement develops in line with the performance of the Bosch pension fund. Entitlements to retirement benefits from commitments predating the introduction of the *Bosch bAV Plan* were transferred to the *Bosch bAV Plan*. For a constantly decreasing number of associates in the vesting period, a transitional arrangement guarantees a fixed rate of return on the defined benefit obligation.

On reaching retirement, or in the event of death, the earned benefits are paid out in the form of a lump-sum payment, in installments, or as a lifelong annuity, depending on the beneficiary's choice. For benefits triggered from January 1, 2016, onward, a fund-based retirement pension payment is made through Bosch Pensionsfonds AG. Owing to the low likelihood of claims being made against Bosch, the *Bosch bAV Plan* is treated as a defined contribution plan from the beginning of the pension phase.

Japan

The majority of the pension obligations are corporate pension plans (CPPs) in the form of funded career average pension plans. The benefits are based on salary-dependent contributions that are subject to interest. The rate of return depends on the structure of the pension plan.

There are also pension obligations from unfunded retirement allowance plans, the benefits of which are based on years of service and final salary.

All benefits are paid out as lump-sum payments on termination, death, or reaching retirement age. In some CPPs, associates can draw pension payments after a certain period of service.

Switzerland

Bosch has a funded pension plan. The Bosch pension plan is organized as a foundation. All the demographic and financial risks are borne by the foundation and regularly assessed by the foundation's board of trustees. In the case of a deficit, adjustments can be made such as a change in the pension factors or an increase in future contributions.

Pension plans are governed by the BVG [*Bundesgesetz über die berufliche Alters-, Hinterlassenen- und Invalidenvorsorge*: Swiss Pension Fund Law]. All benefits are defined by law, and the BVG stipulates the minimum benefits to be paid. The Bosch pension plan meets all legal requirements.

Both employer and employees make contributions to the Bosch pension plan. The benefits are paid out either as a lump sum or a lifelong annuity.

United Kingdom

Bosch finances a closed final-salary-based defined benefit plan. The pension obligation is funded via a trust association which is legally independent of Bosch, and which is operated in accordance with the law. The trustees are required to comply with the legal requirements. The pension plan has a deficit that is being closed through a restructuring plan.

The benefits earned are paid out on reaching retirement age, or in the event of occupational disability or death.

United States

Bosch maintains the Bosch pension plan and additional smaller pension plans, all of which are funded and in line with the ERISA requirements. The legal minimum funding requirements therefore apply to these pension plans. The Bosch pension plan is a cash balance plan in which the benefits depend on age, years of service, and salary. The pension benefits are paid out on reaching retirement age or in the event of death. The Bosch pension plan does not accept new members.

Likewise closed for new members, unfunded pension plans provide benefits for certain members of management or for members of the Bosch pension plan whose income lies above the statutory contribution assessment basis. The benefits depend on age, years of service, and salary, and are paid out on reaching retirement age or in the event of death.

In addition, Bosch finances unfunded plans for post-employment medical care. Several plans are already closed. The level of benefits and the contributions for pensioners vary depending on location, age, and years of service. The benefits include healthcare benefits and life assurance contributions for pensioners and their spouses.

Actuarial calculations and estimates are made for all defined benefit plans. Besides assumptions about life expectancy, and taking index-linked developments into account, the calculations are based on the following parameters, which vary from one country to another depending on local economic circumstances:

percentage figures **T51**

	Germany		Japan		Switzerland		U.K.		U.S.		Total	
	2022	2021	2022	2021	2022	2021	2022	2021	2022	2021	2022	2021
Discount factor	4.1	1.0	1.1	0.5	2.1	0.3	4.8	2.0	4.9	2.7	4.2	1.3
Projected salaries	3.0	3.0	2.9	2.9	1.9	1.6	3.1	3.2	3.5	3.5	3.1	3.0
Projected pensions	2.6	1.5	n.a.	n.a.	0.0	0.0	2.9	2.9	n.a.	n.a.	2.4	1.4

n.a. not applicable

To determine the discount factor in the euro zone, reference was made to corporate bonds rated AA by at least one leading rating agency as of the reporting date.

Projected salaries are future salary increases estimated on the basis of the economic situation and inflation, among other factors.

The pension trend for inflation-linked pension payments is based on the development of country-specific, recognized indices.

The pension plans are measured using the current mortality tables as of December 31 of the fiscal year concerned. As of December 31, 2022, the following mortality tables are used:

T52

Germany	Heubeck 2018G mortality tables
Japan	2020 MHLW Standard Table
Switzerland	BVG 2020 with CMI_2016 improvement factors, LTR of 1.5 percent
United Kingdom	116 percent for males, 108 percent for females of S3PXA tables with 2019 CMI projections and 1.5 percent long-term improvement
United States	Pri-2012, projected by MP2021; aggregate for some plans, collar adjustments for others

As of December 31, 2021, the following mortality tables were used in the key countries:

T53

Germany	Heubeck 2018G mortality tables
Japan	2020 MHLW Standard Table
Switzerland	BVG 2020 with CMI_2016 improvement factors, long-term improvement of 1.5 percent
United Kingdom	116 percent for males, 108 percent for females of S3PXA tables with 2019 CMI projections and 1.5 percent long-term improvement
United States	Pri-2012, projected by MP2021; aggregate for some plans, collar adjustments for others

For the key regions, the present value of the defined benefit obligation can be reconciled to the provision as follows:

in millions of euros **T54**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
12/31/2022					
Germany	13,579	−4,825			8,754
Japan	188	−247	4	83	28
Switzerland	810	−1,002	26	168	2
United Kingdom	222	−272	50		0
United States	1,551	−1,443	85	−1	192
Other	631	−237	12	2	408
	16,981	**−8,026**	**177**	**252**	**9,384**
12/31/2021					
Germany	16,094	−5,077			11,017
Japan	216	−298	9	104	31
Switzerland	915	−1,039	56	69	1
United Kingdom	353	−401	48		0
United States	1,869	−1,819	169		219
Other	642	−259	12		395
	20,089	**−8,893**	**294**	**173**	**11,663**

The development of the net liability of the defined benefit obligation is presented in the following table:

in millions of euros **T55**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
1/1/2022	**20,089**	**−8,893**	**294**	**173**	**11,663**
Pension cost charged to profit or loss					
Current service cost	678				678
Past service cost	0				0
Gains/losses from plan settlements not related to past service cost	−1				−1
Net interest income/expense	252	−128		1	125
Other	0	5			5
	929	**−123**		**1**	**807**
Remeasurement					
Return on plan assets (excluding amounts included in net interest)		1,255			1,255
Gains/losses arising from changes in demographic assumptions	3				3
Gains/losses arising from changes in financial assumptions	−3,350				−3,350
Experience gains/losses	−66				−66
Other adjustments				80	80
	−3,413	**1,255**		**80**	**−2,078**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 162

in millions of euros **T55**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
Contributions					
Employer		−421			−421
Beneficiaries	16	−16			
	16	**−437**			**−421**
Benefits paid[1]	−830	326			−504
Special events (plan settlement)	0	0			0
Transfers	40	−10			30
Currency translation	119	−129		−2	−12
Changes in consolidated group	31	−15			16
Changes in other assets			−117		−117
12/31/2022	**16,981**	**−8,026**	**177**	**252**	**9,384**

1. Including EUR 69 million for transfer payments to Bosch Pensionsfonds at the beginning of the pension phase for payment of a fund-based retirement pension.

in millions of euros **T56**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
1/1/2021	**20,562**	**–7,916**	**78**	**87**	**12,811**
Pension cost charged to profit or loss					
Current service cost	561				561
Past service cost	2				2
Gains/losses from plan settlements not related to past service cost	–6				–6
Net interest income/expense	157	–80		0	77
Other	1	5			6
	715	**–75**		**0**	**640**
Remeasurement					
Return on plan assets (excluding amounts included in net interest)		–572			–572
Gains/losses arising from changes in demographic assumptions	–261				–261
Gains/losses arising from changes in financial assumptions	–886				–886
Experience gains/losses	684				684
Other adjustments		0		86	86
	–463	**–572**		**86**	**–949**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 164

in millions of euros **T56**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
Contributions					
Employer		–446			–446
Beneficiaries	14	–14			
	14	**–460**			**–446**
Benefits paid[1]	–802	301			–501
Special events (plan settlement)	–1	1			
Transfers					
Currency translation	173	–207		0	–34
Changes in consolidated group	–2	2			
Changes in other assets			216		216
Disposal groups	–107	33			–74
12/31/2021	**20,089**	**–8,893**	**294**	**173**	**11,663**

1. Including EUR 82 million for transfer payments to Bosch Pensionsfonds at the beginning of the pension phase for payment of a fund-based retirement pension.

The plan assets comprise the following components:

percentage figures **T 57**

	Germany		Japan		Switzerland		U.K.		U.S.	
	2022	2021	**2022**	2021	**2022**	2021	**2022**	2021	**2022**	2021
Cash and cash equivalents	**4**	3	**0**	2	**3**	3	**1**			1
Equity instruments	**52**	50	**29**	28	**26**	30	**24**	40	**10**	10
of which Europe	62	57	10	10	42	43	27	34	14	12
of which North America	18	22	38	41	36	35	59	46	68	73
of which Asia Pacific	11	12	52	49	5	6	14	16	9	7
of which emerging markets	8	8			13	13		4	9	8
of which other	1	1			4	3				
Debt instruments	**41**	44	**66**	66	**29**	30	**72**	57	**90**	89
of which government bonds	35	34	75	72	21	21	94	44	42	39
of which corporate bonds	64	63	22	24	55	56	6	56	56	56
of which other debt instruments	1	3	3	4	24	23			2	5
Property	**3**	3			**37**	33				
of which owner-occupied	97	76								
of which non-owner-occupied	3	24			100	100				
Insurance			**5**	4			**3**	3		
Other					**5**	4				

Quoted prices in an active market are available for equity instruments. For the other classes of assets, there are in most cases no quoted prices in an active market. The “other” line item mainly contains investments in infrastructure facilities.

Duration and estimated maturities of the pension obligation

The weighted duration of the pension obligation as of December 31, 2022, is 10.6 years (previous year: 13.0 years).

Estimated maturities of the undiscounted estimated pension payments

in millions of euros T58

	2022	2021
Less than one year	874	892
Between one and two years	929	911
Between two and three years	998	1,031
	2,801	**2,834**

The estimated contributions to plan assets in fiscal year 2023 amount to EUR 439 million (previous year: EUR 436 million).

The estimated benefits to be paid directly in fiscal year 2023 amount to EUR 539 million (previous year: EUR 561 million).

Sensitivity of the defined benefit obligation in relation to actuarial parameters

percentage figures T59

	Germany		Japan		Switzerland		U.K.		U.S.	
	2022	2021	2022	2021	2022	2021	2022	2021	2022	2021
Discount factor										
Increase of 0.25 percentage points	−1.2	−2.0	−1.9	−2.0	−2.5	−3.1	−3.2	−3.7	−2.5	−3.0
Decrease of 0.25 percentage points	1.3	2.1	1.9	2.1	2.7	3.3	3.3	4.2	2.6	3.1
Projected salaries										
Increase of 0.25 percentage points	n.a.	n.a.	0.8	0.8	0.2	0.2	0.2	0.4	0.0	0.0
Decrease of 0.25 percentage points	n.a.	n.a.	−0.7	−0.8	−0.2	−0.2	−0.2	−0.4	0.0	0.0
Projected pensions										
Increase of 0.25 percentage points	0.6	0.6	n.a.	n.a.	2.6	2.5	1.9	1.7	n.a.	n.a.
Decrease of 0.25 percentage points	−0.6	−0.6	n.a.	n.a.	−2.5	−2.4	−1.7	−1.7	n.a.	n.a.
Life expectancy										
Increase by one year	1.9	2.2	n.a.	n.a.	3.1	3.0	4.9	3.6	3.1	2.6

n.a. not applicable

The sensitivity analyses of the defined benefit obligation for the main actuarial assumptions are based on the same methods as those used for the post-employment benefit obligations presented in the consolidated statement of financial position (projected unit credit method). In each case, one assumption was changed and the other assumptions left unchanged. This means that possible correlation effects were not considered.

Defined contribution plans

Defined contribution plans mainly include employee contributions to statutory pension schemes and company contributions for defined contribution plans of the company. Expenses for defined contribution plans amounted to EUR 1,642 million (previous year: EUR 1,576 million).

27. Equity

The issued capital of EUR 1,200 million and capital reserve of EUR 4,557 million correspond with the items of the statement of financial position disclosed by Robert Bosch GmbH. The issued capital is divided between the shareholders as follows:

Shareholders of Robert Bosch GmbH

percentage figures **T60**

	Shareholding	Voting rights
Robert Bosch Stiftung GmbH	93.99	
Robert Bosch Industrietreuhand KG	0.01	93.17
ERBO II GmbH	5.36	
Bosch family	0.00	6.83
Robert Bosch GmbH (treasury stock)	0.64	

Retained earnings contain undistributed profits generated in the past by the entities included in the consolidated financial statements, as well as accumulated other comprehensive income. The amount recognized outside profit or loss in the reporting year under financial instruments reduces the revaluation reserve from equity instruments by EUR 987 million (previous year: increase of EUR 607 million) and the revaluation reserve from debt instruments by EUR 483 million (previous year: EUR 216 million). As in the previous year, the other changes reported in the consolidated statement of changes in equity in the reporting year mainly comprise effects from the disposal of equity instruments.

Retained earnings also include treasury stock of EUR 62 million (previous year: EUR 62 million).

The board of management proposes to distribute a dividend of EUR 162 million.

Non-controlling interests

The non-controlling interests in the equity of the consolidated subsidiaries mainly comprise the non-controlling interests in United Automotive Electronic Systems Co., Ltd., Shanghai, Bosch Powertrain Systems Co., Ltd., Wuxi, Bosch HUAYU Steering Systems Group, Shanghai, all China, and Bosch Ltd., Bengaluru, India.

Other notes

28. Statement of cash flows

The statement of cash flows presents cash inflows and outflows from operating activities, investing activities, and financing activities.

Cash flows are derived indirectly, starting from EBIT. EBIT is earnings before tax and before the financial result (interest). Cash flows from operating activities are adjusted for non-cash expenses and income (mainly depreciation and amortization of non-current assets) and take into account changes in working capital as well as cash-effective financial expenses, financial income, and taxes.

Investing activities mainly comprise additions to non-current assets including leased products, the acquisition and disposal of subsidiaries, and changes in securities and time deposits with a term to maturity of more than 90 days.

Financing activities combine the cash inflows and outflows from borrowing and repayment of financial liabilities, from the repayment of lease liabilities, and from dividends.

Changes in items of the statement of financial position contained in the statement of cash flows cannot be directly derived from the statement of financial position, as they have been adjusted for exchange-rate effects and changes in the consolidated group.

Interest and dividends received contains interest received of EUR 464 million (previous year: EUR 411 million) and income received from equity investments of EUR 43 million (previous year: EUR 41 million).

The liquidity reported in the statement of cash flows includes cash and cash equivalents of EUR 6,459 million (previous year: EUR 6,196 million). In the reporting year, cash and cash equivalents of EUR 201 million (previous year: EUR 26 million) were subject to restrictions, including EUR 185 million in Russia and in Ukraine as a result of restrictions on capital movements in the two countries.

Changes in liabilities from financing activities during the reporting year and the previous year are presented in the following table:

in millions of euros **T 61**

		Cash-effective changes		Non-cash changes			
	1/1/2022	**Borrowing**	**Repayment**	**Changes in consolidated group**	**Exchange rate-related changes**	**Other changes**	**12/31/2022**
Bonds	2,011		–21			2	1,992
Promissory loans, registered notes	2,225	1,497	–25			1	3,698
Other financial liabilities	367	545	–194		10	4	732
Lease liabilities	2,066		–590	–5	–3	699	2,167
	6,669	**2,042**	**–830**	**–5**	**7**	**706**	**8,589**

in millions of euros **T 62**

		Cash-effective changes		Non-cash changes			
	1/1/2021	**Borrowing**	**Repayment**	**Changes in consolidated group**	**Exchange rate-related changes**	**Other changes**	**12/31/2021**
Bonds	2,506		–500			5	2,011
Promissory loans, registered notes	3,495		–1,272			2	2,225
Other financial liabilities	271	232	–130			–6	367
Lease liabilities	2,032		–560		36	558	2,066
	8,304	**232**	**–2,462**		**36**	**559**	**6,669**

The other changes in lease liabilities mainly comprise the effects of new or amended lease agreements.

29. Segment reporting

Disclosures on business sectors

in millions of euros T63

	Mobility Solutions		Industrial Technology		Consumer Goods	
	2022	2021	2022	2021	2022	2021
External sales	52,477	45,319	6,944	6,099	21,342	21,022
Intersegment sales	193	2	664	270	507	197
Total sales	**52,670**	**45,321**	**7,608**	**6,369**	**21,849**	**21,219**
EBIT from operations	1,813	317	686	513	970	2,136
of which: result from entities included at equity	–1	–2				
Non-cash expenses (without depreciation and amortization)	2,506	4,074	255	331	710	757
Amortization and depreciation of intangible assets, right-of-use assets, and property, plant, and equipment[1]	3,411	3,339	224	214	995	934
Impairment losses on intangible assets, right-of-use assets, and property, plant, and equipment	18	179			70	32
Non-cash income	988	872	104	102	151	138
Additions to property, plant, and equipment	3,270	2,900	316	198	845	656
Net working capital	15,125	12,412	2,522	2,128	6,310	5,511

1. After offsetting write-ups of EUR 2 million (previous year: EUR 4 million).

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 171

in millions of euros **T63**

	Energy and Building Technology		Other		Consolidation		Group	
	2022	2021	**2022**	2021	**2022**	2021	**2022**	2021
External sales	6,952	5,934	353	374			88,068	78,748
Intersegment sales	440	30	153	2	–1,957	–501		
Total sales	**7,392**	**5,964**	**506**	**376**	**–1,957**	**–501**	**88,068**	**78,748**
EBIT from operations	422	305	–69	–118			3,822	3,153
of which: result from entities included at equity							–1	–2
Non-cash expenses (without depreciation and amortization)	278	393	50	94			3,799	5,649
Amortization and depreciation of intangible assets, right-of-use assets, and property, plant, and equipment[1]	229	207	78	78			4,937	4,772
Impairment losses on intangible assets, right-of-use assets, and property, plant, and equipment	8						96	211
Non-cash income	87	114	36	16			1,366	1,242
Additions to property, plant, and equipment	123	85	342	110			4,896	3,949
Net working capital	1,502	1,193	–152	–102			25,307	21,142

1. After offsetting write-ups of EUR 2 million (previous year: EUR 4 million).

Based on the internal management and reporting structure, the Bosch Group is divided into four business sectors. These are the reportable segments and result from the combination of divisions in accordance with the criteria set forth in IFRS 8 *Operating Segments*. Business operations within the business sectors are the responsibility of the divisions.

The Mobility Solutions business sector mainly comprises the following areas of business: powertrain products and solutions, systems for active and passive driving safety, assistance and convenience functions, technology for user-friendly infotainment as well as vehicle-to-vehicle and vehicle-to-infrastructure communication, concepts, technology, and services for the automotive aftermarket, steering systems for passenger cars and commercial vehicles, connected mobility services, and a wide-ranging portfolio for e-bikes.

The Industrial Technology business sector combines the following activities:
- Automation technology (technologies for drives, controls, and motion)
- Industry 4.0 software activities and projects

The operations of the Consumer Goods business sector comprise the production and distribution of
- Power tools (tools for professionals, industry, and DIY, accessories, garden tools, as well as industrial tools and measuring equipment)
- Household appliances (appliances for cooking, washing-up, laundry, drying, cooling, freezing, floor care, etc.)

The Energy and Building Technology business sector comprises the following activities:
- Security systems (video surveillance, public address systems, evacuation systems, and access control)
- Services to increase energy-efficiency in non-residential buildings
- Thermotechnology (heating and hot-water boilers including open- and closed-loop control systems)
- Service solutions (business solutions for internal and external customers, shared services for the Bosch Group)

Operating segments which are not reportable are combined and presented in the category “Other.” This mainly relates to financial, holding, and other service companies, operations that are not allocated to a corporate sector, and the remaining operations in the photovoltaics area.

The divisions allocated to a business sector are aggregated into a single reportable segment, as they have similar economic characteristics. Above all, the economic performance of all the divisions aggregated in one segment depends to a similar extent on the same core markets (automotive production, capital goods, consumer goods, and energy and building technology).

Line items allocable to financing activities are not included in segment reporting as they are not part of the reported earnings.

The main controlling variables reported to the board of management are sales revenue growth, EBIT from operations as a percentage of sales revenue (EBIT adjusted for negative effects on earnings from purchase price allocations in the fiscal year 2015), and net working capital as a percentage of sales revenue as an indicator of the capital that is generally tied up in the short term. Net working capital is an average of inventories, trade receivables and contract assets, in each case before valuation allowances, plus capitalized deferred consideration to customers, less trade payables and contract liabilities.

Transfer prices between the operating segments are determined at arm's length.

The main items included in non-cash expenses are bad debt allowances, additions to provisions, as well as losses on the disposal of items of property, plant, and equipment, and of intangible assets.

The main items included in non-cash income are income from the reversal of provisions.

Reconciliation statements

in millions of euros **T64**

	2022	2021
Sales		
Sales of reportable segments	89,519	78,873
Sales of "Other"	506	376
Consolidation	−1,957	−501
Differences in the consolidated group	133	
Group sales	**88,201**	**78,748**
Result		
EBIT from operations of reportable segments	3,891	3,271
EBIT from operations of "Other"	−69	−118
Adjustments from purchase price allocations	−342	−338
Differences in the consolidated group	−6	
Financial income	3,829	2,728
Financial expenses	−4,390	−2,244
Profit before tax	**2,913**	**3,299**
Net working capital		
Net working capital of reportable segments	25,459	21,244
Net working capital of "Other"	−152	−102
Reconciliation of average values to carrying amounts as of 12/31	−976	−1,294
Valuation allowances on segment assets	−2,313	−2,132
Group net working capital	**22,018**	**17,716**

Disclosures by key countries

in millions of euros T65

	Sales by registered office of the customer		Non-current assets[1]	
	2022	2021	**2022**	2021
Europe	**44,334**	**41,337**	**22,590**	**21,003**
of which Germany	17,589	15,714	13,596	13,168
of which United Kingdom	3,563	3,444	719	532
of which France	3,050	2,965	409	419
of which Italy	2,596	2,406	566	564
Americas	**16,167**	**12,863**	**4,179**	**3,855**
of which United States	12,077	9,609	3,501	3,318
Asia	**26,369**	**23,326**	**8,388**	**7,543**
of which China	17,580	16,031	5,476	5,448
of which Japan	2,461	2,271	466	511
Other regions	**1,331**	**1,222**	**179**	**153**
Group	**88,201**	**78,748**	**35,336**	**32,554**

1. Non-current assets consist of intangible assets, right-of-use assets, and property, plant, and equipment.

The customer structure of the Bosch Group in the reporting year and in the previous year does not reveal any concentration on individual customers.

30. Additional disclosures on financial instruments

In accordance with IAS 32 *Financial Instruments: Presentation*, a financial instrument is any contract that gives rise to a financial asset of one entity and to a financial liability or equity instrument of another entity.

Financial assets and financial liabilities are recognized in the statement of financial position when the Bosch Group becomes party to the contractual provisions of the financial instrument. For regular way purchases or sales, however, the settlement date is the relevant date for initial recognition and for derecognition from the statement of financial position. On initial recognition, financial assets and financial liabilities are measured at fair value and classified in accordance with IFRS 9 *Financial Instruments*. Unless subsequent measurement is at fair value through profit or loss, directly attributable transaction costs are taken into account on initial recognition. The fair-value option pursuant to IFRS 9 is not exercised. Hedge accounting is not used in the Bosch Group.

On initial recognition, financial assets are classified either as at amortized cost (AC), at fair value through profit or loss (FVPL), or at fair value through other comprehensive income (FVOCI). The classification depends on the business model underlying the financial assets as well as the contractual cash flow characteristics of the asset. Classification is determined by

- whether the financial asset is held within a business model whose objective is to hold financial assets in order to collect contractual cash flows ("hold" business model), whether the objective is achieved by both collecting contractual cash flows and selling financial assets ("hold and sell" business model), or solely by selling financial assets ("sell" business model), and
- whether the contractual cash flows are "solely payments of principal and interest" (SPPI).

The business model is determined on the basis of the Bosch Group's corporate management. For this purpose, the financial instruments are grouped together by their underlying business model. The contractual cash flow characteristics are reviewed at the level of the individual financial instrument.

Financial assets whose cash flows are solely payments of principal and interest on the principal amount outstanding and held within the "hold" business model are measured at amortized cost (AC). These are trade receivables, cash and cash equivalents, bank balances, loan receivables, and sundry other financial assets. These assets are subsequently measured using the effective interest method; impairment gains and losses, or gains or losses from the derecognition of assets, are recognized in profit or loss.

If the group also intends to collect cash flows from selling financial assets ("hold and sell" business model), the financial assets are measured at fair value through other comprehensive income (with recycling, FVOCI wR). Gains and losses are recorded in other comprehensive income in this case. Cumulative changes in fair value are reclassified to profit or loss when the instruments are sold. Impairment losses are likewise reclassified from other comprehensive income to profit or loss. Interest income is recognized in profit or loss using the effective interest method. Most of the Bosch Group's interest-bearing securities are measured in this category.

Financial assets that do not satisfy the cash flow criterion owing to there not being solely payments of principal and interest on the principal amount outstanding are measured at fair value through profit or loss (FVPL). Changes in fair value and income from these assets are recognized immediately in profit or loss. This category mainly comprises interests in partnerships, shares in investment funds, certain interest-bearing securities, and derivatives with a positive fair value which are mainly used to limit currency, interest, and commodity risks in accordance with internal risk management.

The group may, at initial recognition, irrevocably designate equity instruments that are not held for trading as measured at fair value through other comprehensive income (no recycling, FVOCI nR) rather than as measured at fair value through profit or loss. In that case, all changes in value are recognized in other comprehensive income. Cumulative changes in value are not reclassified to profit or loss even when the financial asset is sold. Dividend income, however, is recognized in profit or loss. As this measurement method appropriately presents the net assets and results of operations, the Bosch Group has decided to apply this option to investments in corporations and to shares reported under securities.

With regard to financial assets (not including equity instruments) that are not measured at fair value through profit or loss, IFRS 9 requires loss allowances to be recognized for any expected credit losses. The extent to which expected losses are recognized is determined based on three levels that differ in terms of the extent to which the credit risk on financial assets has significantly increased since initial recognition. Level 1 includes all financial assets whose credit risk has not increased significantly and whose outstanding payments are up to 30 days past due. For such assets, credit losses are recognized in relation to the probability of a default occurring over the next 12 months. If the borrower's credit risk has increased significantly, the financial instrument is allocated to level 2, and loss allowances are recognized at an amount equal to the expected losses over the lifetime of the financial asset. A significant increase in credit risk is assumed when either agreed payments are more than 30 days past due or information is available about a deterioration in the borrower's financial situation. If there is additional evidence that the financial asset is credit-impaired, it is allocated to level 3. Such evidence includes payments more than 90 days past due, observable data about significant financial difficulty of the borrower, a high probability that the borrower will enter bankruptcy, and significant changes in the issuer's technological, economic, regulatory, or market environment.

A simplified loss allowance model applies for trade receivables, contract assets, and lease receivables, according to which a loss allowance is always recognized at the lifetime-expected credit losses irrespective of any changes in the credit risk since initial recognition of the financial asset. As a practical expedient, a loss allowance table is used in the Bosch Group for receivables that are not credit-impaired, which determines the expected losses over the remaining term as a flat-rate percentage in relation to the number of days past due. Historical probabilities of default are used as a basis, supplemented by forward-looking parameters of relevance for the credit risk. If there is any information available about financial difficulty of the borrower, the assets are analyzed individually and a loss allowance for credit-impaired receivables is recognized. According to internal group guidelines, the carrying amounts of receivables are generally adjusted via a loss allowance account. Loss allowances are not recognized if receivables are collateralized or credit insurance exists.

Financial liabilities are generally subsequently measured at amortized cost using the effective interest method. In the Bosch Group, this applies to trade payables, bonds, promissory note loans, registered bonds, liabilities to banks, loan liabilities, and other financial liabilities. The main exception to this rule concerns financial liabilities held for trading, which are measured at fair value through profit or loss. In the Bosch Group, these are derivatives with a negative fair value.

When determining the fair value of financial assets and financial liabilities, the input factors of the valuation techniques pursuant to IFRS 13 are categorized as follows:

- Level 1: Quoted prices (unadjusted) in active markets for identical assets or liabilities that the accounting entity can access at the measurement date
- Level 2: Inputs other than quoted prices included within level 1 that are observable for the asset or liability, either directly or indirectly
- Level 3: Inputs that are not based on observable market data

The fair value of current financial assets and liabilities is assumed to correspond to their carrying amount.

Financial assets are derecognized when the rights to cash flows have expired, e.g. after completion of bankruptcy proceedings or after a court ruling. They are also derecognized when the Bosch Group transfers substantially all risks and rewards from a financial asset. Financial liabilities are derecognized when the obligations specified in the contract have been discharged or canceled, or when they have expired.

Financial assets and financial liabilities are offset and presented as a net amount in the statement of financial position when there is a legal right to offset and the group either intends to settle on a net basis, or when the asset and the liability are to be settled at the same time.

Net gain/loss by category

The table below presents the net gains and losses from financial instruments recognized in the income statement, classified by the categories defined in IFRS 9:

in millions of euros T66

	2022	2021
Financial assets measured at amortized cost (AC)	540	435
Financial assets measured at fair value through other comprehensive income (FVOCI wR)	172	516
Financial assets and financial liabilities measured at fair value through profit or loss (FVPL)	–922	–138
Equity instruments measured at fair value through other comprehensive income (FVOCI nR)	108	99
Financial liabilities measured at amortized cost (AC)	–325	–291

The net gain/loss from equity instruments measured at fair value through other comprehensive income includes dividend income. In all other categories, foreign currency gains and losses as well as interest income and expenses are disclosed. The net gain/loss from financial assets and financial liabilities measured at fair value through profit or loss additionally includes the result from changes in the fair values of investments, securities, and derivatives. Moreover, the net gain/loss from financial assets measured at amortized cost discloses the gains/losses from the measurement of receivables and loans. The gain/loss from financial assets measured at fair value through other comprehensive income includes the gains/losses from the release of the reserve from financial instruments in equity.

The dividend income of EUR 108 million (previous year: EUR 99 million) reported in net gains/losses from investments in equity instruments includes dividend income amounting to EUR 4 million (previous year: EUR 5 million) from equity instruments derecognized in the reporting year.

The measurement gains and losses from securities and equity investments recognized in other comprehensive income are presented in the statement of comprehensive income.

Carrying amounts and fair values by category

in millions of euros T 67

Assets

	Category pursuant to IFRS 9	2022 Carrying amount	2022 Fair value	2021 Carrying amount	2021 Fair value
Cash and cash equivalents	**AC**	**6,459**		**6,196**	
Trade receivables	**AC**	**16,528**		**14,034**	
Current other financial assets		**3,803**		**7,897**	
Securities	FVPL	2,003	2,003	3,434	3,434
	FVOCI wR	362	362	454	454
Bank balances	AC	636		3,454	
Loan receivables	AC	95		93	
Derivatives	FVPL	285	285	72	72
Receivables from finance leases	n.a.	36		36	
Sundry other financial assets	AC	386		354	
Non-current financial assets		**14,021**		**15,864**	
Securities	FVOCI nR	2,821	2,821	3,396	3,396
	FVOCI wR	4,521	4,521	5,119	5,119
	FVPL	4,260	4,260	4,623	4,623
Investments	FVPL	164	164	151	151
	FVOCI nR	1,701	1,701	1,939	1,939
	n.a.	138		145	
Bank balances	AC	83	83	76	76
Loan receivables	AC	14	14	15	15
Derivatives	FVPL	33	33	71	71
Receivables from finance leases	n.a.	147	147	143	143
Other financial assets	AC	139	139	186	187

AC At amortized cost
FVPL At fair value through profit or loss
FVOCI wR At fair value through other comprehensive income, with recycling
FVOCI nR At fair value through other comprehensive income, no recycling
n.a. Not applicable

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 180

in millions of euros **T 67**

Equity and liabilities

		2022		2021	
	Category pursuant to IFRS 9	Carrying amount	Fair value	Carrying amount	Fair value
Trade payables	**AC**	**10,761**		**9,948**	
Current other financial liabilities		**2,210**		**1,370**	
Bonds	AC			21	
Promissory loans, registered notes	AC	500		25	
Liabilities to banks	AC	328		227	
Commercial papers	AC	328		132	
Loans	AC	102		72	
Derivatives	FVPL	182	182	230	230
Sundry other financial liabilities	AC	770		663	
Non-current financial liabilities		**5,457**		**4,395**	
Bonds	AC	1,992	1,916	1,990	2,317
Promissory loans, registered notes	AC	3,198	3,014	2,200	2,348
Liabilities to banks	AC	75	75	8	8
Loans	AC	49	49	40	40
Derivatives	FVPL	6	6	9	9
Other financial liabilities	AC	137	136	148	148

AC At amortized cost
FVPL At fair value through profit or loss
FVOCI wR At fair value through other comprehensive income, with recycling
FVOCI nR At fair value through other comprehensive income, no recycling
n.a. Not applicable

The carrying amounts of the financial assets and liabilities, classified by IFRS 9 measurement categories, are as follows:

in millions of euros **T68**

	2022	2021
Financial assets measured at amortized cost (AC)	24,340	24,408
Financial assets measured at fair value through other comprehensive income (FVOCI wR)	4,883	5,573
Equity instruments measured at fair value through other comprehensive income (FVOCI nR)	4,522	5,335
Financial assets measured at fair value through profit or loss (FVPL)	6,745	8,351
Financial liabilities measured at fair value through profit or loss (FVPL)	188	239
Financial liabilities measured at amortized cost (AC)	18,240	15,474

The tables presented below show the fair values of financial assets and financial liabilities measured at fair value determined by using the fair value hierarchy in accordance with IFRS 13:

in millions of euros **T 69**

		2022			
	Category pursuant to IFRS 9	**Level 1[1]**	**Level 2[2]**	**Level 3[3]**	**Total**
Financial assets					
Securities	FVPL	251	5,550	462	6,263
	FVOCI wR	53	4,830		4,883
	FVOCI nR	2,808	13		2,821
Investments	FVPL			164	164
	FVOCI nR	714		987	1,701
Derivatives	FVPL	19	299		318
Financial liabilities					
Derivatives	FVPL	15	173		188

1. Fair value is measured on the basis of quoted, unadjusted market prices in active markets.
2. Fair value is measured on the basis of market data such as share prices, exchange rates, or interest curves using market-based valuation techniques.
3. Fair value is measured on the basis of unobservable market data.

in millions of euros **T70**

	2021				
	Category pursuant to IFRS 9	**Level 1[1]**	**Level 2[2]**	**Level 3[3]**	**Total**
Financial assets					
Securities	FVPL	163	7,623	271	8,057
	FVOCI wR	400	5,173		5,573
	FVOCI nR	3,380	16		3,396
Investments	FVPL			151	151
	FVOCI nR	1,082		857	1,939
Derivatives	FVPL	14	129		143
Financial liabilities					
Derivatives	FVPL	4	235		239

1. Fair value is measured on the basis of quoted, unadjusted market prices in active markets.
2. Fair value is measured on the basis of market data such as share prices, exchange rates, or interest curves using market-based valuation techniques.
3. Fair value is measured on the basis of unobservable market data.

Investments measured at fair value through other comprehensive income include the equity investments in Ceres Power Holdings plc (fair value of EUR 134 million; previous year: EUR 401 million), in Husqvarna AB (EUR 182 million), in Nikola Corporation (EUR 14 million; previous year: EUR 101 million), in Powercell Sweden AB (EUR 63 million; previous year: EUR 106 million), and in Weifu High Technology Group Co, Ltd. (EUR 321 million; previous year: EUR 391 million).

The fair value of financial assets and liabilities measured at amortized cost is determined on the basis of observable market data such as share prices, exchange rates, and interest curves (level 2).

At the end of the fiscal year, items are reviewed to determine whether they need to be reclassified between individual levels of the fair-value hierarchy. In the reporting year, a small volume of securities measured at fair value through other comprehensive income were reclassified from level 1 to level 2, as they were no longer measured at their stock market price. A small volume of securities were reclassified from level 2 to level 1, as measurement at stock market price is possible as of the reporting year. The table presenting the changes in financial assets allocated to level 3 includes reclassifications relating to this level.

Equity investments measured at fair value through profit or loss and those measured at fair value through other comprehensive income are allocated to level 3. Various methods are used to determine the fair values, mainly based on price information from third parties and financing rounds carried out in the reporting year; the discounted cash flow method is also applied. In addition, in certain cases, cost is used as the best estimate of fair value.

Units in a closed fund are also allocated to level 3 (reported under securities). The fair value of the fund units is notified by the asset management firm; it is measured based on the fund's net asset value. The fair value is dependent on changes in the market value of the respective investments within the fund.

Changes during the reporting year and the previous year in financial assets allocated to level 3 are presented in the tables below:

in millions of euros **T71**

	1/1/2022	Additions	Disposals	Reclassifications	Changes recognized in other comprehensive income	Changes recognized in profit or loss	Other changes	12/31/2022
Investments FVOCI nR	857	203	–43		–8		–22	987
Investments FVPL	151	11	–6			16	–8	164
Securities	271	154				37		462

in millions of euros **T72**

	1/1/2021	Additions	Disposals	Reclassifications	Changes recognized in other comprehensive income	Changes recognized in profit or loss	Other changes	12/31/2021
Investments FVOCI nR	1,015	165	–152	–9	184		–346	857
Investments FVPL	100	20	–16			43	3	151
Securities	199	21				51		271

Changes recognized in profit or loss are presented in the financial result, while changes recognized in other comprehensive income are reported in the gains/losses on financial instruments.

In the previous year, certain entities performed IPOs. Correspondingly, the Bosch Group's equity investment in those entities was reclassified from level 3 to level 1. There were no reclassifications in the reporting year. Neither in the reporting year nor in the previous year were there any reclassifications of securities allocated to level 3.

31. Capital and risk management

Capital management

The Bosch Group's goal is to achieve sustainable growth through innovation while maintaining its financial independence. To achieve this goal, it is necessary to maintain a high internal financing ability, along with unrestricted access to capital markets, which is ensured by a solid A rating at a minimum. Capital structure and other financial performance indicators, such as free cash flow, are tracked as part of financial planning. As of December 31, 2022, the Bosch Group's equity ratio as a percentage of total assets was 47 percent (previous year: 45 percent). Depending on market circumstances, the volume required, and the preferred currency, the Bosch Group generally raises debt capital on capital markets in the form of bonds, promissory loans, registered notes, and commercial paper programs. Bilateral and syndicated loan facilities with banks are also in place.

Hedging policy and financial derivatives

The business operations of the Bosch Group are impacted in particular by fluctuations in exchange and interest rates and, on the procurement side, by commodity price risks. Business policy aims to limit these risks by means of hedging. All hedging transactions are managed at corporate level.

Internal regulations and guidelines set down a mandatory framework and define the responsibilities relating to investment and hedging transactions. According to these regulations, derivatives may only be used in connection with business operations, financial investments, or financing transactions; speculative transactions are not allowed. Trader limits are an important component of the guidelines. Hedges are generally concluded via banks with good credit ratings from leading agencies and taking into account current risk assessments in financial markets. The creditworthiness of the Bosch Group's banking partners is closely monitored and the risk mitigated by counterparty limits.

To reduce the credit risk of the bank, fixed-term deposits are in some cases also entered into as secured deposits in triparty repo transactions. In such cases, the bank provides predefined securities as collateral. The transactions themselves, as well as the management and valuation of the securities, are managed by a clearing center. Further information is provided in note 16 "Other current and non-current financial assets."

The decision-making bodies are committees for commodities, foreign currencies, and investments that meet at regular intervals. There is a functional segregation of trading, settlement, and control functions. Key tasks of the control function include determining risks using the value-at-risk method as well as the basis-point-value method, and ongoing compliance checks with instructions and guidelines.

Each month, the risk of financial investments is calculated using the value-at-risk concept. Risks relating to financial assets are monitored using asset allocation studies conducted as needed and limited by diversifying investment. The board of management is informed about risk analyses and the results of investments and hedges on a monthly basis in the foreign-currency and investment committee.

Currency risks

Currency risks from cash flows in business operations are mitigated by the central management of invoicing and purchasing currencies. The currency risk is determined on the basis of the worldwide consolidated cash flows in the respective currencies. Based on the business plan, estimated inflows and outflows in the various currencies for the planning period are aggregated in a foreign exchange balance plan. The resulting net position is used for the central management of currency exposures.

The largest net currency positions of the planned cash flows are in CNY, USD, GBP, and HUF.

Hedging largely takes the form of forward exchange contracts; currency options and currency swaps are used to a lesser extent. These transactions, which are only entered into with banks, are subject to minimum requirements with respect to nature and scope.

The risk attaching to material foreign currency items from operations is determined using the cash-flow-at-risk concept. These risk analyses and the hedge result are determined monthly and also presented to the board of management in the foreign-currency and investment committee.

To present the currency risks for the most important foreign currencies of the Bosch Group in accordance with IFRS 7 *Financial Instruments: Disclosures*, all monetary assets and monetary liabilities denominated in foreign currency for all consolidated companies were analyzed as of the reporting date and sensitivity analyses carried out for the respective currency pairs, in terms of the net risk.

A change in the EUR of 10 percent (taking the closing rate as the baseline) against the foreign currencies listed in the table would have the following effects on the profit before tax:

in millions of euros **T73**

	10% increase in EUR		10% decrease in EUR	
	2022	2021	**2022**	2021
AUD	0	–1	0	1
BRL	–6	–7	6	7
CAD	5	5	–5	–5
CHF	2	13	–2	–13
CNY	–23	35	23	–35
CZK	–16	–15	16	15
GBP	33	28	–33	–28
HUF	–24	–18	24	18
INR	–12	–10	12	10
JPY	–22	–8	22	8
KRW	2	1	–2	–1
MXN	–9	–15	9	15
PLN	–5	–8	5	8
RUB	–7	–11	7	11
TRY	–1	–13	1	13
USD	–69	–32	69	32

A change in the USD of 10 percent (taking the closing rate as the baseline) against the foreign currencies listed in the table would have the following effects on the profit before tax:

in millions of euros **T74**

	10% increase in USD		10% decrease in USD	
	2022	2021	2022	2021
CNY	–8	–7	8	7

The effects on the reported profit or loss mainly result from foreign currency positions relating to operations as well as from loans within the Bosch Group if, by way of an exception, the loan was granted in a currency other than the local currency of the borrower – for example, because it can be repaid from expected cash flows in this currency. The currency risk for the statement of financial position differs from the purely economic currency risk, as the latter is determined on the basis of forecast cash flows from operations.

Interest-rate risks

Risks from changes in interest rates on investments and borrowings are limited by select use of derivative financial instruments, mainly interest rate swaps and interest rate futures.

An analysis of the interest-rate risk was carried out in accordance with IFRS 7. The sensitivity analysis considered assets and liabilities subject to floating interest rates, fixed-rate securities, pension and money market funds, as well as interest derivatives.

A change in the market interest rate by 100 basis points (taking the interest rate on the reporting date as the baseline) would have the following effect on the gains/losses on financial instruments recognized in equity and the profit before tax:

in millions of euros **T75**

	Increase in market interest level by 100 basis points		Decrease in market interest level by 100 basis points	
	2022	2021	2022	2021
Reserve from financial instruments	–220	–289	220	289
Profit before tax	–8	0	8	0

Share-price risks

The Bosch Group holds stock as part of its financial investments used to cover long-term pension obligations. It also holds investments in publicly quoted companies. The analysis of the share-price risk in accordance with IFRS 7 took into account share portfolios, quoted investments, equity funds, and share derivatives with a total carrying amount of EUR 4,854 million (previous year: EUR 6,052 million).

A change in the share price of 10 percent (taking the share price on the reporting date as the baseline) would have the following effect on the gains/losses on financial instruments recognized in equity and the profit before tax:

in millions of euros **T76**

	10% increase in share price		10% decrease in share price	
	2022	2021	**2022**	2021
Reserve from financial instruments	353	448	−353	−448
Profit before tax	132	157	−132	−157

To reduce share-price risks, a broadly diversified investment strategy is pursued across various regions and sectors.

Other price risks

Derivatives are used to limit the risks of fluctuating commodity prices. The analysis of the commodity-price risk in accordance with IFRS 7 took into account commodity derivatives measured as of the reporting date.

A change in the forward-rate level of 10 percent (taking the forward rate on the reporting date as the baseline) would have the following effect on the profit before tax:

in millions of euros **T77**

	10% increase in forward rates		10% decrease in forward rates	
	2022	2021	**2022**	2021
Profit before tax	39	48	−39	−48

As of the reporting date, the Bosch Group is not aware that it is exposed to any significant other price risks as defined by IFRS 7.

Credit risks

The maximum credit risk for each category of financial instruments is the carrying amount of the financial assets recognized in the statement of financial position.

The credit risk from customer receivables is recorded and monitored on an ongoing basis. Responsibilities and duties relating to credit risks are governed by an internal directive. This mainly concerns the stipulation of payment terms, fixing of credit limits, release of deliveries, and receivables monitoring.

The credit risk for trade receivables is reduced by processing invoices with the corresponding credit notes in a single work step; the net amount is reported in the statement of financial position. This procedure is only performed if there is a legal right to offset and the customer intends to settle the receivable on a net basis or to settle the receivable by offsetting against the corresponding liability. Moreover, trade receivables are partly secured by retention of title. For some trade receivables, collateral has been additionally provided in the form of guarantees, property liens, and mortgages.

The table below shows the remaining credit risk for trade receivables:

in millions of euros **T78**

	2022	2021
Trade receivables (before offsetting of credit notes)	17,410	14,894
Offsetting of credit notes	–882	–860
Trade receivables (carrying amount)	16,528	14,034
Financial guarantee contracts (received)	–2,039	–2,060
Remaining credit risk	**14,489**	**11,974**

The following table presents the development of loss allowances on trade receivables (credit-impaired and not credit-impaired) as well as on loan receivables and sundry other financial assets (according to the three-level impairment model) for the reporting year and the previous year:

in millions of euros **T79**

	Trade receivables	**Loan receivables and sundry other financial assets**	
		Level 1	**Level 2/3**
1/1/2021	**261**	**6**	**126**
Changes in consolidated group	3	0	0
Amounts added	76	3	12
Amounts utilized	–42	0	0
Amounts reversed	–47	–3	–30
Exchange-rate differences	–1	0	0
12/31/2021	**250**	**6**	**108**
Changes in consolidated group	0	0	0
Amounts added	79	1	9
Amounts utilized	–20	0	0
Amounts reversed	–13	–2	–5
Exchange-rate differences	–6	0	0
12/31/2022	**290**	**5**	**112**

As of December 31 of the reporting year, allowances for contract assets amount to EUR 16 million (previous year: EUR 14 million) and allowances for finance lease receivables amount to EUR 2 million (previous year: EUR 2 million).

The table below shows the gross carrying amounts of trade receivables:

in millions of euros **T80**

	2022	2021
Trade receivables	16,818	14,284
of which not exposed to default	5,123	4,538
of which credit-impaired	293	262
of which not credit-impaired	11,402	9,484
not due	10,096	8,679
up to 30 days past due	812	489
31–90 days past due	271	155
91–180 days past due	105	50
more than 180 days past due	118	111

The development of impairment losses on securities measured at fair value through other comprehensive income is presented in the following table:

in millions of euros **T81**

	Level 1	**Level 2/3**
1/1/2021	**16**	**66**
Changes in consolidated group	0	0
Additions	9	17
Amounts utilized		0
Amounts reversed	–22	–43
Reclassifications	10	–10
Exchange-rate differences	0	0
12/31/2021	**13**	**30**
Changes in consolidated group	0	0
Additions	9	57
Amounts utilized	0	0
Amounts reversed	–17	–31
Reclassifications	7	–7
Exchange-rate differences	0	0
12/31/2022	**12**	**49**

Derivative transactions are entered into in accordance with either the German master agreement for financial forward transactions or the ISDA (International Swaps and Derivatives Association). These do not satisfy the set-off criteria of IAS 32 as netting is only enforceable in the case of insolvency.

The credit risk for derivatives with a positive fair value that do not currently satisfy the set-off criteria of IAS 32 (offsetting only enforceable in the case of insolvency of the contracting party) is presented in the following table:

in millions of euros **T 82**

	2022	2021
Derivatives with a positive fair value	318	143
Amounts not offset in the statement of financial position		
Derivatives	–82	–34
Cash collateral received	–77	–13
Remaining credit risk	**159**	**96**

Liquidity risks

Changes in financial assets and liabilities are monitored on an ongoing basis. Internal directives regulate the duties and responsibilities of liquidity management and planning. The company has liquidity reserves in the form of highly liquid assets totaling EUR 8,824 million (previous year: EUR 10,084 million). In addition, a U.S. commercial paper program with a volume of USD 2,000 million is available, under which up to USD 350 million was drawn on a revolving basis in the reporting year. Furthermore, there are bilateral U.S. loan facilities with a volume of USD 950 million. An existing syndicated loan facility with an ESG component was increased to EUR 5,000 million. Neither loan facility was drawn.

The liquidity risk is reduced by processing invoices for trade payables with the corresponding credit notes received in a single work step. This procedure is only performed if there is a legal right to offset and there is an intention to settle the liability on a net basis or to settle the liability by offsetting against the corresponding receivable. Moreover, collateral is provided in the form of guarantees.

The table below shows the remaining liquidity risk for trade payables:

in millions of euros **T 83**

	2022	2021
Trade payables (before offsetting of credit notes)	11,643	10,808
Offsetting of credit notes	–882	–860
Trade payables (carrying amount)	10,761	9,948
Financial guarantee contracts (granted)	–8	–3
Remaining liquidity risk	**10,753**	**9,945**

The liquidity risk for derivatives that do not currently satisfy the set-off criteria of IAS 32 (offsetting only enforceable in the case of insolvency) is presented in the following table:

in millions of euros **T 84**

	2022	2021
Derivatives with a negative fair value	188	239
Amounts not offset in the statement of financial position		
Derivatives	–82	–34
Cash collateral provided	–1	–7
Remaining liquidity risk	**105**	**198**

The undiscounted cash outflows of the non-derivative and derivative financial liabilities are presented in the tables below:

in millions of euros T85

	Carrying amount	Undiscounted cash flows					
	2022	2023	2024	2025	2026	2027	2028 et seq.
Non-derivative financial liabilities							
Trade payables	10,761	10,761					
Bonds	1,992	48	798	35	35	35	1,387
Promissory loans, registered notes	3,698	581	78	629	863	698	1,370
Liabilities to banks	403	337	1	73	0	0	4
Commercial papers	328	328					
Lease liabilities	2,167	583	482	342	260	206	599
Loans	151	102	27	8	8	4	6
Other financial liabilities	907	771	31	10	1	1	94
Derivatives							
Gross settlement	145						
Cash outflows		5,271	22			10	
Cash inflows		5,127	21			10	
Net settlement	43						
Cash outflows		38	3			2	

in millions of euros T86

	Carrying amount	Undiscounted cash flows					
	2021	2022	2023	2024	2025	2026	2027 et seq.
Non-derivative financial liabilities							
Trade payables	9,948	9,948					
Bonds	2,011	69	48	791	35	35	1,418
Promissory loans, registered notes	2,225	51	524	23	151	818	856
Liabilities to banks	235	230	2	2	2	1	
Commercial papers	132	133					
Lease liabilities	2,066	551	443	324	279	196	475
Loans	112	73	8	10	9	6	7
Other financial liabilities	811	666	37	5	1	1	105
Derivatives							
Gross settlement	212						
Cash outflows		8,125	59				
Cash inflows		7,917	55				
Net settlement	27						
Cash outflows		22	1	0		4	

The undiscounted cash outflows contain interest and principal payments. All on-call financial liabilities are allocated to the earliest possible period. Variable interest payments were calculated using the most recent interest rate determined before the respective reporting date.

32. Leases

Contracts that convey the right to control the use of an identifiable asset for a period of time in exchange for consideration are accounted for as leases in accordance with IFRS 16.

Bosch as lessee

The lessee generally recognizes leases based on the right-of-use approach. With certain exceptions, this requires recognizing right-of-use assets and liabilities for the payment obligations under the lease in the statement of financial position. These accounting requirements are not applied to short-term leases and leases of low-value assets; lease payments under such leases are recognized in functional costs on a straight-line basis over the lease term. In addition, the requirements of IFRS 16 are not applied to leases of intangible assets.

Lease liabilities are measured at the present value of the lease payments over the lease term. Lease payments include fixed payments for lease components and non-lease components as well as variable lease payments based on an index or an interest rate. The payments are generally discounted using the incremental borrowing rate for the appropriate currency and lease term. In determining the lease term, termination and extension options are considered if it is reasonably certain that they will be exercised.

At the commencement date, right-of-use assets are recognized at the amount of the lease liability, plus initial direct costs and less any lease incentives received. Right-of-use assets are typically depreciated over the lease term, with depreciation recognized in functional costs.

As lessees, entities of the Bosch Group have entered into leases mainly for land and buildings and, to a lesser extent, vehicles, plant and equipment, and other equipment, fixtures, and furniture.

The right-of-use assets recognized in the statement of financial position and the corresponding depreciation charge are as follows:

in millions of euros T 87

	2022		2021	
	Carrying amount	Depreciation	Carrying amount	Depreciation
Land and buildings	1,696	435	1,700	397
Plant, fixtures, and furniture	162	40	87	30
Vehicles	210	134	213	142
	2,068	**609**	**2,000**	**569**

Depreciation includes impairment losses of EUR 24 million relating to right-of-use assets of the BSH Hausgeräte division's Russian subsidiary (Consumer Goods business sector). The impairment losses were recognized on account of the applicable sanctions and the associated changes in the economic and legal environment.

Additions to right-of-use assets came to EUR 856 million in the reporting year (previous year: EUR 615 million).

The following amounts were additionally recognized in the income statement:

in millions of euros T 88

	2022	2021
Interest expenses relating to lease liabilities	59	51
Expenses relating to short-term leases	132	112
Expenses relating to leases of low-value assets	86	63
Expenses for variable lease payments	26	19

Cash outflows from leases totaled EUR 893 million in the reporting year (previous year: EUR 805 million). The maturity analysis of future lease payments is contained in the liquidity risk section of note 31 "Capital and risk management."

Bosch as lessor

Lessors are required to classify a lease as either a finance lease or an operating lease.

Finance leases transfer substantially all the risks and rewards incidental to ownership to the lessee. For such leases, a receivable is recognized at the amount of the net investment in the lease and disclosed under financial assets.

The receivables from finance lease agreements mainly stem from products leased by the Building Technologies division. As a rule, the agreed lease term is ten years. The receivables are due as follows:

in millions of euros **T89**

	2022	2021
Gross capital expenditures on finance leases, not discounted		
due no later than one year	42	42
due later than one year and no later than two years	36	36
due later than two years and no later than three years	30	30
due later than three years and no later than four years	26	25
due later than four years and no later than five years	21	21
due later than five years	49	47
	204	**201**
Present value of outstanding minimum lease payments		
due no later than one year	36	36
due later than one year and no later than two years	32	32
due later than two years and no later than three years	27	27
due later than three years and no later than four years	23	22
due later than four years and no later than five years	20	19
due later than five years	46	45
	184	**181**
Unearned finance income	**20**	**20**

In relation to finance leases, finance income in the reporting year came to EUR 6 million (previous year: EUR 7 million) and losses on disposal amounted to EUR 4 million (previous year: EUR 3 million). There were no unguaranteed residual values.

Under operating leases, the lessor retains substantially all the risks and rewards incidental to ownership. The assets concerned are recognized in property, plant, and equipment and, unless recognized as sales revenue, the lease payments received are recorded in other operating income.

The outstanding undiscounted minimum lease payments from operating lease agreements with entities of the Bosch Group as lessors stem mainly from activities of the Building Technologies and BSH Hausgeräte GmbH divisions. They are due as follows in the reporting year:

in millions of euros **T90**

	2022	2021
Due no later than one year	41	32
Due later than one year and no later than two years	5	6
Due later than two years and no later than three years	3	4
Due later than three years and no later than four years	2	2
Due later than four years and no later than five years	1	1
Due later than five years	2	2
	54	**47**

In the reporting year, income from operating leases came to EUR 51 million (previous year: EUR 47 million).

33. Related party disclosures

As shareholder, Robert Bosch Industrietreuhand KG exercises the majority of voting rights at Robert Bosch GmbH. In addition, Robert Bosch Industrietreuhand KG is responsible for the internal audit of the Bosch Group. The related costs incurred of EUR 20 million (previous year: EUR 20 million) were borne by Robert Bosch GmbH. As in the previous year, there were only immaterial other transactions and outstanding balances as of the reporting date.

A part of the pension obligations and funds has been outsourced to Bosch Pensionsfonds AG. Robert Bosch GmbH is the sole shareholder of Bosch Pensionsfonds AG. In the fiscal year, contributions were made to the plan assets of Bosch Pensionsfonds AG to finance pension obligations. For further details, see note 26 “Pension provisions and similar obligations.”

Robert Bosch Stiftung GmbH, Stuttgart, is the lessee of several properties belonging to Robert Bosch GmbH, Stuttgart. As of the reporting date, Robert Bosch GmbH has a liability of EUR 33 million (previous year: EUR 11 million) to Robert Bosch Stiftung GmbH.

Business transactions with related entities

Related entities of the Bosch Group include the joint ventures, associated entities, and the entities in which non-controlling interests are held (investees). Transactions with these entities are presented in the following table:

in millions of euros **T91**

	Goods and services sold		Goods and services purchased		Receivables		Liabilities	
	2022	2021	2022	2021	2022	2021	2022	2021
Joint ventures	84	10	1	4	10	9	23	1
Associated entities and investees	116	130	76	465	8	32	60	28

All transactions with related parties were at arm's length.

Total remuneration of key management personnel

The key management personnel are the general partners of Robert Bosch Industrietreuhand KG and any limited partners who are concurrently members of the board of management of Robert Bosch GmbH, as well as the members of the supervisory board and the members of the board of management of Robert Bosch GmbH.

Total remuneration of key management personnel breaks down as follows:

in millions of euros **T92**

	2022	2021
Short-term benefits	24	36
Post-employment benefits	37	17
Other long-term benefits	6	7
Termination benefits	0	4

For obligations from pensions and deferred compensation, provisions totaling EUR 59 million (previous year: EUR 141 million) have been recognized.

Share-based payments are not made.

Beyond this, the companies of the Bosch Group have not conducted any reportable transactions with key management personnel.

34. Remuneration of members of the board of management and supervisory board

The total remuneration of the members of the board of management comes to EUR 25 million in fiscal year 2022 (previous year: EUR 42 million), and that of the former members of the board of management and their dependants to EUR 26 million (previous year: EUR 20 million). An amount of EUR 274 million (previous year: EUR 362 million) has been accrued for pension obligations to former members of the board of management and their surviving dependants.

The remuneration of the members of the supervisory board comes to approximately EUR 2 million.

35. Auditor's fees

The fees of the group auditor for audit and advisory services in Germany amount to:

in millions of euros **T93**

	2022	2021
Fees for		
Audit services	7	6
Audit-related services	0	0
Tax advisory services	1	1
Other services	7	4

36. Events after the reporting date

On February 3, 2023, 100 percent of the shares in Hydra-Force Inc., Lincolnshire, IL, United States, were acquired. Further information is provided in note 6 "Consolidation" in the section on business combinations.

On February 8, 2023, share purchase agreements relating to OOO Robert Bosch Saratov and OOO Bosch Power Tools, both based in Engels, Russia, were signed. Further details can be found in note 6 "Consolidation" in the section "Non-current assets held for sale and disposal groups."

Also on February 8, 2023, a share purchase agreement relating to Bosch Heating Systems LLC, Engels, Russia, was signed. The transaction is scheduled to be closed in the second quarter of 2023.

List of shareholdings of the Bosch Group

as of December 31, 2022

A. Subsidiaries

1. Fully consolidated entities

Region/country	Company name	Registered office	Percentage share of capital
Germany	AJNS New Media GmbH	Berlin	**100.0**
	AS Abwicklung Dritte Produktion GmbH i.L.	Stuttgart	**100.0**
	AS Abwicklung und Solar-Service GmbH	Stuttgart	**100.0**[1]
	AS Guss Beteiligungsgesellschaft mbH	Stuttgart	**100.0**
	Bosch Access Systems GmbH	Aachen	**100.0**[1]
	Bosch Automotive Service Solutions GmbH	Pollenfeld	**100.0**[1]
	Bosch Building Automation GmbH	Verl	**100.0**[1]
	Bosch Charging Solutions GmbH	Stuttgart	**100.0**[1]
	Bosch Energy and Building Solutions GmbH	Ditzingen	**100.0**[1]
	Bosch Engineering GmbH	Abstatt	**100.0**[1]
	Bosch Global Software Technologies GmbH	Stuttgart	**100.0**[1]
	Bosch Healthcare Solutions GmbH	Waiblingen	**100.0**[1]
	Bosch Hilfe GmbH	Stuttgart	**100.0**
	Bosch Industriekessel GmbH	Gunzenhausen	**100.0**[1]
	Bosch KWK Systeme GmbH	Lollar	**100.0**[1]
	Bosch Pensionsgesellschaft mbH	Stuttgart	**100.0**[1]
	Bosch Rexroth AG	Stuttgart	**100.0**[1,2]
	Bosch Rexroth Vermögensverwaltung GmbH i.L.	Lohr am Main	**100.0**[1]
	Bosch Sensortec GmbH	Kusterdingen	**100.0**[1]
	Bosch Service Solutions GmbH	Stuttgart	**100.0**[1]
	Bosch Service Solutions Leipzig GmbH	Leipzig	**100.0**[1]

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 203

Region/country	Company name	Registered office	Percentage share of capital
	Bosch Service Solutions Magdeburg GmbH	Magdeburg	100.0[1]
	Bosch Sicherheitssysteme Engineering GmbH	Nuremberg	100.0[1]
	Bosch Sicherheitssysteme GmbH	Stuttgart	100.0[1,2]
	Bosch Sicherheitssysteme Montage und Service GmbH	Weimar	100.0[1]
	Bosch SoftTec GmbH	Hildesheim	100.0[1]
	Bosch Solar Services GmbH	Arnstadt	100.0[1,2]
	Bosch Solar Thin Film GmbH	Arnstadt	100.0[1]
	Bosch Solarthermie GmbH	Wettringen	100.0[1]
	Bosch Technology Licensing Administration GmbH	Gerlingen	100.0[1]
	Bosch Telecom Holding GmbH	Stuttgart	100.0[1,2]
	Bosch Thermotechnik GmbH	Wetzlar	100.0[1,2]
	Bosch Wohnungsverwaltungsgesellschaft mbH & Co. KG	Stuttgart	100.0[3]
	Bosch.IO GmbH	Berlin	100.0[1]
	BSH Hausgeräte GmbH	Munich	100.0[1,2]
	BSH Hausgeräte Service GmbH	Munich	100.0[1]
	BSH Hausgeräte Service Nauen GmbH	Nauen	100.0[1]
	BSH Hausgerätewerk Nauen GmbH	Nauen	100.0[1]
	BSH Vermögensverwaltungs-GmbH	Munich	100.0[1]
	Buderus Guss GmbH	Breidenbach	100.0[1]
	COBI.Bike GmbH	Frankfurt/Main	100.0[1]
	Constructa-Neff Vertriebs-GmbH	Munich	100.0
	DAA GmbH	Hamburg	100.0[1]
	ELPRO Messtechnik GmbH	Schorndorf	100.0
	ETAS GmbH	Stuttgart	100.0[1,2]
	EVI Audio GmbH	Straubing	100.0[1]
	Gaggenau Hausgeräte GmbH	Munich	100.0[1]
	grow platform GmbH	Stuttgart	100.0[1]

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 204

Region/country	Company name	Registered office	Percentage share of capital
	Holger Christiansen Deutschland GmbH	Wilnsdorf	100.0[1]
	Hörburger AG	Waltenhofen	100.0
	ITK Engineering GmbH	Rülzheim	100.0
	ITK Holding GmbH	Rülzheim	100.0
	Moehwald GmbH	Homburg/Saar	100.0[1]
	Neff GmbH	Munich	100.0[1]
	Pollux Solar-Service GmbH	Arnstadt	100.0
	Residential IoT Services GmbH	Stuttgart	100.0[1]
	Robert Bosch Automotive Steering GmbH	Schwäbisch Gmünd	100.0[1,2]
	Robert Bosch Elektronik GmbH	Salzgitter	100.0[1]
	Robert Bosch Elektronik Thüringen GmbH	Arnstadt	100.0[1]
	Robert Bosch Fahrzeugelektrik Eisenach GmbH	Eisenach	100.0[1]
	Robert Bosch Hausgeräte GmbH	Munich	100.0[1]
	Robert Bosch Lollar Guss GmbH	Lollar	100.0[1]
	Robert Bosch Manufacturing Solutions GmbH	Stuttgart	100.0[1,2]
	Robert Bosch Power Tools GmbH	Leinfelden-Echterdingen	100.0[1]
	Robert Bosch Risk and Insurance Management GmbH	Stuttgart	100.0[1]
	Robert Bosch Sechste Vermögensverwaltungsgesellschaft mbH	Gerlingen	100.0[1]
	Robert Bosch Semiconductor Manufacturing Dresden GmbH	Dresden	100.0[1]
	Robert Bosch Siebte Vermögensverwaltungsgesellschaft mbH	Gerlingen	100.0[1]
	Robert Bosch Smart Home GmbH	Stuttgart	100.0[1]
	Robert Bosch Steering Columns GmbH	Stuttgart	100.0[1]
	Robert Bosch Venture Capital GmbH	Gerlingen	100.0[1]
	Robert Bosch Wohnungsgesellschaft mbH	Stuttgart	100.0[1]
	Security and Safety Things GmbH	Munich	100.0
	SEG Hausgeräte GmbH	Munich	100.0[1]
	sia Abrasives Deutschland GmbH	Solingen	100.0

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CONTINUED FROM PAGE 205

Region/country	Company name	Registered office	Percentage share of capital
	WeWash GmbH	Munich	100.0[1]
	WOGE Service- und Regiebetrieb GmbH	Stuttgart	100.0[1]

1. These companies make use of the exemption provided for in Sec. 264 (3) HGB.
2. These companies make use of the exemption provided for in Sec. 291 (2) HGB.
3. This company makes use of the exemption provided for in Sec. 264b HGB.

Region/country	Company name	Registered office	Percentage share of capital
Europe			
Austria	Bosch General Aviation Technology GmbH	Vienna	100.0
	Bosch Industriekessel Austria GmbH	Bischofshofen	100.0
	Bosch Rexroth GmbH	Pasching	100.0
	BSH Finance and Holding GmbH	Vienna	100.0
	BSH Hausgeräte Gesellschaft mbH	Vienna	100.0
	Robert Bosch AG	Vienna	100.0
	Robert Bosch Holding Austria GmbH	Vienna	100.0
Belgium	Bosch Rexroth N.V.	Anderlecht	100.0
	Bosch Thermotechnology N.V./S.A.	Mechelen	100.0
	BSH Home Appliances S.A.	Brussels	100.0
	Robert Bosch Produktie N.V.	Tienen	100.0
	Robert Bosch S.A.	Anderlecht	100.0
	sia Abrasives Belgium N.V./S.A.	Mollem	100.0
	The KOBI Company B.V.	Leuven	100.0

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CONTINUED FROM PAGE 206

Region/country	Company name	Registered office	Percentage share of capital
Bulgaria	Bosch.IO EOOD	Sofia	**100.0**
	BSH Domakinski Uredi Bulgaria EOOD	Sofia	**100.0**
Croatia	BSH kućanski uređaji d.o.o.	Zagreb	**100.0**
Czech Republic	Bosch Powertrain s.r.o.	Jihlava	**100.0**
	Bosch Rexroth spol. s.r.o.	Brno	**100.0**
	Bosch Thermotechnika s.r.o.	Prague	**100.0**
	BSH domácí spotřebiče s.r.o.	Prague	**100.0**
	Robert Bosch odbytova s.r.o.	Prague	**100.0**
	Robert Bosch, spol. s.r.o.	České Budějovice	**100.0**
Denmark	Bosch Rexroth A/S	Hvidovre	**100.0**
	BSH Hvidevarer A/S	Ballerup	**100.0**
	ELPRO NORDIC ApS	Roskilde	**100.0**
	Holger Christiansen A/S	Esbjerg	**100.0**
	Kassow Robots ApS	Copenhagen	**100.0**
	Robert Bosch A/S	Ballerup	**100.0**
Finland	Bosch Rexroth Oy	Vantaa	**100.0**
	BSH Kodinkoneet Oy	Helsinki	**100.0**
	Minima Processor Oy	Oulu	**100.0**
	Robert Bosch Oy	Vantaa	**100.0**
France	Bosch Automotive Service Solutions S.A.S.	Saint-Ouen	**100.0**
	Bosch Rexroth DSI S.A.S.	Vénissieux	**100.0**
	Bosch Rexroth S.A.S.	Vénissieux	**100.0**

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CONTINUED FROM PAGE 207

Region/country	Company name	Registered office	Percentage share of capital
	Bosch Security Systems France S.A.S.	Drancy	100.0
	BSH Electroménager S.A.S.	Saint-Ouen	100.0
	e.l.m. leblanc S.A.S.	Drancy	100.0
	ETAS S.A.S.	Saint-Ouen	100.0
	Gaggenau Industrie S.A.S.	Lipsheim	100.0
	Holger Christiansen France S.A.S.	Olivet	100.0
	Robert Bosch (France) S.A.S.	Saint-Ouen	100.0
	Robert Bosch Automotive Steering Marignier S.A.S.	Marignier	100.0
	Robert Bosch Automotive Steering Vendôme S.A.S.	Vendôme	100.0
Greece	BSH Ikiakes Syskeves A.B.E.	Athens	100.0
	Robert Bosch S.A.	Koropi (Athens)	100.0
Hungary	Automotive Steering Column Kft.	Eger	100.0
	Bosch Rexroth Kft.	Budapest	100.0
	BSH Háztartási Készülék Kereskedelmi Kft.	Budapest	100.0
	ELPRO Systems Kft.	Budapest	100.0
	Robert Bosch Automotive Steering Kft.	Maklár	100.0
	Robert Bosch Elektronika Gyártó Kft.	Hatvan	100.0
	Robert Bosch Energy and Body Systems Kft.	Miskolc	100.0
	Robert Bosch Kft.	Budapest	100.0
	Robert Bosch Power Tool Elektromos Szerszámgyártó Kft.	Miskolc	100.0
Ireland	Robert Bosch Ireland Ltd.	Dublin	100.0
Italy	ARESI S.p.A.	Brembate	100.0
	Bosch Automotive Service Solutions S.r.l.	Parma	100.0

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CONTINUED FROM PAGE 208

Region/country	Company name	Registered office	Percentage share of capital
	Bosch Rexroth Oil Control S.p.A.	Milan	**100.0**
	Bosch Rexroth S.p.A.	Cernusco	**100.0**
	Bosch Security Systems S.p.A.	Milan	**100.0**
	BSH Elettrodomestici S.p.A.	Milan	**100.0**
	Centro Studi Componenti per Veicoli S.p.A.	Modugno (Bari)	**100.0**
	EDiM S.p.A.	Villasanta	**100.0**
	Freud S.p.A.	Milan	**100.0**
	Holger Christiansen Italia S.r.l.	San Lazzaro di Savena	**100.0**
	ROBERT BOSCH S.p.A. Società Unipersonale	Milan	**100.0**
	Tecnologie Diesel S.p.A. Società Unipersonale	Modugno (Bari)	**100.0**
Kazakhstan	TOO BSH Home Appliances	Almaty	**100.0**
	TOO Robert Bosch	Almaty	**100.0**
Latvia	Robert Bosch SIA	Riga	**100.0**
Luxembourg	BSH électroménagers S.A.	Senningerberg	**100.0**
	Ferroknepper Buderus S.A.	Esch-sur-Alzette	**100.0**
Netherlands	Bosch Building Technology B.V.	Nieuwegein	**100.0**
	Bosch Power Tools B.V.	Breda	**100.0**
	Bosch Rexroth B.V.	Boxtel	**100.0**
	Bosch Security Systems B.V.	Eindhoven	**100.0**
	Bosch Thermotechniek B.V.	Deventer	**100.0**
	Bosch Transmission Technology B.V.	Tilburg	**100.0**
	BSH Huishoudapparaten B.V.	Amsterdam	**100.0**
	Digicontrol Benelux B.V.	Apeldoorn	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 209

Region/country	Company name	Registered office	Percentage share of capital
	ELPRO Benelux B. V.	s'-Hertogenbosch	**100.0**
	Hacousto Group B.V.	Berkel en Rodenrijs	**100.0**
	Hacousto Holland B.V.	Berkel en Rodenrijs	**100.0**
	Hacousto Protec B.V.	Amsterdam	**100.0**
	Hacousto Protec Projects B.V.	Berkel en Rodenrijs	**100.0**
	Hacousto Security Systems B.V.	Berkel en Rodenrijs	**100.0**
	Hacousto Videotechniek B.V.	Berkel en Rodenrijs	**100.0**
	Halin Communication Technology B.V.	Best	**100.0**
	ItoM Services B.V.	Eindhoven	**100.0**
	Nefit Vastgoed B.V.	Deventer	**100.0**
	Protec Brandbeveiliging B.V.	Berkel en Rodenrijs	**100.0**
	Protec Netherlands B.V.	Berkel en Rodenrijs	**100.0**
	Robert Bosch Asset Managing C.V.	Boxtel	**100.0**
	Robert Bosch B.V.	Boxtel	**100.0**
	Robert Bosch Finance Nederland B.V.	Boxtel	**100.0**
	Robert Bosch Holding Nederland B.V.	Boxtel	**100.0**
	Robert Bosch Investment Nederland B.V.	Boxtel	**100.0**
	Security and Safety Things B.V.	Eindhoven	**100.0**
Norway	Bosch Rexroth AS	Ski	**100.0**
	BSH Husholdningsapparater AS	Oslo	**100.0**
	Robert Bosch AS	Trollåsen	**100.0**
Poland	Bosch Rexroth Sp.z o.o.	Warsaw	**100.0**
	BSH Sprzet Gospodarstwa Domowego Sp.z o.o.	Warsaw	**100.0**
	ROBERT BOSCH Sp.z o.o.	Warsaw	**100.0**
	SIA Abrasives Polska Sp.z o.o.	Goleniów	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 210

Region/country	Company name	Registered office	Percentage share of capital
Portugal	Bosch Car Multimedia Portugal, S.A.	Braga	**100.0**
	Bosch Security Systems, S.A.	Ovar	**100.0**
	Bosch Termotecnologia S.A.	Lisbon	**100.0**
	BSHP Electrodomésticos, S.U., Lda.	Carnaxide	**100.0**
	Robert Bosch, S.A.	Lisbon	**100.0**
Romania	Bosch Automotive S.R.L.	Blaj	**100.0**
	Bosch Rexroth Sales S.R.L.	Blaj	**100.0**
	Bosch Service Solutions S.R.L.	Timişoara	**100.0**
	BSH Electrocasnice S.R.L.	Bucharest	**100.0**
	ROBERT BOSCH S.R.L.	Bucharest	**100.0**
	S.C. Hörburger s.r.l.	Sibiu	**100.0**
Russian Federation	Bosch Heating Systems LLC	Engels	**100.0**
	OOO “Construction & investments”	Khimki	**100.0**
	OOO Bosch Power Tools	Engels	**100.0**
	OOO Bosch Rexroth	Moscow	**100.0**
	OOO Bosch Thermotechnik	Moscow	**100.0**
	OOO BSH Bytowije Pribory	St. Petersburg	**100.0**
	OOO Robert Bosch	Moscow	**100.0**
	OOO Robert Bosch Saratow	Engels	**100.0**
	Robert Bosch Samara LLC	Chernovskiy	**100.0**
Serbia	BSH Kućni Aparati d.o.o. Beograd	Belgrade	**100.0**
	Robert Bosch d.o.o. Beograd	Belgrade	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 211

Region/country	Company name	Registered office	Percentage share of capital
Slovakia	BSH Drives and Pumps s.r.o.	Michalovce	**100.0**
	Robert Bosch spol.s.r.o.	Bratislava	**100.0**
	Robert Bosch Production Slovakia, s.r.o.	Bernolákovo	**100.0**
Slovenia	Bosch Rexroth d.o.o.	Škofja Loka	**100.0**
	BSH Hišni Aparati d.o.o.	Nazarje	**100.0**
Spain	Bosch Rexroth, S.L.U.	Madrid	**100.0**
	Bosch Service Solutions, S.A.U.	Madrid	**100.0**
	BOSCH SISTEMAS DE FRENADO, S.L.U.	Madrid	**100.0**
	BSH Electrodomésticos España, S.A.	Zaragoza	**100.0**
	ROBERT BOSCH ESPAÑA FÁBRICA ARANJUEZ S.A.U.	Aranjuez	**100.0**
	ROBERT BOSCH ESPAÑA FÁBRICA CASTELLET S.A.U.	Castellet	**100.0**
	ROBERT BOSCH ESPAÑA FÁBRICA MADRID S.A.U.	Madrid	**100.0**
	ROBERT BOSCH ESPAÑA, S.L.U.	Madrid	**100.0**
	sia Abrasives Espana S.A.U.	Madrid	**100.0**
Sweden	Bosch Rexroth AB	Stockholm	**100.0**
	Bosch Thermoteknik AB	Tranås	**100.0**
	BSH Home Appliances AB	Stockholm	**100.0**
	Robert Bosch AB	Kista	**100.0**
Switzerland	Bosch Rexroth Schweiz AG	Buttikon	**100.0**
	BSH Hausgeräte AG	Geroldswil	**100.0**
	Bosch Thermotechnik AG	Pratteln	**100.0**
	ELPRO-BUCHS AG	Buchs	**100.0**
	Elpro Group AG	Buchs	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 212

Region/country	Company name	Registered office	Percentage share of capital
	Robert Bosch AG	Zuchwil	**100.0**
	Robert Bosch Internationale Beteiligungen AG	Zuchwil	**100.0**
	Scintilla AG	Zuchwil	**100.0**
	sia Abrasives Industries AG	Frauenfeld	**100.0**
Turkey	Bosch Fren Sistemleri Sanayi ve Ticaret A.S.	Bursa	**84.5**
	Bosch Rexroth Otomasyon Sanayi ve Ticaret A.S.	Bursa	**100.0**
	Bosch Sanayi ve Ticaret A.S.	Bursa	**100.0**
	Bosch Termoteknik Isitma ve Klima Sanayi Ticaret A.S.	Manisa	**100.0**
	BSH Ev Aletleri Sanayi ve Ticaret A.S.	Istanbul	**100.0**
Ukraine	MBT Trade T.B.O.	Kyiv	**100.0**
	SC “Robert Bosch Production Ukraine”	Krakovets	**100.0**
	Robert Bosch Ltd.	Kyiv	**100.0**
	TOV BSH Pobutova Technika	Kyiv	**100.0**
	Zelmer Ukraine T.B.O.	Kyiv	**100.0**
United Kingdom	Bosch Automotive Service Solutions Ltd.	Brixworth	**100.0**
	Bosch Lawn and Garden Ltd.	Stowmarket	**100.0**
	Bosch Rexroth Ltd.	St. Neots	**100.0**
	Bosch Service Solutions Ltd.	Denham	**100.0**
	Bosch Thermotechnology Ltd.	Worcester	**100.0**
	BSH Home Appliances Ltd.	Milton Keynes	**100.0**
	ELPRO UK Ltd.	Worthing	**100.0**
	Five AI Limited	Bristol	**100.0**
	Gas Alarm Systems Limited	Nelson	**100.0**
	Lynteck Limited	Nelson	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 213

Region/country	Company name	Registered office	Percentage share of capital
	Protec Camerfield Limited	Nelson	**100.0**
	Protec Fire and Security Group Limited	Nelson	**100.0**
	Protec Fire Detection Plc	Nelson	**100.0**
	Protec Fire Detection (Export) Limited	Nelson	**100.0**
	Robert Bosch Investment Ltd.	Worcester	**100.0**
	Robert Bosch Ltd.	Denham	**100.0**
	Robert Bosch UK Holdings Limited	Denham	**100.0**
	sia Abrafoam Ltd.	Alfreton	**100.0**
	sia Abrasives (G.B.) Ltd.	Greetland	**100.0**
	sia Abrasives Holding Ltd.	Greetland	**100.0**
	sia Fibral Ltd.	Greetland	**100.0**
	Worcester Group Ltd.	Worcester	**100.0**

Region/country	Company name	Registered office	Percentage share of capital
Americas			
Argentina	Bosch Rexroth S.A.I.C.	Buenos Aires	**100.0**
	Robert Bosch Argentina Industrial S.A.	Buenos Aires	**100.0**
Brazil	Bosch Rexroth Ltda.	Itatiba-SP	**100.0**
	Bosch Soluções Integradas Brasil Ltda.	Campinas	**100.0**
	Bosch Telecom Ltda.	São Paulo	**100.0**
	Robert Bosch Direçáo Automotiva Ltda.	Sorocaba	**100.0**
	Robert Bosch Ltda.	Campinas	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 214

Region/country	Company name	Registered office	Percentage share of capital
Canada	Bosch Rexroth Canada Corporation	Welland, ON	**100.0**
	BSH Home Appliances Ltd. / Électroménagers BSH Ltée	Mississauga, ON	**100.0**
	Freud Canada Inc.	Mississauga, ON	**100.0**
	ROBERT BOSCH INC.	Mississauga, ON	**100.0**
Chile	Bosch Rexroth Chile S.p.A.	Santiago de Chile	**100.0**
	Robert Bosch S.A.	Santiago de Chile	**100.0**
Colombia	BSH Electrodomesticos S.A.S.	Bogotá	**100.0**
	Robert Bosch Ltda.	Bogotá	**100.0**
Costa Rica	Robert Bosch Service Solutions – Costa Rica Sociedad Anonima	Heredia	**100.0**
Mexico	Bosch Rexroth, S.A. de C.V.	Mexico City	**100.0**
	BSH Home Appliances S.A. de C.V.	Mexico City	**100.0**
	Frenados Mexicanos, S.A. de C.V.	Aguascalientes	**100.0**
	Robert Bosch México Sistemas Automotrices, S.A. de C.V.	San Luis Potosí	**100.0**
	Robert Bosch México Sistemas de Frenos, S. de R.L. de C.V.	Juárez	**100.0**
	Robert Bosch México Sistemas de Seguridad, S.A. de C.V.	Hermosillo	**100.0**
	Robert Bosch México, S.A. de C.V.	Mexico City	**100.0**
	Robert Bosch Sistemas Automotrices, S.A. de C.V.	Juárez	**100.0**
	Robert Bosch Tool de México, S.A. de C.V.	Mexicali	**100.0**
	Robert Bosch, S. de R.L. de C.V.	Toluca	**100.0**
	SPLT México, S.A. de C.V.	Mexico City	**100.0**
Panama	Robert Bosch Panama Colón, S.A.	Colón	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 215

Region/country	Company name	Registered office	Percentage share of capital
Peru	BSH Electrodomésticos S.A.C.	Callao/Lima	**100.0**
	Robert Bosch S.A.C.	Lima	**100.0**
United States	Automotive Steering Column LLC	Florence, KY	**100.0**
	Bosch Automotive Service Solutions Inc.	Warren, MI	**100.0**
	Bosch Automotive Workshop Services LLC	Wilmington, DE	**100.0**
	Bosch Aviation Technology LLC	Novi, MI	**100.0**
	Bosch Brake Components LLC	Oakbrook Terrace, IL	**100.0**
	Bosch grow platform LLC	Wilmington, DE	**100.0**
	Bosch Rexroth Corporation	Lehigh Valley, PA	**100.0**
	Bosch Security Systems LLC	Burnsville, MN	**100.0**
	Bosch Thermotechnology Corp.	Londonderry, NH	**100.0**
	BSH Home Appliances Corporation	Irvine, CA	**100.0**
	Climatec, LLC	Phoenix, AZ	**100.0**
	Elmo Motion Control Inc.	Nashua, NH	**100.0**
	ELPRO Services, Inc.	Marietta, OH	**100.0**
	ETAS Inc.	Wilmington, DE	**100.0**
	FHP Manufacturing Company	Fort Lauderdale, FL	**57.0**
	Five AI Inc.	Wilmington, DE	**100.0**
	Freud America Inc.	High Point, NC	**100.0**
	Nimbus Holdings LLC	Wilmington, DE	**100.0**
	Robert Bosch Automotive Steering LLC	Florence, KY	**100.0**
	Robert Bosch Battery Systems LLC	Orion, MI	**100.0**
	Robert Bosch Finance LLC	Mt. Prospect, IL	**100.0**
	ROBERT BOSCH FUEL SYSTEMS LLC	Kentwood, MI	**100.0**
	Robert Bosch LLC	Farmington Hills, MI	**100.0**
	Robert Bosch North America Corporation	Oakbrook Terrace, IL	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 216

Region/country	Company name	Registered office	Percentage share of capital
	Robert Bosch Start-up Platform North America LLC	Wilmington, DE	**100.0**
	Robert Bosch Tool Corporation	Mt. Prospect, IL	**100.0**
	sia Abrasives, Inc. USA	Raleigh, NC	**100.0**

Region/country	Company name	Registered office	Percentage share of capital
Asia Pacific (including other countries)			
Australia	Bosch Automotive Service Solutions Pty. Ltd.	Clayton	**100.0**
	Bosch Rexroth Pty. Ltd.	Kings Park	**100.0**
	Bosch Security Systems Pty. Ltd.	Sydney	**100.0**
	BSH Home Appliances Pty. Ltd.	Heatherton	**100.0**
	MoTeC PTY LTD	Croydon South	**100.0**
	MoTeC Holdings PTY LTD	Docklands	**100.0**
	Protec Fire Detection Pty Ltd	Sydney	**100.0**
	Robert Bosch (Australia) Pty. Ltd.	Clayton	**100.0**
	sia Abrasives Australia Pty. Ltd.	Rowville	**100.0**
Botswana	Bosch Rexroth Botswana (Pty) Ltd.	Gaborone	**100.0**
China	Bosch (Chengdu) Information Technology Service Co., Ltd.	Chengdu	**100.0**
	Bosch (China) Investment Ltd.	Shanghai	**100.0**
	Bosch (Donghai) Automotive Test & Technology Center Co., Ltd.	Donghai	**100.0**
	Bosch (Hulunbeier) Automotive Test and Technology Centre Co., Ltd.	Yakeshi	**100.0**
	Bosch (Ningbo) e-scooter Motor Co., Ltd.	Ningbo	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 217

Region/country	Company name	Registered office	Percentage share of capital
	Bosch (Shanghai) Digital Technology Ltd.	Shanghai	**100.0**
	Bosch (Shanghai) Investment Consulting Co., Ltd.	Shanghai	**100.0**
	Bosch (Shanghai) Security Systems Ltd.	Shanghai	**100.0**
	Bosch (Shanghai) Smart Life Technology Ltd.	Shanghai	**100.0**
	Bosch (Shanghai) Venture Capital Investment Co., Ltd.	Shanghai	**100.0**
	Bosch (Zhuhai) Security Systems Co., Ltd.	Zhuhai	**100.0**
	Bosch Automotive Aftermarket (China) Co., Ltd.	Nanjing	**100.0**
	Bosch Automotive Components (Changchun) Co., Ltd.	Changchun	**55.0**
	Bosch Automotive Products (Changsha) Co., Ltd.	Changsha	**100.0**
	Bosch Automotive Products (Chengdu) Co., Ltd.	Chengdu	**100.0**
	Bosch Automotive Products (Suzhou) Co., Ltd.	Suzhou	**100.0**
	Bosch Automotive Service Solutions (Suzhou) Co., Ltd.	Suzhou	**100.0**
	Bosch Automotive Steering (Jinan) Co., Ltd.	Jinan	**100.0**
	Bosch Automotive Systems (Wuxi) Co., Ltd.	Wuxi	**100.0**
	Bosch Automotive Technical Service (Beijing) Co., Ltd.	Beijing	**100.0**
	Bosch Connected Mobility Solutions Ltd.	Wuxi	**100.0**
	Bosch Electronics Trading (Suzhou) Co., Ltd.	Suzhou	**100.0**
	Bosch HUAYU Steering Systems (Nanjing) Co., Ltd.	Nanjing	**100.0**
	Bosch HUAYU Steering Systems (Wuhan) Co., Ltd.	Wuhan	**100.0**
	Bosch HUAYU Steering Systems (Yantai) Co., Ltd.	Yantai	**100.0**
	Bosch HUAYU Steering Systems Co., Ltd.	Shanghai	**51.0**
	Bosch Hydrogen Powertrain Systems (Chongqing) Co., Ltd.	Chongqing	**60.0**
	Bosch Innovation and Software Development (Wuxi) Co., Ltd.	Wuxi	**100.0**
	Bosch Laser Equipment (Dongguan) Limited	Dongguan	**100.0**
	Bosch Power Tools (Chengdu) Co., Ltd.	Chengdu	**100.0**
	Bosch Power Tools (China) Co., Ltd.	Hangzhou	**100.0**
	Bosch Powertrain Systems Co., Ltd.	Wuxi	**66.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 218

Region/country	Company name	Registered office	Percentage share of capital
	Bosch Rexroth (Beijing) Hydraulic Co., Ltd.	Beijing	**100.0**
	Bosch Rexroth (Changzhou) Co., Ltd.	Changzhou	**100.0**
	Bosch Rexroth (China) Ltd.	Hong Kong	**100.0**
	Bosch Rexroth (Xi’an) Electric Drives and Controls Co., Ltd.	Xi'an	**100.0**
	Bosch Security Systems Ltd.	Hong Kong	**100.0**
	Bosch Thermotechnology (Beijing) Co., Ltd.	Beijing	**100.0**
	Bosch Thermotechnology (Shanghai) Co., Ltd.	Shanghai	**100.0**
	Bosch Thermotechnology (Wuhan) Co., Ltd.	Wuhan	**100.0**
	Bosch Trading (Shanghai) Co., Ltd.	Shanghai	**100.0**
	BSH Electrical Appliances (Jiangsu) Co., Ltd.	Nanjing	**100.0**
	BSH Home Appliances (China) Co., Ltd.	Nanjing	**100.0**
	BSH Home Appliances Co., Ltd.	Chuzhou	**100.0**
	BSH Home Appliances Holding (China) Co., Ltd.	Nanjing	**100.0**
	BSH Home Appliances Ltd.	Hong Kong	**100.0**
	BSH Home Appliances Service Jiangsu Co., Ltd.	Nanjing	**100.0**
	BSW Household Appliances Co., Ltd.	Wuxi	**100.0**
	ETAS Automotive Technology (Shanghai) Co., Ltd.	Shanghai	**100.0**
	Gaggenau Home Appliances (Shanghai) Co., Ltd.	Shanghai	**100.0**
	Guangzhou sia Abrasives Company Ltd.	Guangzhou	**100.0**
	Le-AutomatiX (Shanghai) Co., Ltd.	Shanghai	**100.0**
	Le-HydrauliX (Suzhou) Co., Ltd.	Suzhou	**100.0**
	Le-HydrauliX BoWei (Shanghai) Co., Ltd.	Shanghai	**50.0**
	Robert Bosch Company Ltd.	Hong Kong	**100.0**
	Shanghai Bosch Rexroth Hydraulics & Automation Ltd.	Shanghai	**100.0**
	Taixiang Vehicle Replace Parts (Shenzhen) Co., Ltd.	Shenzhen	**100.0**
	United Automotive Electronic Systems (Chongqing) Co., Ltd.	Chongqing	**65.0**
	United Automotive Electronic Systems (Liuzhou) Co., Ltd.	Liuzhou	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 219

Region/country	Company name	Registered office	Percentage share of capital
	United Automotive Electronic Systems Co., Ltd.	Shanghai	**51.0**
Egypt	BSH Home Appliances Holding LLP	New Cairo	**100.0**
	BSH Home Appliances LLC	New Cairo	**100.0**
Ghana	Bosch Rexroth Ghana Ltd.	Accra	**100.0**
India	Bosch Automotive Electronics India Private Ltd.	Bengaluru	**100.0**
	Bosch Chassis Systems India Private Ltd.	Pune	**100.0**
	Bosch Electrical Drives India Private Ltd.	Chennai	**100.0**
	Bosch Global Software Technologies Private Limited	Bengaluru	**100.0**
	Bosch Ltd.	Bengaluru	**70.5**
	Bosch Rexroth (India) Private Limited	Ahmedabad	**100.0**
	BSH Household Appliances Manufacturing Private Limited	Mumbai	**100.0**
	ETAS Automotive India Private Ltd.	Bengaluru	**100.0**
	Robert Bosch Automotive Steering Private Limited	Pune	**100.0**
	Robert Bosch India Manufacturing and Technology Private Limited	Bengaluru	**100.0**
Indonesia	PT. Robert Bosch	Jakarta	**100.0**
	PT BSH Home Appliances	Jakarta	**100.0**
Israel	BSH Home Appliances Ltd.	Herzlia	**100.0**
	Elmo Motion Control Ltd.	Petach Tikva	**100.0**
Japan	Bosch Corporation	Tokyo	**100.0**
	Bosch Engineering K.K.	Tokyo	**100.0**
	Bosch Rexroth Corporation	Tsuchiura-shi	**99.9**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 220

Region/country	Company name	Registered office	Percentage share of capital
	Bosch Security Systems Ltd.	Tokyo	**100.0**
	ETAS K.K.	Yokohama	**100.0**
	FA Niigata Co., Ltd.	Niigata	**100.0**
	Fuji Aitac Co., Ltd.	Gunma	**100.0**
	Gunma Seiki Co., Ltd.	Gunma	**100.0**
	Nippon Injector Corporation	Odawara	**50.0**
Korea	Bosch Electrical Drives Co., Ltd.	Sejong	**100.0**
	Bosch Rexroth Korea Ltd.	Busan	**100.0**
	ETAS Korea Co., Ltd.	Seoul	**100.0**
	KB Wiper Systems Co., Ltd.	Daegu	**100.0**
	Robert Bosch Korea Limited Company	Daejeon	**100.0**
Malaysia	Bosch Power Tools Engineering Sdn. Bhd.	Penang	**100.0**
	Bosch Rexroth Sdn. Bhd.	Kuala Lumpur	**100.0**
	BSH Home Appliances Sdn. Bhd.	Kuala Lumpur	**100.0**
	Robert Bosch (Malaysia) Sdn. Bhd.	Penang	**100.0**
	Robert Bosch Power Tools Sdn. Bhd.	Penang	**100.0**
	Robert Bosch Automotive Steering Sdn. Bhd.	Penang	**100.0**
	Robert Bosch Sdn. Bhd.	Kuala Lumpur	**100.0**
	Robert Bosch Semiconductor Manufacturing Penang Sdn. Bhd.	George Town Pulau Pinang	**100.0**
Morocco	BSH Electroménagers (SA)	Casablanca	**100.0**
	Robert Bosch Morocco S.A.R.L.-A.U.	Casablanca	**100.0**
Mozambique	Bosch Rexroth Mozambique Lda.	Maputo	**100.0**
	Bosch Rexroth Matola Lda.	Matola	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 221

Region/country	Company name	Registered office	Percentage share of capital
Namibia	Bosch Rexroth Namibia (Pty) Ltd.	Walvis Bay	**100.0**
New Zealand	BSH Home Appliances Ltd.	Auckland	**100.0**
Philippines	Bosch Service Solutions, Inc.	Manila	**100.0**
	Robert Bosch Inc.	Manila	**100.0**
Singapore	AquaEasy Pte. Ltd.	Singapore	**100.0**
	Bosch Rexroth Pte. Ltd.	Singapore	**100.0**
	BSH Home Appliances Pte. Ltd.	Singapore	**100.0**
	ELPRO Pte. Ltd.	Singapore	**100.0**
	Robert Bosch (South East Asia) Pte. Ltd.	Singapore	**100.0**
	Robert Bosch Security Solutions Pte. Ltd.	Singapore	**100.0**
South Africa	Bosch Rexroth South Africa (RF) (Pty) Ltd.	Johannesburg	**100.0**
	BSH Home Appliances (Pty) Ltd.	Johannesburg	**100.0**
	Corgam Property Investments (RF) (Pty) Ltd.	Kempton Park	**100.0**
	Hydraulic and Automation Warehouse (RF) (Pty) Ltd.	Kempton Park	**100.0**
	Hytec Engineering (RF) (Pty) Ltd.	Kempton Park	**100.0**
	Hytec Fluid Technology (RF) (Pty) Ltd.	Kempton Park	**100.0**
	Bosch Rexroth Africa Development (RF) (Pty) Ltd.	Kempton Park	**100.0**
	Hytec South Africa (RF) (Pty) Ltd.	Kempton Park	**75.0**
	Robert Bosch (Pty) Ltd.	Midrand	**100.0**
	Tectra Automation (RF) (Pty) Ltd.	Kempton Park	**100.0**
Taiwan	Bosch Rexroth Co. Ltd.	Taipei	**100.0**
	BSH Home Appliances Private Limited	Taipei	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 222

Region/country	Company name	Registered office	Percentage share of capital
	Robert Bosch Taiwan Co., Ltd.	Taipei	**100.0**
Thailand	Bosch Automotive Thailand Co., Ltd.	Rayong	**87.9**
	BSH Home Appliances Ltd.	Bangkok	**100.0**
	Robert Bosch Automotive Technologies (Thailand) Co., Ltd.	Rayong	**100.0**
	Robert Bosch Ltd.	Bangkok	**100.0**
United Arab Emirates	BSH Home Appliances FZE	Dubai	**100.0**
	BSH Home Appliances General Trading LLC	Dubai	**100.0**
	Robert Bosch Middle East FZE	Dubai	**100.0**
Vietnam	Bosch Vietnam Co., Ltd.	Dong Nai Province	**100.0**
	Bosch Global Software Technologies Co. Ltd.	Ho Chi Minh City	**100.0**
Zambia	Bosch Rexroth Zambia Ltd.	Kitwe	**100.0**

2. Non-consolidated entities

Region/country	Company name	Registered office	Percentage share of capital
Germany	AIG Planungs- und Ingenieurgesellschaft mbH	Stuttgart	**100.0**
	Bosch Climate Solutions GmbH	Gerlingen	**100.0**
	Bosch Management Support GmbH	Leonberg	**100.0**
	Bosch Pensionsfonds AG	Stuttgart	**100.0**
	BSH Altersfürsorge GmbH	Munich	**100.0**
	BSH Digital Ventures GmbH	Munich	**100.0**
	Circular Economy Solutions GmbH	Göttingen	**100.0**
	Coup Mobility GmbH	Ludwigsburg	**100.0**
	eAx solutions GmbH	Stuttgart	**100.0**
	ECP Energiecontracting GmbH	Heidelberg	**81.0**
	Elmo Motion Control GmbH	Viernheim	**100.0**
	for you Insurance Services GmbH	Stuttgart	**100.0**
	GFI Gesellschaft für Infrastrukturdienste mbH	Reutlingen	**100.0**
	Home Connect GmbH	Munich	**100.0**
	Joos MSR GmbH	Spraitbach	**51.0**
	Kassow Robots GmbH	Ulm	**100.0**
	Koller + Schwemmer GmbH	Nuremberg	**100.0**
	Mobility Media GmbH	Gerlingen	**100.0**
	NEVONEX GmbH	Holzkirchen	**100.0**
	Prüfzentrum Boxberg GmbH	Boxberg	**100.0**
	Service- und Betriebsgesellschaft Heidehof mbH	Stuttgart	**100.0**

Region/country	Company name	Registered office	Percentage share of capital
Europe			
Austria	ITK Engineering GmbH	Premstätten	**100.0**
Belarus	Robert Bosch OOO	Minsk	**100.0**
Bulgaria	Robert Bosch EOOD	Sofia	**100.0**
Croatia	Robert Bosch d. o. o.	Zagreb	**100.0**
Czech Republic	KR Soft s. r. o.	Prague	**100.0**
Estonia	Robert Bosch OÜ	Tallinn	**100.0**
Georgia	Robert Bosch Ltd.	Tblisi	**100.0**
Greece	Bosch Rexroth S. A.	Athens	**100.0**
Italy	Elmo Italy S. R. L.	Arese	**100.0**
Lithuania	UAB Robert Bosch	Vilnius	**100.0**
Netherlands	Semiconductor Ideas To The Market (ItoM) B. V.	Eindhoven	**100.0**
	ItoM Enschede B. V.	Enschede	**100.0**
	European Semiconductor B. V.	Breda	**100.0**
Poland	Elmo Motion Control Poland Sp. z o. o.	Warsaw	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 225

Region/country	Company name	Registered office	Percentage share of capital
Romania	Bosch Servicii Termotehnica S.R.L.	Bucharest	**100.0**
	BSH Electrocasnice Manufacturing S.R.L.	Bucharest	**100.0**
Slovakia	Bosch Electrical Drives SK s.r.o.	Bratislava	**100.0**
Slovenia	BSH I.D. Invalidska družba d.o.o.	Nazarje	**100.0**
	Robert Bosch d.o.o.	Ljubljana	**100.0**
Spain	Bosch Automotive Service Solutions S.A.U.	Madrid	**100.0**
	ITK Systems Engineering, S.L.U.	Barcelona	**100.0**
Switzerland	Elmo Motion Control AG	Biel	**100.0**
United Kingdom	Bosch Automotive Training Limited	Motherwell	**100.0**
	Camerfield Limited	Nelson	**100.0**
	Elmo Motion Control UK Ltd.	Crawley	**100.0**
	ETAS Ltd.	York	**100.0**
	Face Macanda Limited	Nelson	**100.0**
	Firepro Systems Limited	Nelson	**100.0**
	LAGTA Group Training Limited	Motherwell	**100.0**
	MoTeC (Europe) Limited	Oxford	**100.0**
	XL Fire Detection Systems Ltd.	Nelson	**100.0**

Region/country	Company name	Registered office	Percentage share of capital
Americas			
Brazil	Bosch Management Support Ltda.	Campinas	**100.0**
	Metapar Usinagem Ltda.	Curitiba-Paraná	**100.0**
	Robert Bosch Centro de Comunicação Limitada	Joinville	**100.0**
	sia Abrasivos Industriais Ltda.	São José dos Pinhais	**100.0**
Canada	ETAS Embedded Systems Canada Inc.	Waterloo, ON	**100.0**
Ecuador	Robert Bosch Sociedad Anónima – Ecuabosch	Guayaquil	**100.0**
Mexico	Bosch Management Services México, S.C.	Mexico City	**100.0**
Paraguay	Robert Bosch Sociedad Anonima	Asunción	**100.0**
Peru	Bosch Rexroth S.A.C.	Lima	**100.0**
United States	Bosch Management Services Corporation	Wilmington, DE	**100.0**
	Bosch Solar Energy Corp.	Detroit, MI	**100.0**
	ITK Engineering, LLC	East Lansing, MI	**100.0**
Urugay	Robert Bosch Uruguay S.A.	Montevideo	**100.0**
Venezuela	Bosch Rexroth S.A.	Caracas	**100.0**
	Inversiones 421.10 (Venezuela Holding)	Caracas	**100.0**
	Robert Bosch S.A.	Caracas	**100.0**
	Skil Venezolana S.R.L.	Caracas	**100.0**

Region/country	Company name	Registered office	Percentage share of capital
Asia Pacific (including other countries)			
Angola	Robert Bosch, Limitada	Luanda	**100.0**
Australia	Pacifica Group Pty. Ltd.	Melbourne	**100.0**
Bangladesh	Robert Bosch (Bangladesh) Ltd.	Dhaka	**100.0**
Cambodia	Robert Bosch (Cambodia) Co., Ltd.	Phnom Penh	**100.0**
China	Elmo Motion Control Technology (Shanghai) Co., Ltd.	Shanghai	**100.0**
	Freud International Trading (Shanghai) Co., Ltd.	Shanghai	**100.0**
	ITK Engineering Technology (Wu Xi) Co., Ltd.	Wuxi	**100.0**
	KB Wiper Systems (JiangYin) Co., Ltd.	Jiangyin	**100.0**
	Shanghai Boyuan Jiacheng Venture Investment Partnership	Shanghai	**99.0**
Egypt	Bosch Rexroth Egypt LLC	Cairo	**100.0**
	RBEG LLC	Cairo	**100.0**
	Robert Bosch Holding-Egypt LLC	Cairo	**100.0**
	Robert Bosch Ltd.	Cairo	**100.0**
Ghana	Robert Bosch Ghana Ltd.	Accra	**100.0**
India	Automobility Services and Solutions Private Limited	Bengaluru	**100.0**
	KB Wiper Systems India Private Ltd.	Oragadam	**100.0**
	MIVIN Engineering Technologies Private Ltd.	Bengaluru	**100.0**
	Newtech Filter India Private Limited	Nalagarh	**100.0**
	Precision Seals Manufacturing Ltd.	Chakan	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 228

Region/country	Company name	Registered office	Percentage share of capital
Indonesia	PT Robert Bosch Automotive	Jakarta	**100.0**
	PT Bosch Rexroth	Jakarta	**100.0**
	PT KB Wiper Systems Indonesia	Cikarang	**100.0**
Iran	Bosch Tejarat Pars	Tehran	**100.0**
Israel	Robert Bosch Technologies Israel Ltd.	Tel Aviv	**100.0**
Japan	Atlatec Japan K.K.	Tokyo	**100.0**
	Bosch Global Software Technologies Ltd.	Tokyo	**100.0**
	Bosch Service Solutions Corporation	Siki	**100.0**
	ITK Engineering Japan, Inc.	Tokyo	**100.0**
	Kanto Seiatsu Kogyo Co., Ltd.	Honjo	**92.9**
Kenya	Robert Bosch East Africa Ltd.	Nairobi	**100.0**
Korea	Elmo Motion Control APAC Ltd.	Hwaseong	**100.0**
Laos	Robert Bosch (Lao) Sole Co., Ltd.	Vientiane Capital	**100.0**
Malaysia	Robert Bosch (Penang) Sdn. Bhd.	Penang	**100.0**
Morocco	Bosch Rexroth Morocco S.A.R.L.	Casablanca	**100.0**
New Zealand	Bosch Rexroth Ltd.	Auckland	**100.0**
	Robert Bosch Ltd.	Auckland	**100.0**

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 229

Region/country	Company name	Registered office	Percentage share of capital
Nigeria	Robert Bosch Limited	Lagos	**100.0**
Saudi Arabia	BSH Home Appliances Saudi Arabia LLC	Jeddah	**51.0**
	Robert Bosch Saudi Arabia Ltd.	Riyadh	**100.0**
Singapore	Elmo Motion Control (Singapore) PTE Ltd.	Singapore	**100.0**
	WhatsEGG Pte. Ltd.	Singapore	**100.0**
South Africa	Hägglunds Drives South Africa (Pty) Ltd.	Fourways	**100.0**
Sri Lanka	Robert Bosch Lanka (Pvt.) Ltd.	Colombo	**100.0**
Thailand	FMP Distribution Ltd.	Bangkok	**50.1**
	FMP Group (Thailand) Ltd.	Rayong	**50.7**
	Pacific BBA (Thailand) Ltd.	Bangkok	**100.0**
	WhatsEgg (Thailand) Co. Ltd.	Bangkok	**70.0**
Tunisia	Robert Bosch Tunisie S. A. R. L.	Tunis	**100.0**
Vietnam	BSH Home Appliances (Vietnam) Co. Ltd.	Ho Chi Minh City	**100.0**

B. Joint ventures and associated entities

1. Entities measured using the equity method

Region/country	Company name	Registered office	Percentage share of capital
Germany	Bosch BASF Smart Farming GmbH	Cologne	**50.0**
	BS Systems GmbH & Co. KG	Zusmarshausen	**50.0**
	MAGURA Bosch Parts & Services GmbH & Co. KG	Bad Urach	**50.0**
	plc2 Design GmbH	Endingen am Kaiserstuhl	**25.0**

Region/country	Company name	Registered office	Percentage share of capital
Europe			
Ireland	ads-tec Energy plc	Dublin	**21.4**
United Kingdom	BOXT Limited	Leeds	**20.0**

Region/country	Company name	Registered office	Percentage share of capital
Americas			
United States	North America Fuel Systems Remanufacturing LLC	Kentwood, MI	**50.0**

Region/country	Company name	Registered office	Percentage share of capital
Asia Pacific (including other countries)			
India	ZF Steering Gear (India) Ltd.	Pune	**25.8**

2. Entities not measured using the equity method on materiality grounds

Region/country	Company name	Registered office	Percentage share of capital
Germany	Alltrucks GmbH & Co. KG	Munich	**33.3**
	Blauhut & Partner Informationssysteme GmbH	Egling	**42.9**
	European Center for Information and Communication Technologies – EICT GmbH	Berlin	**20.0**
	Aranea Battery Solutions GmbH	Heilbronn	**50.0**
	MAGURA Bosch Parts & Services Verwaltungs-GmbH	Bad Urach	**50.0**
	Siliconally GmbH	Dresden	**38.8**
	SupplyOn AG	Hallbergmoos	**42.1**

Region/country	Company name	Registered office	Percentage share of capital
Europe			
Italy	BARI SERVIZI INDUSTRIALI Società consortile a r. l.	Modugno	**50.0**
	Oleodinamica Gambini S. r. l.	Modena	**20.0**
Netherlands	Euroradiators Holding B.V.	Boxtel	**49.0**
	Tradeplace B.V.	Amsterdam	**20.0**
Poland	Loos Centrum Sp. z o. o.	Warsaw	**26.0**
United Kingdom	Megasets Ltd.	London	**25.1**

Region/country	Company name	Registered office	Percentage share of capital
Americas			
Mexico	PartsTech S.A. de C.V.	Guadalajara	**49.0**
United States	Foldimate Inc.	Wilmington, DE	**39.6**

Region/country	Company name	Registered office	Percentage share of capital
Asia Pacific (including other countries)			
Australia	FMP Group (Australia) Pty. Ltd.	Ballarat	**49.0**
	The Yield Technology Solution Pty. Ltd.	Hobart	**28.7**
China	HEFEI M&B Air Conditioning Equipment Co., Ltd.	Heifei	**40.0**
India	AMP Solar Infrastructure Private Limited	New Delhi	**26.0**
	Autozilla Solutions Pte. Ltd.	Hyderabad	**26.0**
	Hinduja Renewables One Pvt. Ltd.	Mumbai	**26.0**
	Prebo Automotive Pte. Ltd.	Pune	**40.0**
	Simyog Technology Pvt. Ltd.	Bengaluru	**24.7**
Israel	Electra Industries Ltd.	Rishon Le'Zion	**40.0**
Japan	Advanced Driver Information Technology Corporation	Kariya-shi	**50.0**

C. Other investments

Region/country	Company name	Registered office	Percentage share of capital
Europe			
Austria	RobArt GmbH	Linz	**24.8**
Netherlands	Intrinsic ID B.V.	Eindhoven	**28.2**
United Kingdom	Sunlight.io Ltd.	Cambridge	**27.0**

Region/country	Company name	Registered office	Percentage share of capital
Americas			
United States	Shop-Ware Inc.	San Francisco, CA	**21.0**

Region/country	Company name	Registered office	Percentage share of capital
Asia Pacific (including other countries)			
China	Boyuan (Shanghai) Investment Management Co., Ltd.	Shanghai	**50.0**
Israel	Allegro Artificial Intelligence Ltd.	Ramat Gan	**20.4**

Stuttgart, March 15, 2023

Robert Bosch Gesellschaft mit beschränkter Haftung
The board of management

Dr. Stefan Hartung
Dr. Christian Fischer
Filiz Albrecht
Dr. Markus Forschner
Dr. Markus Heyn
Dr. Tanja Rückert

Auditor's report

Independent auditor's report

To Robert Bosch Gesellschaft mit beschränkter Haftung

Opinions

We have audited the consolidated financial statements of Robert Bosch Gesellschaft mit beschränkter Haftung, Stuttgart and its subsidiaries (the Group), which comprise the consolidated income statement and consolidated statement of comprehensive income for the fiscal year from January 1 to December 31, 2022, the consolidated statement of financial position as at December 31, 2022, the consolidated statement of changes in equity and the consolidated statement of cash flows for the fiscal year from January 1 to December 31, 2022, and notes to the consolidated financial statements, including a summary of significant accounting policies. In addition, we have audited the group management report of Robert Bosch Gesellschaft mit beschränkter Haftung for the fiscal year from January 1 to December 31, 2022. In accordance with the German legal requirements, we have not audited the content of the statement on corporate governance pursuant to Sec. 289f (4) HGB ["Handelsgesetzbuch": German Commercial Code] included in the "Corporate governance report" section of the group management report (disclosure on female representation on executive boards).

In our opinion, on the basis of the knowledge obtained in the audit,

- the accompanying consolidated financial statements comply, in all material respects, with the IFRSs as adopted by the EU, and the additional requirements of German commercial law pursuant to Sec 315e (1) HGB and, in compliance with these requirements, give a true and fair view of the assets, liabilities and financial position of the Group as at December 31, 2022 and of its financial performance for the fiscal year from January 1 to December 31, 2022, and
- the accompanying group management report as a whole provides an appropriate view of the Group's position. In all material respects, this group management report is consistent with the consolidated financial statements, complies with German legal requirements and appropriately presents the opportunities and risks of future development. We do not express an opinion on the content of the statement on corporate governance referred to above.

Pursuant to Sec. 322 (3) Sentence 1 HGB, we declare that our audit has not led to any reservations relating to the legal compliance of the consolidated financial statements and of the group management report.

Basis for the opinions

We conducted our audit of the consolidated financial statements and of the group management report in accordance with Sec. 317 HGB and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer [Institute of Public Auditors in Germany] (IDW). Our responsibilities under those requirements and principles are further described in the "Auditor's responsibilities for the audit of the consolidated financial statements and of the group management report" section of our auditor's report. We are independent of the group entities in accordance with the requirements of German commercial and professional law, and we have fulfilled our other German professional responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinions on the consolidated financial statements and on the group management report.

Other information

The supervisory board is responsible for the supervisory board report. The executive directors are responsible for the other information. The other information comprises the statement on corporate governance pursuant to Sec. 289f (4) HGB referred to above (disclosures on the quota for women on executive boards). Furthermore, the other information comprises additional parts to be included in the annual report, of which we obtained a version prior to issuing this auditor's report, in particular the sections: "Foreword", "Board of management", "Supervisory board report", "Supervisory board", "Industrial trust and international advisory committee", "Highlights 2022", "Robert Bosch Stiftung" and "Ten-year summary of the Bosch Group", but not the consolidated financial statements, not the group management report disclosures whose content is audited and not our auditor's report thereon.

Our opinions on the consolidated financial statements and on the group management report do not cover the other information, and consequently we do not express an opinion or any other form of assurance conclusion thereon.

In connection with our audit, our responsibility is to read the other information and, in so doing, to consider whether the other information

- is materially inconsistent with the consolidated financial statements, with the group management report or our knowledge obtained in the audit, or
- otherwise appears to be materially misstated.

Responsibilities of the executive directors and the supervisory board for the consolidated financial statements and the group management report

The executive directors are responsible for the preparation of the consolidated financial statements that comply, in all material respects, with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to Sec. 315e (1) HGB, and that the consolidated financial statements, in compliance with these requirements, give a true and fair view of the assets liabilities, financial position, and financial performance of the Group. In addition, the executive directors are responsible for such internal control as they have determined necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud (i.e., fraudulent financial reporting and misappropriation of assets) or error.

In preparing the consolidated financial statements, the executive directors are responsible for assessing the Group's ability to continue as a going concern. They also have the responsibility for disclosing, as applicable, matters related to going concern. In addition, they are responsible for financial reporting based on the going concern basis of accounting unless there is an intention to liquidate the Group or to cease operations, or there is no realistic alternative but to do so.

Furthermore, the executive directors are responsible for the preparation of the group management report that, as a whole, provides an appropriate view of the Group's position and is, in all material respects, consistent with the consolidated financial statements, complies with German legal requirements, and appropriately presents the opportunities and risks of future development. In addition, the executive directors are responsible for such arrangements and measures (systems) as they have considered necessary to enable the preparation of a group management report that is in accordance with the applicable German legal requirements, and to be able to provide sufficient appropriate evidence for the assertions in the group management report.

The supervisory board is responsible for overseeing the Group's financial reporting process for the preparation of the consolidated financial statements and of the group management report.

Auditor's responsibilities for the audit of the consolidated financial statements and of the group management report

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and whether the group management report as a whole provides an appropriate view of the Group's position and, in all material respects, is consistent with the consolidated financial statements and the knowledge obtained in the audit, complies with the German legal requirements and appropriately presents the opportunities and risks of future development, as well as to issue an auditor's report that includes our opinions on the consolidated financial statements and on the group management report.

Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Sec. 317 HGB and in compliance with German Generally Accepted Standards for Financial Statement Audits promulgated by the Institut der Wirtschaftsprüfer (IDW) will always detect a material misstatement. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these consolidated financial statements and this group management report.

We exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the consolidated financial statements and of the group management report, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinions. The risk of not detecting a material misstatement resulting from fraud is higher than the risk of not detecting a material misstatement resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit of the consolidated financial statements and of arrangements and measures (systems) relevant to the audit of the group management report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of these systems.
- Evaluate the appropriateness of accounting policies used by the executive directors and the reasonableness of estimates made by the executive directors and related disclosures.
- Conclude on the appropriateness of the executive directors' use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Group's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to

draw attention in the auditor’s report to the related disclosures in the consolidated financial statements and in the group management report or, if such disclosures are inadequate, to modify our respective opinions. Our conclusions are based on the audit evidence obtained up to the date of our auditor’s report. However, future events or conditions may cause the Group to cease to be able to continue as a going concern.

- Evaluate the overall presentation, structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements present the underlying transactions and events in a manner that the consolidated financial statements give a true and fair view of the assets, liabilities, financial position and financial performance of the Group in compliance with IFRSs as adopted by the EU and the additional requirements of German commercial law pursuant to Sec. 315e (1) HGB.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express opinions on the consolidated financial statements and on the group management report. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinions.
- Evaluate the consistency of the group management report with the consolidated financial statements, its conformity with [German] law, and the view of the Group’s position it provides.
- Perform audit procedures on the prospective information presented by the executive directors in the group management report. On the basis of sufficient appropriate audit evidence we evaluate, in particular, the significant assumptions used by the executive directors as a basis for the prospective information, and evaluate the proper derivation of the prospective information from these assumptions. We do not express a separate opinion on the prospective information and on the assumptions used as a basis. There is a substantial unavoidable risk that future events will differ materially from the prospective information.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

Stuttgart, March 15, 2023

Ernst & Young GmbH
Wirtschaftsprüfungsgesellschaft

Prof. Dr. Wollmert	Somes
Wirtschaftsprüfer	Wirtschaftsprüferin
[German Public Auditor]	[German Public Auditor]

Additional information

List of graphs and tables

List of graphs

List of tables

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 241

List of tables

CONTINUED NEXT PAGE

CONTINUED FROM PAGE 242

List of tables

Ten-year summary of the Bosch Group

in millions of euros **T94**

	2013	2014	2015	2016	2017	2018	2019	2020	2021	**2022**
Sales	**46,068**	**48,951**	**70,607**	**73,129**	**78,066**	**78,465**	**77,721**	**71,494**	**78,748**	**88,201**
of which generated outside Germany (as a percentage)	77	78	80	80	80	79	80	79	80	80
Research and development cost[1]	4,543	4,959	6,378	6,911	7,264	5,963	6,079	5,890	6,110	7,224
as a percentage of sales revenue	9.9	10.1	9.0	9.5	9.3	7.6	7.8	8.2	7.8	8.2
Capital expenditure	2,539	2,585	4,058	4,252	4,345	4,946	4,989	3,312	3,949	4,896
of which in Germany	913	1,098	1,394	1,580	1,546	1,757	1,718	1,469	1,598	1,636
of which outside Germany	1,626	1,487	2,664	2,672	2,799	3,189	3,271	1,843	2,351	3,260
as a percentage of sales revenue	5.5	5.3	5.7	5.8	5.6	6.3	6.4	4.6	5.0	5.6
as a percentage of depreciation	126	138	146	141	140	159	146	101	116	141
Depreciation of property, plant, and equipment	2,008	1,868	2,788	3,022	3,095	3,103	3,421	3,282	3,393	3,474
Annual average number of associates (thousands)	280	286	369	384	403	407	408	395	400	414
of which in Germany	108	105	131	133	137	138	136	133	131	133
of which outside Germany	172	181	238	251	266	269	272	262	269	281
as of 12/31 of the year	281	290	375	389	402	410	398	395	403	421
Personnel expenses	14,907	15,325	20,369	21,056	22,266	22,219	23,824	22,483	23,766	24,822
Total assets	**55,725**	**61,924**	**77,266**	**81,875**	**81,870**	**83,654**	**87,861**	**91,369**	**97,723**	**100,247**
Equity	27,686	29,541	34,424	36,084	37,552	39,176	41,079	40,166	44,304	46,727
as a percentage of total assets	50	48	45	44	46	47	47	44	45	47
Cash flows from operating activities	4,276	3,835	5,959	6,137	6,799	7,267	7,752	9,016	6,890	1,859
as a percentage of sales revenue	9.3	7.8	8.4	8.4	8.7	9.3	10.0	12.6	8.7	2.1
Profit after tax	1,251	2,637	3,537	2,374	3,274	3,574	2,060	749	2,499	1,838
Dividend of Robert Bosch GmbH	88	102	142	138	241	242	119	67	143	162

1. Up to 2017, including development work charged directly to customers

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