BOSCH

Annual report 2021

Decoding tomorrow

Our ultimate aim is to develop technologies that make life simpler and better. At Bosch, we sum this up in three simple words: “Invented for life.” With our focus firmly on society and the environment, we develop solutions that give people the key to tomorrow’s world: products that spark enthusiasm, that simplify everyday life, and that conserve natural resources. In this endeavor, we rely on a thirst for knowledge, engineering spirit, expertise in key technologies, and excellence in the development of hardware, software, and services. This is how we’re “Decoding tomorrow.”

The digital magazine that accompanies our latest annual report provides a few examples of what this means in practice.
annual-report.bosch.com

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Selected key data

in millions of euros **01**

	2021	2020
Sales revenue	**78,748**	**71,494**
percentage change from previous year	10.1	−8.0
percentage of sales revenue generated outside Germany	80	79
Research and development cost	**6,110**	**5,890**
as a percentage of sales revenue	7.8	8.2
Capital expenditure	**3,949**	**3,312**
as a percentage of depreciation	116	101
Headcount		
average for the year	399,703	395,029
at December 31	402,614	395,034
Balance-sheet total	**97,723**	**91,369**
Equity	**44,304**	**40,166**
as a percentage of total assets	45	44
EBIT	**2,815**	**1,657**
as a percentage of sales revenue	3.6	2.3
Profit after tax	**2,499**	**749**
Dividend of Robert Bosch GmbH	**143**	**67**

Bosch at a glance

The Bosch Group is a leading global supplier of technology and services. It employs roughly 402,600 associates worldwide (as of December 31, 2021). The company generated sales of 78.7 billion euros in 2021. 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 440 subsidiary and regional companies in some 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, the Bosch Group has been carbon neutral since the first

Bosch at a glance

quarter of 2020. The basis for the company's future growth is its innovative strength. At 128 locations across the globe, Bosch employs some 76,100 associates in research and development, of which more than 38,000 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.

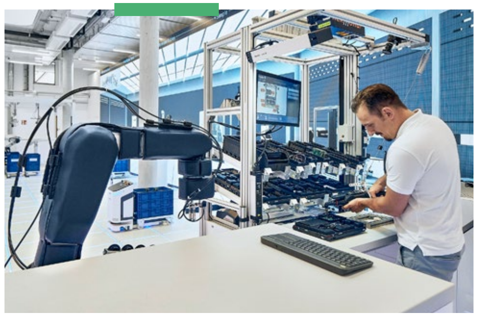
Business sectors

Industrial Technology

— **Drive and Control Technology**[2]

Other businesses

— Bosch Connected Industry
— Robert Bosch Manufacturing Solutions GmbH



Mobility Solutions

— **Powertrain Solutions**
— **Chassis Systems Control**
— **Electrical Drives**
— **Cross-Domain Computing Solutions**
— **Automotive Electronics**
— **Automotive Aftermarket**
— **Automotive Steering**
— **Connected Mobility Solutions**[1]
— **Bosch eBike Systems**

Other businesses

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

Consumer Goods

— **Power Tools**
— **BSH Hausgeräte GmbH**

Energy and Building Technology

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

Other businesses

— Robert Bosch Smart Home GmbH

Other businesses not allocated to business sectors

— Bosch Healthcare Solutions GmbH
— Bosch.IO GmbH
— grow platform GmbH
— Robert Bosch Venture Capital GmbH

1. Until December 31, 2021
2. Bosch Rexroth AG (100% Bosch-owned)

Foreword

DR. STEFAN HARTUNG

Ladies and gentlemen,

All of us on the newly constituted management board are eagerly looking forward to the work that lies ahead. It demands our respect, but we will tackle it with confidence.

Most immediately, the challenges we face include the war in Ukraine, whose further course and impact we cannot yet judge. We are very concerned for all those affected by it. We are doing all we can to help, and this help is not directed solely to our associates. War cannot solve political conflict.

On top of that, we have not yet put the coronavirus pandemic behind us. In addition, we are confronted with severe supply shortages, especially of chips and other primary products, as well as with steep price increases.

At the same time, our markets are in flux. The main reasons for this are well known: climate action, electrification, automation, and connectivity. Side by side with this, the structures of global trade are changing, and geopolitical constellations are becoming more complex. We have to find responses to this. As an innovative company that has set itself the objective of creating technology "Invented for life," we always see technological change as an opportunity as well. In this context, we can build on a strong position in diverse areas of business and technological domains, as well as on our international presence in more than 60 countries.

Together with our executives and our roughly 400,000 associates worldwide, our aim as the board of management team is to take Bosch safely and successfully into the next decade. To achieve this, we are devoting a great deal of effort to making ourselves less vulnerable to risks, as well as to our growth strategies. Even now, we operate

> “Bosch’s biggest strength is its associates with their expertise and ideas, their creativity and their commitment.”

some 230 plants and 130 research and development locations worldwide and employ roughly 38,000 software experts. With its many strong brands, Bosch is well known around the world. People trust Bosch – and, as we see it, living up to this trust is also an obligation. Ever since 2020, our own operations have been carbon neutral, and we have set ourselves further ambitious sustainability targets.

We have been preparing the ground for this for some years now. Bosch already has a strong product portfolio in electromobility, in electric heat pumps, and in the electrification of hydraulics. We are also focusing our efforts on the promising field of fuel cells. Our home and garden appliances simplify and enrich the lives of many people. And we want to play a leading role in the development of automated driving and of new automotive electronic architectures. The connected and smart factory of the future is no longer only something we put into practice on our own shopfloors. Today, we also actively market this promising technology. When we speak of “Invented for life,” we mean hardware, software, and services that are developed for a wide range of applications, and that are made and sold with the aim of benefiting as many people as possible.

Particularly in times of fundamental technological change – such as we are now seeing in automotive powertrain technology – we know very well that extensive adjustments are also necessary. In such a situation, our aim is to work with the employee representatives to find acceptable solutions. After all – and this is our firm belief – Bosch’s biggest strength is its associates with their expertise and ideas, their creativity and their commitment.

“Decoding tomorrow,” our first ever exclusively digital annual report, highlights the many different facets of our company’s skills and achievements, and illustrates how, as the title says, we are decoding tomorrow in the interest of our customers and of society in general.

The successful outcome of the 2021 business year, with significant sales and earnings growth despite a difficult environment, bolsters our confidence. That said, the challenges we face in 2022 are no less tough. We will do all we can to seize our opportunities despite them.

With best regards,

Dr. Stefan Hartung
Chairman of the board of management

Board of management

DR. STEFAN HARTUNG

FILIZ ALBRECHT

DR. MARKUS HEYN

DR. MARKUS FORSCHNER

ROLF NAJORK

DR. CHRISTIAN FISCHER

Board of management

Dr. Volkmar Denner[1]
Chairman

Corporate responsibilities
- Strategy, Organization, and Business Development
- Communications and Governmental Affairs
- Real Estate and Facilities
- Research and Advance Engineering[2]
- Technology[2]
- Chief Digital Office[2]
- Intellectual Property[2]

Subsidiary
- Bosch Healthcare Solutions GmbH

Regional responsibilities
China

Dr. Stefan Hartung
Chairman[3]

Technology, Innovation, and Digital Transformation

Functions and services
- Strategy, Organization, and Business Development[3]
- Communications and Governmental Affairs[3]
- Corporate Affairs[3]
- Human Resources Senior Management Personnel[3]
- Quality Management[4]
- Field Quality Board[4]
- Research and Advance Engineering[3]
- Intellectual Property[3]
- Digital Transformation[3]

Mobility Solutions business sector[1]
- Purchasing Direct Materials
- Quality Management
- Communications
- Performance Program
- Strategy

Divisions[1]
- Powertrain Solutions
- Electrical Drives

Business
- Healthcare Solutions[3]

Regions
China[3], India

Prof. Stefan Asenkerschbaumer[1]
Deputy chairman

Corporate responsibilities
- Finance, Reporting, and Treasury
- Performance Controlling, Risk Management, Mergers and Acquisitions
- Tax and Customs Duties
- Supply Chain Management
- Internal Auditing
- Global Business Services

Dr. Christian Fischer
Deputy chairman[3]

Consumer Goods business sector[2] Energy and Building Technology business sector

- Bosch Performance Excellence Office[1]
- Transformation and Performance Consulting[1]

Business
- Power Tools[2]
- BSH – Bosch and Siemens Home Appliances[2]
- Building Technologies
- Thermotechnology
- Bosch Global Service Solutions
- Smart Home

Regions[2]
Africa, Southeast Asia, Western Europe[1], Middle Eastern Europe[1], Russia[1], Middle East[1], Australia[1]

1. Until December 31, 2021
2. From July 1, 2021
3. From January 1, 2022
4. From July 1 to December 31, 2021

Dr. Michael Bolle[5]

Corporate responsibilities
- Research and Advance Engineering
- Technology
- Internet of Things and Digitalization
- Information Systems and Services
- Intellectual Property
- Quality Management
- Field Quality Board

Business units
- Bosch.IO Connect
- Bosch.IO X
- Residential IoT Services
- Software and Digital Solutions

Rolf Najork

Manufacturing and Quality, Industrial Technology business sector

Functions and services
- Manufacturing and Technology[3]
- ATMO – Manufacturing Tools and Systems
- Quality Management[3]
- Field Quality Board[3]

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

Regions[3]
North America, South America
Japan, South Korea, Australia

Harald Kröger[1]

- Systems Engineering and Technical Strategy Mobility Solutions

Divisions
- Chassis Systems Control
- Cross-Domain Computing Solutions
- Automotive Electronics
- Automotive Steering
- Bosch eBike Systems

Business unit
- Two-Wheeler and Powersports

Dr. Markus Heyn

Mobility Solutions business sector

Functions and services
- Cross-divisional Sales Organization[6]
- Mobility Sales and Customers[7]
- Mobility Company project[7]
- Marketing and Sales[1]
- Strategy, Sales, and Business Excellence[3]
- Purchasing Direct Materials[3]
- Communications[8]
- Performance Management[3]
- Systems Engineering and Technical Strategy[8]
- Quality Management[8]
- Software Development Services[3]
- Digital Business Mobility Solutions[6]

Business
- Powertrain Solutions[3]
- Chassis Systems Control[3]
- Electrical Drives[3]
- Cross-Domain Computing Solutions[3]
- Automotive Electronics[3]
- Automotive Aftermarket
- Automotive Steering[3]
- Connected Mobility Solutions[1]
- Bosch eBike Systems[3]
- ETAS[6]
- Software Defined Vehicle[8]
- BEG – Automotive Engineering Solutions
- Two-Wheeler and Powersports[3]

Regions[1]
North America, South America
Japan, South Korea, Australia

1. Until December 31, 2021
3. From January 1, 2022
5. Until June 30, 2021
6. Until January 31, 2022
7. From February 1, 2022
8. From January 1 to 31, 2022

Uwe Raschke[5]

Consumer Goods business sector

Division
- Power Tools

Subsidiary
- BSH Hausgeräte GmbH

Regional responsibilities
Western Europe, Middle Eastern Europe, Russia, Africa, Middle East, Southeast Asia (ASEAN), Australia

Dr. Markus Forschner[3]

Finance, Performance, and Global Services

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
- Global Business Services

Regions
Europe, Turkey

Filiz Albrecht

Human Resources, Legal, Compliance, and Sustainability

Functions and services
- Human Resources People and Culture
- Human Resources Transformation[3]
- Human Resources including senior executives[1]
- Legal Services
- Compliance Management
- Sustainability, Environment, Health and Safety

Presidents of the divisions

Manfred Baden
- 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
- Powertrain Solutions

Jan Brockmann
- Thermotechnology

Klaus Mäder
- Automotive Electronics

Rolf Najork
- Drive and Control Technology

Dr. Mathias Pillin
- Cross-Domain Computing Solutions

Dr. Elmar Pritsch[1]
- Connected Mobility Solutions

Dr. Tanja Rückert[9]
Thomas Quante[10]
- Building Technologies

Dr. Gerta Marliani
- Automotive Steering

Dr. Bernhard Straub[11]
Michael Budde[12]
- Electrical Drives

1. Until December 31, 2021
3. From January 1, 2022
5. Until June 30, 2021
9. Until May 31, 2021
10. From June 1, 2021
11. Until April 30, 2021
12. From May 1, 2021

Supervisory board report

PROF. STEFAN ASENKERSCHBAUMER

Ladies and gentlemen,

For the supervisory board of Robert Bosch GmbH, the close of 2021 marked the end of an era. For some ten years, Franz Fehrenbach had successfully chaired the supervisory board, showing the entrepreneurial far-sightedness and high level of commitment our company founder would have expected. The Bosch Group owes him a great debt of thanks. Heartfelt appreciation is also due to Dr. Wolfgang Malchow, who has also retired as a representative of the shareholders from the supervisory board. We welcome his successor Dr. Eberhard Veit.

A new generation took its place on the board of management as well. The supervisory board would like to thank the long-standing chairman of the board of management, Dr. Volkmar Denner, as well as the management board members Dr. Michael Bolle, Harald Kroeger, and Uwe Raschke, who also stepped down in 2021, for their successful work and great dedication.

The year 2021 presented the Bosch Group with formidable challenges. There was still no end to the Covid-19 pandemic. Supply bottlenecks and price increases for raw materials and primary products also resulted in considerable burdens. Nonetheless, sales and earnings grew significantly, and the company made further progress.

The supervisory board would like to thank all Bosch Group associates around the world for their untiring effort in times of protracted difficulty. For me as the new chairman of the supervisory board, it is extremely important that we – associates, board of management, and supervisory board – work together to successfully take our company forward in the spirit of our company founder.

The supervisory board once again fulfilled its legal and regulatory obligations with great care in 2021. Once again, meetings were carried out virtually in part, using the possibility provided by our company statutes. The board regularly devoted its attention to the development of the business environment, the business situation of the Bosch Group, and the outlook for the future. It solicited detailed information about the measures taken with respect to compliance, about the risk management system, and about significant risks such as cyber-risks, and requested an outline of the finance and capital expenditure planning, as well as of the business plan, for 2022.

Heightened scrutiny was given to the strategy of the Mobility Solutions business sector, and especially the adjustment measures that are required in the power-train field. The growth opportunities for Bosch in the consumer goods segment were discussed in detail, as was the inauguration of our wafer fab in Dresden, the biggest single investment in the company's history. 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 and issued an unqualified audit opinion on the annual financial statements and consolidated financial statements of Robert Bosch GmbH, as well as the accompanying management reports, as of and for the year ended December 31, 2021. 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 supervisory 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.

> "The supervisory board would like to thank all Bosch Group associates around the world for their untiring effort in times of protracted difficulty."

Stuttgart, March 2022
For the supervisory board

Prof. Stefan Asenkerschbaumer
Chairman

Supervisory board

Franz Fehrenbach[1]
Stuttgart
Chairman
Managing partner of Robert Bosch Industrie-treuhand KG, formerly chairman of the board of management of Robert Bosch GmbH

Prof. Stefan Asenkerschbaumer[2]
Stuttgart
Chairman
Managing partner of Robert Bosch Industrie-treuhand 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 Industrie-gewerkschaft Metall

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
Formerly general manager of Industry Platform, IBM Deutschland 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 Robert Bosch Car Multimedia GmbH, Hildesheim, and chairwoman of the combined works council of Robert Bosch GmbH

1. Until December 31, 2021
2. From January 1, 2022

Dr. Wolfgang Malchow[1]
Pliezhausen
Managing partner of Robert Bosch Industrietreuhand KG

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[2]
Göppingen
Managing partner of Robert Bosch Industrietreuhand KG, formerly chairman of the executive board of Festo AG

Dr. Richard Vogt
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, Graduate Institute of International and Development Studies, Geneva, research professor at INSEAD, Singapore, and president of the Centre for Economic Policy Research, London

Prof. Hermann Scholl
Stuttgart
Honorary chairman of the Bosch Group

1. Until December 31, 2021
2. From January 1, 2022

Industrial trust and international advisory committee

Robert Bosch Industrietreuhand KG

GENERAL PARTNERS

Franz Fehrenbach[1]
Stuttgart
Chairman of the shareholders' meeting

Prof. Stefan Asenkerschbaumer[2]
Stuttgart
Chairman of the shareholders' meeting

Dr. Wolfgang Malchow[1]
Pliezhausen

Dr. Eberhard Veit[2]
Göppingen

LIMITED PARTNERS

Prof. Stefan Asenkerschbaumer[1]
Stuttgart

Dr. Christof Bosch
Königsdorf

Dr. Volkmar Denner[1]
Pfullingen

Dr. Christian Fischer[2]
Stuttgart

Prof. Elgar Fleisch
St. Gallen

Prof. Lino Guzzella
Uster

Dr. Stefan Hartung[2]
Ludwigsburg

Prof. Michael Kaschke[2]
Oberkochen

Prof. Renate Köcher
Konstanz

Peter Spuhler
Weiningen

Dr. Eberhard Veit[1]
Göppingen

Robert Bosch International Advisory Committee

Franz Fehrenbach[1]
Stuttgart
Chairman

Prof. Stefan Asenkerschbaumer[2]
Stuttgart
Chairman

Prof. Lars G. Josefsson
Stockholm

Baba N. Kalyani
Pune

Pascal Lamy
Paris

Friedrich Merz[1]
Arnsberg

Yumiko Murakami
Tokyo

Prof. Volker Perthes[3]
Berlin

Ingo Plöger[1]
São Paulo

Paul Ryan
Janesville

Jing Ulrich
Hong Kong

Prof. Igor Yurgens
Moscow

1. Until December 31, 2021
2. From January 1, 2022
3. Until March 31, 2021

Highlights 2021

Mar 3

AI system for zero-defect production

The AI-based system developed by Bosch detects anomalies and malfunctions early on in the manufacturing process. It is rolled out at some 50 Bosch powertrain plants worldwide in 2021, and connected to more than 800 production lines.

Mar 26

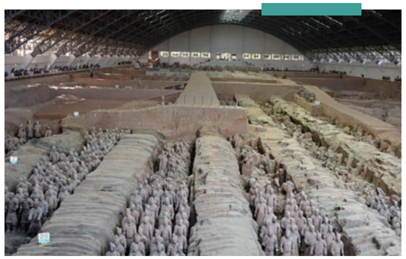
Protection for terracotta army

In Xi'an, China, Building Technologies has installed an intruder alert system in the mausoleum of Qin Shi Huang. This UNESCO world heritage site is home to a two-thousand-year old army of terracotta figures. This world-famous terracotta army guards the grave of China's first emperor. And several hundred Bosch motion detectors help prevent the figures being damaged or stolen.

Jan 5

Bosch Car Service turns 100

The first "Bosch installation and repair shop," opened in Hamburg, Germany, in 1921, gave birth to what is now the world's biggest brand-independent repair shop network, with more than 15,000 repair shops in 150 countries.



Feb 18

Development alliance with Microsoft announced

The aim is to develop vehicle software more quickly and easily throughout the car's lifetime, and to download it to control units and vehicle computers via the cloud.

Mar 29

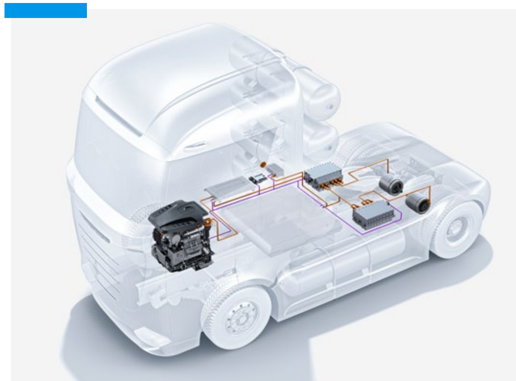
First real-life operation of a stationary fuel cell

In Bamberg, Germany, Bosch and the city's public utilities demonstrate how an entire city can be supplied with climate-friendly power from a local source.

Apr 14

Joint venture with Chinese truck manufacturer Qingling Motors announced

The new company, known as Bosch Hydrogen Powertrain Systems, will develop, assemble, and market fuel-cell systems for commercial vehicles for the Chinese market.



May 4

Covid vaccination program starts in Germany

In many countries around the world, Bosch supports local vaccination campaigns. In Germany alone, the company is capable of vaccinating up to 6,000 associates a day.

Jun 7

Wafer fab of the future opens in Dresden

The new wafer fab is the single biggest investment in the company's history, as well as its first AIoT plant, where natural and artificial intelligence work together with the internet of things. Highly automated, fully connected machines and integrated processes, combined with AI methods, make the Dresden plant a trailblazer in Industry 4.0.

May 3

Bosch, Shell, and Volkswagen present Blue Gasoline

The new fuel contains up to 33 percent renewables. From a well-to-wheel perspective, this means vehicles emit roughly 20 percent less CO_2.

Jul 30

Increased capacity for semiconductors

Bosch is further expanding its capacity for semiconductors with a new location in Penang, Malaysia. Above all, the new location will perform final tests on the chips and sensors made in other plants. Construction work started in May, and production is scheduled to start in 2023. The first stage is the test center, covering 14,100 square meters. Just under half this floor space has been set aside for clean-room production.

Aug 31

Fully connected cycling: Bosch eBike Systems debuts smart system

Thanks to the eBike Flow app, an intuitive control unit, display, battery power, and drive unit, riding an e-bike just became even more personalized.

Sep 24

Climate neutrality: Bosch advises the Weifu Group

Together with the Weifu Group and the Wuxi district authorities, Bosch China has signed a framework agreement relating to climate neutrality. Bosch will give the high-tech company and the local authorities advice on reducing CO_2 emissions, For Bosch, this is the first project of its kind in China.

Sep 6

World’s first electric-car charging cable for flexible recharging without a control box

The flexible smart charging cable weighs less than three kilos, 40 percent less on average than a conventional charging cable featuring a control box.

Oct 7

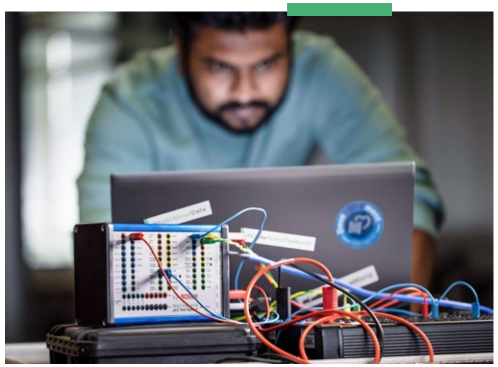
Premiere for AI solution Anysight

This plug and play solution shows how heating systems are working, gives early warnings of breakdowns, ensures smoother operation, and can reduce energy consumption by up to 30 percent.

Nov 9

Bosch to lead consortium in the silicon carbide project “Transform”

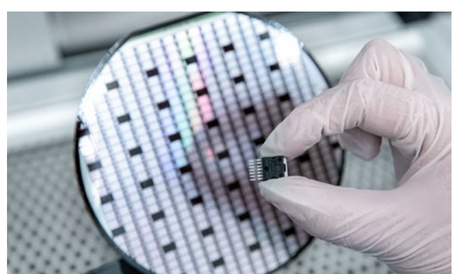
This publicly funded project aims to establish a robust European supply chain for silicon carbide semiconductor technologies. To achieve this, Bosch will work with 33 other companies, universities, and research institutes from seven European countries.



Dec 2

Green light for volume production of silicon carbide chips

Bosch wants to exploit its proprietary, highly complex manufacturing methods to become the globally leading producer of SiC chips, which allow electric vehicles to drive farther and recharge faster.



Dec 7

Development work for universal vehicle software pooled under the umbrella of ETAS GmbH

With an eye to achieving a leading position in the software-dominated future of mobility, Bosch announces that 2,300 experts from different areas of development work are to be brought together in one unit in mid-2022.

Dec 16

Plans to acquire Swiss Elpro Group AG announced

Established in 1986, the company employs a workforce of 220 and develops monitoring solutions for the pharmaceuticals, biotech, life science, and healthcare industries. Such solutions allow the uninterrupted monitoring of things such as cold chains.

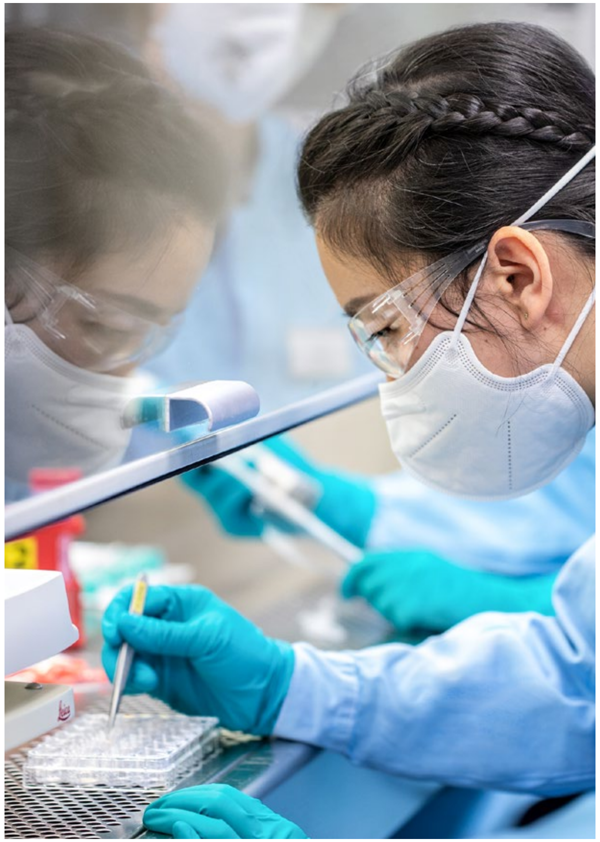
Dec 31

Judicious changeover

Bosch pins its hopes on a new leadership team, and completes a long-planned generational changeover on the board of management effective January 1, 2022. The new board inherit a company well prepared for sustainable growth.

Robert Bosch Stiftung

Since it was established in 1964, Robert Bosch Stiftung GmbH has been carrying on the company founder's public welfare endeavors. It helps smooth the path toward viable and innovative solutions for social challenges. The support it provides can take the form of projects of its own, of partnerships, and of grants for third-party initiatives. The foundation finances its work from the dividend it receives as a shareholder in Robert Bosch GmbH.



The scientists working at the Institute for Clinical Pharmacology (shown here) on the Bosch Health Campus are also researching into drug-based treatment.

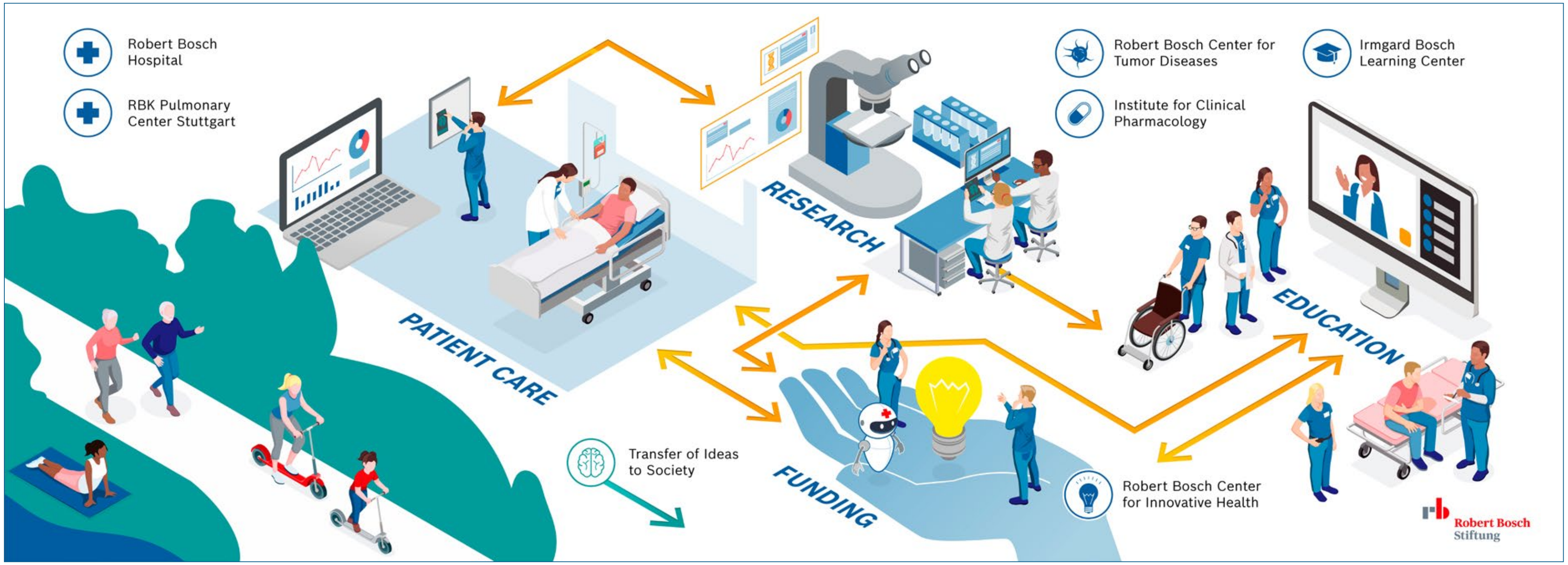
New management

Effective July 1, 2021, Dr. Bernhard Straub left Robert Bosch GmbH to join the management board of the foundation. He assumed overall management effective May 1, 2022.

Following the conclusion of a fundamental strategy process last year, the foundation now focuses its support on three areas: healthcare, education, and global issues. At the same time, the type of support it provides has changed significantly. Increasingly, the focus is on collaborative approaches in which the foundation pools its resources and expertise in order to maximize the impact of its work.

Rethinking healthcare

For Robert Bosch Stiftung, healthcare has been a central concern ever since it was established. In this, it is following in the footsteps of its eponym and his broad-based understanding of health, with the Robert Bosch Hospital at its



Bosch Health Campus: Patient care. Research. Education. Funding.

center. Today, the foundation is working to strengthen the viability of the healthcare system beyond regional healthcare provision. After all, the healthcare system is currently undergoing rapid change. The change is being driven by megatrends such as aging, digitalization, and technological innovation, as well as by global developments such as migration and climate change.

In setting up the Bosch Health Campus, the foundation is reacting to these challenges and rethinking healthcare. At the Robert Bosch Hospital in Stuttgart, which is owned by the foundation, it brings together all its institutions and activities in the healthcare sphere: patient care, research, education, and funding are closely coordinated on this site. For example, hospital patients benefit from the latest research findings of the Institute for Clinical Pharmacology and of the Robert Bosch Center for Tumor Diseases in areas such as cancer research and drug-based treatment. For their part, researchers learn from the practical results of their treatment and consolidate them. These new insights find their way into the syllabus of the Irmgard Bosch Learning Center for medical and nursing staff. The integrated support area – the Robert Bosch Center for

Innovative Health – turns the campus into a living lab promoting promising ideas for a viable healthcare system oriented to people's needs.

Following three years of work, the foundation presented concrete proposals and demands for urgently needed healthcare reforms at the “Neustart!” (new start) health summit in Berlin in June 2021. The proposals include the widespread establishment of primary care centers that ensure basic care on a local level and provide people with help tailored to their individual circumstances. In Germany, an idea of what such health centers could look like is provided by the 13 PORT centers (patient-oriented centers for primary and long-term care) that Robert Bosch Stiftung is supporting financially as a model project in nine federal states. The foundation will continue to work on establishing this approach, which is also enshrined in the new federal government’s coalition agreement.

Shaping the future of education

In its education work, Robert Bosch Stiftung advocates a future-oriented education system that is equitable, effective, and geared to the well-being of children and adolescents. It also looks at how current developments such as digitalization will affect people, institutional learning, future coexistence, and tomorrow’s world of work.

In view of the huge challenges schools are facing in the Covid-19 pandemic, the foundation last year announced a special competition for the Deutscher Schulpreis (German school award). With the pioneering models they had developed for dealing with the coronavirus crisis, nearly 400 schools applied to take part in this prestigious competition, which the foundation has been organizing since 2006. In May 2021, Federal President Frank-Walter Steinmeier awarded seven of them with the “20|21 Spezial” German school award. This year again, the prize will focus on schools that have taken advantage of the boost to innovation provided by the pandemic. The central concern will be the quality of the learning experience. The foundation analyzes and adapts the award-winning models for classroom practice, and then makes them available through channels such as in-service training, publications, and the online “German school portal.” This cycle reinforces and disseminates good classroom practice.

Meeting global challenges

When supporting work on global issues, the foundation has brought its contributions to solving global challenges under six headings: democracy, immigration society, peace, climate change, migration, and inequality. It devotes special attention to the way these issues interact. The following section looks at some selected examples.

On the subject of democracy, the foundation works to promote a constructive culture of debate, both online and offline, as well as the ability to tolerate differences of opinion, to see things from a different perspective, to compromise, and to think critically – in other words, for the democratic competence that is the basis of political and social engagement. A study carried out in Germany, Poland, France, the United Kingdom, and the United States and published last year together with the organization

The German Federal President Frank-Walter Steinmeier presented seven schools with the “20|21 Spezial” German school award – an award for the best models of classroom practice developed during the Covid-19 pandemic.

Health summit in Berlin: As part of the “Neustart!” (new start) initiative, members of society, scientific experts, and healthcare practitioners developed proposals for a reform of the healthcare system and presented them to the public.

At the COP 26 Climate Change Conference, Robert Bosch Stiftung presented a project to restore drylands in the Sahel.

"More in Common" shows that while a great majority of people are fundamentally affirmative of democracy, many think that their concerns are not heard and that their vote makes no difference. Frequently, the result is complacency, but also a subjective feeling of disorientation and even sympathy for authoritarian alternatives. This is why one of the foundation's approaches here is to strengthen innovative participatory formats as a complement to representative democracy, so that more people can take part in the organization of political processes.

With its work relating to climate change, the foundation wants to help create a fair transition to a climate-positive system of land use that can also absorb the impact of climate change. The focus here is on renewable agricultural and forestry practice in Europe and Africa, as well as on climate-friendly food production and a political framework geared to sustainability. One of the projects presented by the foundation at the UN Climate Change Conference in Glasgow is concerned with restoring drylands in the Sahel. It also took part in many events organized by its partners, such as the Global Alliance for the Future of Food.

The foundation's work in the migration field supports far-sighted, inclusive approaches that center around human dignity as a guiding principle. Last year, it joined the Africa Climate Mobility Initiative (ACMI) created by the African Union Commission, the UN, and the World Bank. The initiative promotes data-based solutions when adapting to climate-related migration, campaigns for migrants' rights, and strengthens African communities' resilience in the face of the climate crisis. The foundation also supports local innovations, applied research, and the inclusion of relevant stakeholders in policymaking, as in the case of the Mayors Migration Council, an international organization made up of mayors from cities such as Los Angeles, Bristol, and Zürich.

Study finding: Many people are fundamentally affirmative of democracy, yet also think that their concerns are not heard.

On the subject of inequality, the foundation wants to find out how systemic inequality can be effectively reduced, thus allowing everyone a life of dignity and equal opportunity. To achieve this, the foundation supports players who advocate this objective, taking both the interaction between different forms of inequality and its structural causes into consideration. Reducing Inequalities Through Intersectional Practice, a program set up in 2021, supports 11 organizations that want to reduce inequality by focusing on the overlap between various mechanisms of structural disadvantage – from origin, gender, and migration to climate change and technology.

Evidence-based recommendations and international perspectives

In all the areas it supports, the foundation encourages the development and dissemination of evidence-based recommendations for action and relevant solutions for social challenges. It gives scientists food for thought and builds bridges between science and society. At the same time, also under the auspices of the Robert Bosch Academy, it promotes open dialogue between policymakers and opinion leaders on the one hand and international experts from diverse disciplines on the other. In this way, it reinforces the social and political processes of debate and decision making, and enriches socio-political discourse by bringing in international perspectives.

On the invitation of the federal president, fellows of the Robert Bosch Academy met at Bellevue Palace to discuss Germany's role in the international order (shown here: Kuni Naidoo (*far left*), a human rights and environmental activist from South Africa, and María Fernanda Espinosa (*far right*), a politician from Ecuador).

in millions of euros **G 01**

Funding in 2021

76.43

23.87	**Global issues (aggregated)**
13.38	**Research at institutes and the Robert Bosch Hospital**
9.66	**Education**
8.61	**Strategic partnerships and Robert Bosch Academy**
5.57	**Capital expenditure for the Robert Bosch Hospital**
3.57	**Healthcare**
1.73	**Robert Bosch College UWC GmbH**
1.59	**International Alumni Center gGmbH**
8.45	**Other grants**

GROUP MANAGEMENT REPORT

of Robert Bosch GmbH as of December 31, 2021

The Bosch Group rose well to the challenges of 2021. Expectations were exceeded in terms of both sales and result, although the global coronavirus pandemic and considerable supply bottlenecks again had a negative impact on business developments. The severe chip shortage in the automotive sector was a particular burden, with the result that automotive production only slightly exceeded the level of the crisis year 2020. Moreover, raw materials prices, which increased considerably overall, had to be absorbed. Nonetheless, the company performed well, with the Bosch Group’s high level of innovation and broad diversification in very divergent business sectors and regions once again playing a role. Consequently, all business sectors were able to increase their sales and disclose a positive result for 2021. At the same time, we succeeded in driving forward many strategic projects. One special event was the inauguration of our new wafer fab in Dresden.

A considerable question mark hangs over the 2022 business year with respect to the course and impact of the war in Ukraine. In addition to this, there are still the imponderables of the coronavirus pandemic and of the supply bottlenecks, especially for semiconductors. Assuming that our business environment is not disrupted to any further considerable degree, we expect that Bosch Group sales will increase 6 percent and that EBIT margin from operations will remain largely stable. In addition to addressing these currently pressing challenges, our focal points will include the further positioning of the company in light of revolutionary market developments such as increasing electrification in response to tougher climate action requirements. There is also the issue of automation in conjunction with smart connectivity and data utilization in an intensely competitive global environment. The task of the new board of management, which was constituted at the beginning of 2022, will be to adapt the Bosch Group’s configuration and organization to these focal points.

Fundamental information about the group

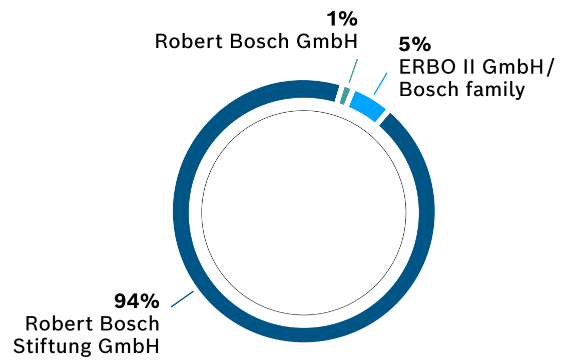
The group

The Bosch Group is a global supplier of technology and services, and generates nearly half its sales outside Europe. The group encompasses around 440 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 currently 94 percent of the share capital of Robert Bosch GmbH, the not-for-profit foundation Robert Bosch Stiftung 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 founder's descendants via the not-for-profit ERBO II GmbH. Of the voting rights, 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 remaining 7 percent of voting rights are held by the founder's descendants. This ownership structure guarantees the Bosch Group's entrepreneurial independence.

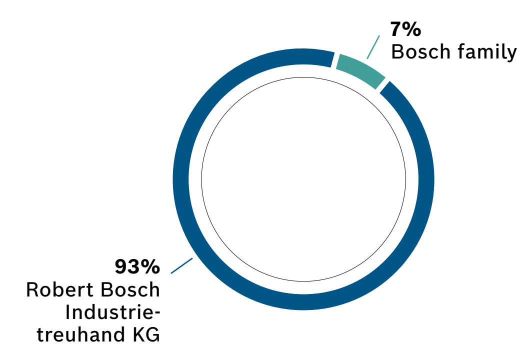
G 02

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 400,000 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 connectivity over the internet, the considerably increased importance of sustainability – and 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 the growth of electrification, automation, connectivity, multimodal mobility, and, related to this, cross-domain automotive electronic architectures and an increase in the significance of software in vehicles and for value creation. These trends are attracting additional suppliers from industries such as consumer electronics and semiconductors, from the services and internet sector, and from the providers of mobility platforms.

In addition, automakers are expanding their own value creation in the promising areas of electronics, software, and electromobility. Other important factors for our activities are the significant decline in the proportion of passenger cars fitted with diesel engines in the important European and Indian markets and the increasingly stringent statutory standards 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 and BSH Hausgeräte divisions orient to end-user and consumer requirements. These solutions compete with those from both global and regional providers. Even before the coronavirus pandemic, there was growing evidence in both divisions of a global shift from traditional brick-and-mortar retail to online commerce. This trend has gained momentum as a result of the pandemic.

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 involved in energy and building technology are converging. The Bosch Global Service Solutions division is active with its services in a fragmented market featuring both large international rivals and smaller local providers.

Corporate governance

The board of management of Robert Bosch GmbH defines the strategy for the entire company and leads the company as a whole. Its 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 as part of a generational change. 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, above all, 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 2017, the supervisory board of Robert Bosch GmbH set Robert Bosch GmbH targets for the proportion of women, to be met by the end of 2021. These were 20.0 percent on the supervisory board and 10.0 percent on the board of management of Robert Bosch GmbH. As of December 31, 2021, six of the 20 members of the supervisory board of Robert Bosch GmbH were women. Women thus make up 30.0 percent.

Since January 1, 2021, there has been one woman on the board of management of Robert Bosch GmbH in the person of Filiz Albrecht, resulting in a proportion of women of 12.5 percent among board of management’s eight members at the end of 2021. The 2017 targets were thus met. With the departure of Volkmar Denner, Stefan Asenkerschbaumer, and Harald Kroeger from the board of management at the end of 2021, and with Markus Forschner joining the board of management at the beginning of 2022, the proportion of women on the board of management of Robert Bosch GmbH is 16.67 percent.

Moreover, in December 2021, the supervisory board of Robert Bosch GmbH adopted new targets for the proportion of women. The targets adopted by the supervisory board are 30.0 percent for the supervisory board of Robert Bosch GmbH and 16.67 percent for the board of management of Robert Bosch GmbH (this equates to one woman among the board of management’s six members). The deadline for achieving both targets was set as December 31, 2025.

Further targets for the proportion of women have existed for the Bosch Group in Germany since 2017. They are 8.0 percent for the first management level below the board of management and 12.0 percent for the second management level. At year-end 2021, the proportion of women on the first management level was 9.3 percent and on the second management level 15.0 percent. The targets were thus exceeded.

In December 2021, the board of management of Robert Bosch GmbH adopted new 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.

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 18.4 percent in 2021 (previous year: 17.8 percent). We intend to keep on increasing this percentage. At present, our target is 20 percent.

Description of business sectors

Mobility Solutions business sector

As a supplier of original automotive equipment, Bosch is engaged in a wide range of activities, which are organized into six divisions. The 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 Connected Mobility Solutions division was dissolved effective year-end 2021.

Powertrain Solutions

The Powertrain Solutions division offers products and solutions for powertrain technology, from gasoline and diesel direct injection to electrified powertrains with battery systems and fuel-cell technologies, for passenger cars and commercial vehicles including off-highway vehicles. Where

G 04

Bosch Group business sectors (divisions)

Mobility Solutions	**Industrial Technology**	**Consumer Goods**	**Energy and Building Technology**
Powertrain Solutions	Drive and Control Technology[2]	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			
Connected Mobility Solutions[1]			
Bosch eBike Systems			

1. Until December 31, 2021

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

combustion engines are concerned, its portfolio comprises solutions and systems based on diesel, gasoline, natural gas, ethanol, 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 purely electric vehicles, and for vehicles with fuel-cell powertrains. Products range from electric motors, power electronics, battery systems such as the 48-volt battery, battery management systems, and transmission technology to complete e-axles. These compact units comprise electric motor, power electronics, and transmission. For fuel cells, Powertrain Solutions offers both components – such as electric air compressors, hydrogen injectors, tank valves, control units, and sensors – and stacks and complete power modules. With initial solutions for cross-domain ECUs and cloud-based approaches, the division is responding to the growing demand for IoT solutions such as remote diagnostics.

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 ABS, ESP®, vacuum-based brake systems, vacuum-independent brake boosters (iBooster), and combined systems (integrated power brake). Its passenger protection systems encompass airbag control units and the associated crash sensor technology. 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) has so far supplied brake discs for passenger cars.

Electrical Drives

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

Cross-Domain Computing Solutions

Bosch's Cross-Domain Computing Solutions division is a response to the changing requirements in the rapidly growing market for software-intensive electronic systems in the automotive sector. The electrical/electronics architecture is evolving into a cross-domain, centralized architecture featuring a small number of vehicle computers, which are also very powerful, instead of many individual control units. Since January 2021, the division has been Bosch's full-service provider

of the relevant software and electronics expertise. It is responsible for hardware and software for vehicle computers, sensors, and control units for numerous automotive applications such as driver assistance and infotainment.

Automotive Electronics

The Automotive Electronics division is on the one hand an in-house manufacturing and engineering service provider for electronic control units and semiconductors (integrated circuits and sensors). On the other, it manufactures semiconductor products and sensors for the external market. Its semiconductors for automotive applications range from application-specific integrated circuits (ASICs) through 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 auto 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. 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. Up to now, its portfolio has also included steering and gear pumps 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. The dominant steering systems in commercial vehicles are hydraulic and, increasingly, electro-hydraulic.

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 ACC adaptive cruise control, the MSC motorcycle stability control system, powertrain technology, display instruments, and connectivity solutions. The cross-divisional unit can draw on the global 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.

Bosch Engineering also 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 Bosch companies that form **ETAS GmbH,** based in Stuttgart, Germany, provide solutions for embedded software systems that are used in the automotive and other industries. The company is expanding the scope of its activities to include basic vehicle software, middleware, cloud services, and development tools. Its subsidiary ESCRYPT GmbH, based in Bochum, Germany, develops cybersecurity solutions.

Industrial Technology business sector

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

Drive and Control Technology

The 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 applications, 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.

Other businesses

Robert Bosch Manufacturing Solutions GmbH, a provider of automation and assembly solutions based in Stuttgart, Germany, develops flexible, scalable, and intelligent plans for assembly systems, customized solutions in the field of testing and process technology, and related services. The Industrial Technology business sector also includes the **Bosch Connected Industry** business unit. With a focus on Industry 4.0, it develops software solutions and carries out projects for internal and external customers.

Consumer Goods business sector

This 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. The 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 users are also sold under the Dremel brand.

BSH Hausgeräte

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, cooktops, ovens, extractor hoods, and dishwashers, to small appliances such as vacuum cleaners, coffee makers, and connected food processors. The home-appliance specialist sells its products under the global Bosch and Siemens brands (under license). It also sells under its own 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 Kitchen Stories.

Energy and Building Technology business sector

As well as the Building Technologies, Thermotechnology, and Bosch Global Service Solutions divisions, this business sector also 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

Worldwide, Thermotechnology offers its customers solutions for sustainable home comfort. It provides heating and air-conditioning systems, energy management for residential buildings, and water heaters, and is active in the business of constructing plant for commercial and industrial steam and hot-water generation, heating, and air conditioning. The product portfolio includes condensing boilers, heat pumps, hybrid systems, air-conditioning systems, ventilation equipment, 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, Worcester, elm.leblanc, and Nefit.

Bosch Global Service Solutions

The Bosch Global Service Solutions division provides technology-based services primarily for customers in the automotive, financial services, and logistics industries, and in information and communications technology.

Other businesses

Robert Bosch Smart Home GmbH, Stuttgart, Germany, 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 cameras, 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 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 new 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.

Prospects for the Bosch Group

Fundamental strategic orientation

The starting point for our goals and strategies is 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 enduring ambition is to develop products that are "Invented for life," 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 that go with them.

We are driving forward innovations in both products and business models, operating in new business fields, and further modifying our organization in the process. We want to use connectivity on the internet of things (IoT), combined with artificial intelligence (AI), to continuously improve our products and services, including our manufacturing processes. Climate action, and sustainability in general, are also two of our paramount strategic focal points for the future. Moreover, the coronavirus pandemic in particular has made it clear how important it is for supply and value chains to be robust.

The Bosch Group is undergoing a phase of fundamental change in technologies and markets. Besides digitalization, increased connectivity over the IoT, and the opportunities that artificial intelligence opens up, this is also due above all to growing global concern about climate change, geopolitical developments, and social trends such as increasing urbanization. Connectivity is affecting all our areas of business, from mobility solutions, industrial technology, and consumer goods such as home appliances and power tools, through to building and energy technology. Increasing electrification is revolutionizing our business as well, especially in automotive technology, but also in industrial technology and energy and building technology. The coronavirus pandemic has accelerated the trend toward digitalization in many walks of life.

As affirmed in our "We are Bosch" mission statement, one of our strategic focal points is shaping change, taking into account the aspects of connectivity, electrification, energy efficiency, automation, and emerging markets. It is our ambition to play a part in molding the far-reaching changes in markets and technology. Apart from shaping change, our strategic focal points are customer focus and excellence.

Customer focus means having a precise understanding of customers' needs and using this understanding to find the best possible solutions for products and business models. Excellence in all areas is essential in order to enduringly achieve our business targets. In this respect, we measure ourselves against our best competitors. We believe that efficient processes, lean structures, and high productivity will help us maintain and increase the value of our company. A business environment that is changing at an ever faster pace also calls for a very high degree of adaptability and agility. To achieve this, we are further modifying our understanding of leadership, collaboration, organization, and communication, as well as the models based on these concepts.

When putting our strategy into practice, we build on the Bosch culture, on our high level of innovativeness, which is also measured in terms of our research and development spending, on quality, and on our broad diversification and global presence. 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.

Ample opportunities

For the Bosch Group, changes in markets and technology are opening up ample opportunities – especially as a result of connectivity, automation, and electrification, the growing importance of sustainability, and through additional business in emerging regions such as ASEAN and Africa. Products are becoming less expensive, being made increasingly smart, and also being connected to the internet more and more often. 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 enhancing our proficiency in the areas of connectivity and artificial intelligence, which we see as fundamental for the design of intelligent, user-friendly products, services, and processes.

In addition to the Industrial Technology and Energy and Building Technology business sectors, automation affects the Mobility Solutions business sector in particular, where we are expecting strong market growth in partially and highly automated driving.

Where industrial technology is concerned, many opportunities arise 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 new 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 through new services such as maintenance and additional business with leasing models.

Electrification is of particular importance for Mobility Solutions, our biggest business sector. The key drivers for electrification and electromobility are emissions standards aimed at complying with climate targets and improving urban air quality, falling battery costs, and 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 new market opportunities.

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 demand for affordable products – frequently ones that meet the special requirements of the local market, such as robustness and ease of repair.

Business goals and strengthening profitability

Our most important business goal is to grow profitably, both organically and as a result of acquisitions. Given the fundamental changes in the market and competitive environment in some areas of our business, and also the need to curb growing complexity, this may also require adjustments to our portfolio, as was the case in the past. It remains our goal to grow more rapidly than the market, to increase our sales in Asia Pacific and the Americas faster than in Europe, and to grow our presence in Africa. Broad diversification across different business sectors is also essential for securing the company's economic independence. In terms of sales, we continue to aim for a balance between Mobility Solutions and our other business sectors.

We intend to grow by innovating and by opening up new markets, but also by acquiring companies and entering into partnerships. For the Bosch Group, it remains our target to achieve an EBIT margin from operations of some 7 percent, a level to which we want to return in the medium term. The target for our EBIT margin from operations is derived from a regular comparison with our operating units' competitors. It takes into account the upfront investments in future growth that our operating units have planned. The negative effects on earnings from increased depreciation and amortization as a consequence of the complete takeover of the former joint ventures Automotive Steering and BSH Hausgeräte are not taken into account in the target margin from operations.

In order to achieve the target for EBIT margin from operations, the company adopted a multi-year performance program in 2020. It covers all business sectors, corporate departments, 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.

Strategy and innovation

Group-wide topics

Digital business and AIoT

We are systematically digitalizing our core business in order to enhance customer benefit. In the future, we aim to generate additional services-based revenue with connected products. We see the fusion of artificial intelligence (AI) with the IoT (AIoT) as a key technological factor in our future strategy. In particular, AIoT provides an opportunity to stay in touch with customers throughout the entire product life cycle. Our objective is to use connected, intelligent solutions to make life easier, more efficient, safer, and also more sustainable for as many people as possible – completely in line with our “Invented for life” ethos.

The core elements of our strategy are the expansion of our third-party business with digital solutions and the harnessing of the power of AIoT for intelligent in-house processes – whether in development, production, logistics, or administration. To this end, we need to broaden knowledge within the company of the opportunities and requirements of digital business. In addition to providing skills in AIoT, the focus is on appreciating the opportunities for value creation provided by information technology (IT). Moreover, we are expanding the career paths for software professionals, including different expert levels for software engineers and developers.

We regard the breadth of our presence in diverse markets and industries as an advantage, providing us with comprehensive insights. This domain knowledge also helps us establish and expand ecosystems such as ctrlX AUTOMATION in industrial engineering. Over the medium term, we especially want AIoT to help us significantly increase the contribution that annually recurring revenue makes to sales. This contribution is still low. Our intention here is to make our business operations more independent of cyclical fluctuations.

In recent years, the initial focus for connectivity and AIoT was on building the technological basis, creating the conditions and the organization, and empowering associates. Now, however, the focus is on commercialization and scaling. That is why we are also reallocating our third-party business, which was previously assigned to the corporate operating unit Bosch.IO, to the divisions. The aim is to operate as closely as possible to the market. Bosch.IO is now tasked exclusively with supporting the divisions in developing our AIoT and digital business. This means that the Berlin-based subsidiary Bosch.IO GmbH will no longer have dealings with third parties as an independent company.

The technological basis now in place throughout the company comprises four elements. The Bosch IoT Suite connects different devices to the relevant IT infrastructure (backend) solutions and collects the data transmitted by these devices. The Bosch hybrid cloud acts as a universal platform for securely processing and storing data. The RED Lake (Robert Bosch Enterprise Data Lake) gives the data structure and makes it accessible in the company. The AI platform (under construction) analyzes the data, generates knowledge, and determines what action to take. The aim is to gradually grow the number of active customers and of products that are in fact digitally connected, to intensify the company's data focus, and to advance the maturity of the AI platform.

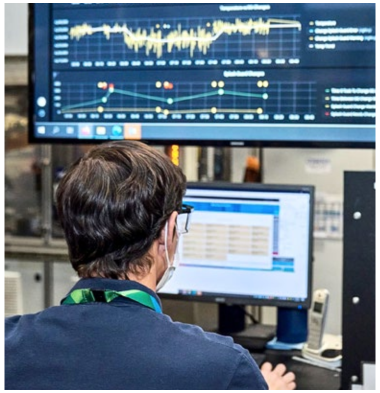
By the end of 2021, all our electronic product classes were connectable. We track progress – such as the number of registered customers and subscribed services – on an IoT dashboard, which is continually being improved. On the technical side, rapid scaling is enabled by integrating content and services from external partners, such as cloud services. Our clear corporate guidelines provide a frame of reference for development work.

In the shape of the Bosch Center for Artificial Intelligence (BCAI), we have a center of competence which operates at seven locations in Germany, the U.S., China, India, and Israel. What began as an in-house research facility will in the future also have the mission of focusing on commercializing and scaling AI solutions within the company. Bosch now has more than 1,000 patent families in the field of artificial intelligence, the majority of them attributable to BCAI as a center of competence.

One example is Manufacturing Analytics Solutions, a system for the continuous collection, visualization, monitoring, and analysis of manufacturing data. It enables associates at Bosch plants to analyze manufacturing processes, detect anomalies with the help of AI, and identify and eliminate the causes of irregularities at an early stage. The system was rolled out further in 2021. We have published a code of ethics that governs our use of artificial intelligence. Our maxim is that humans should be the ultimate arbiter of any AI-based decision. Our aim is to develop safe, robust, and explainable AI products.

The growing importance of software and information technology goes hand in hand with activities and learning programs that pave the way to acquiring new skills. In 2020, Bosch launched a comprehensive AI training program to make almost 30,000 associates AI-savvy. It includes training formats at three different levels for managers, engineers, and AI developers.

First, we are training more than 25,000 executives in the commercial aspects of AI. We are also expanding our AI learning platform. The platform serves as a kind of online university, using practical examples and exercises from within the company. In addition, a virtual and informal learning event (Global Days of Learning) was offered for the first time by and for our associates worldwide. The goal of the format is to learn from each other in a self-directed way, across locations and business areas. In ten days, 150,000 attendees took advantage of the more than 500 sessions with more than 800 hours of learning opportunities for personalized training.



Sustainability

Bosch wants to keep the environmental impact of its operations to a minimum. To fulfill this ambition, we have had a global environmental management system in place for many years. Through our strategies – backed by ambitious targets – we make it our particular aim to drive climate action worldwide. Our activities in this field are increasingly going beyond our direct sphere of influence to include supply chains and use of products sold.

We want to be a climate action pioneer. Our strategy for this relates to the company's own value creation and comprises four levers: improving energy efficiency, expanding renewable power generation, procuring more green electricity (i.e. generated from renewables), and – as a final option – offsetting unavoidable CO_2 emissions. With its more than 400 locations worldwide, Bosch's business operations have been carbon neutral in both Scope 1 (direct emissions) and Scope 2 (procured power) since 2020. It was the first automotive supplier worldwide to achieve this, and in doing so has reached an important initial target.

Our goal is to optimize the above-mentioned mix of measures so as to further reduce the burden on the climate. In 2021, we reduced the proportion of offsets needed to achieve carbon neutrality, among other things by expanding renewable power generation (new clean power). Also in 2021, we entered into long-term supply agreements with energy suppliers in Germany, India, and the Netherlands, thus enabling the construction of new renewable energy plants. Each of these energy suppliers has an exclusive agreement with Bosch to supply electricity from subsidy-free photovoltaic and wind power plants. In addition, we are sourcing green electricity for our sites in more and more countries. In 2021, for example, we switched supply contracts in Turkey and parts of Australia to green electricity.

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 CO_2 emissions by 15 percent compared to absolute emissions in the baseline year of 2018. This target has been reviewed and endorsed by the Science Based Targets initiative (SBTi). 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 of our products. In doing so, we aim to reduce the amount of material used in our products, and their carbon footprint. One aim is to create a circular economy either directly within Bosch or outside our company as part of established recycling cycles. Examples include the use of recycled plastics in power tools or recyclable home appliances.

Bosch also places great importance on occupational safety. We see preventing accidents and providing workplace safety as part of our responsibility. To fulfill this responsibility, we have lowered our 2020 target of no more than 1.7 accidents per 1 million hours worked to 1.45, and want to meet this target by 2025.

Robustness

The coronavirus pandemic has shown us how important it is to protect associates' health and secure supply chains. In this respect, we want to ensure our company is robust for the long term. In 2021, the health and occupational safety of our associates remained a top priority due to the ongoing coronavirus pandemic. Our wide-ranging reporting tools, which provide up-to-date information on how the pandemic is developing in the various countries, on cases of the virus at Bosch, on capacity utilization at the plants, and on safeguarding supplies to customers, continued to be central to managing the situation.

In addition, extensive hygiene measures and rules of conduct – tailored to meet the requirements of various regions – applied in the company. As a result, we were able to keep infections within the company to a minimum. These measures also included extensive options for working from home – which in some cases were required by law – and for virtual collaboration. Based on positive experience with remote working, we developed worldwide guidelines and added new options to our existing range. This opens up additional flexibility for both associates and the company.

In contrast to 2020, the coronavirus pandemic itself caused considerably fewer direct production cutbacks at Bosch in 2021. However, chip shortages were a major challenge, with the automotive sector being affected the worst. Since spring 2021, the scarcity has become steadily more acute.

We responded to the bottlenecks early on and created several task forces for areas such as purchasing, logistics, quality assurance, development, and customer support. Our objective, together with our customers, is to limit the consequences of the bottlenecks as far as possible. Other business sectors such as Consumer Goods are increasingly feeling the effects of the chip supply shortages as well. The divisions' development teams are therefore cultivating alternative suppliers and carrying out change projects. At the same time, we will increase our capital expenditure in the semiconductor segment, expand capacity at our Reutlingen site, and accelerate the ramp-up of our new wafer fab in Dresden.

Mobility Solutions

The automotive industry is in flux. After peaking in 2017, global automotive production has been falling since 2018. Moreover, temporary factory closures in the automotive industry in response to the coronavirus pandemic caused production figures to fall by a further significant amount in 2020. In the 2021 business year, supply shortages, particularly of semiconductors, meant that automotive production remained nearly on a par with the previous year despite the lifting of many pandemic-related restrictions. Only over the medium term do we expect a recovery to pre-crisis levels. Here, we anticipate a further increase in personal and goods transport in the coming decades, driven by factors such as population growth and increasing prosperity.

In this process, mobility will change radically. The reasons for this are, on the one hand, climate targets and the associated further tightening of standards for carbon emissions and, on the other, more stringent exhaust emissions, new technological possibilities, and changing user preferences, particularly in relation to connectivity. Connectivity opens up the possibility of new types of mobility concepts and services. Software updates mean that new driving functions can be added to vehicles even after delivery. At the same time, the further increase in traffic poses additional challenges in terms of safety and the optimum use of transport infrastructure. All these trends will have repercussions for technological developments. For example, they will affect electric vehicles, vehicle connectivity, driver assistance systems, and automated driving.

Our vision of the future is for mobility to be sustainable, safe, and exciting. In this context, our ambition is to be the biggest automotive supplier by revenue, even in a changing market, and to help shape change in the automotive industry. We expect attractive business potential, and hence growth opportunities, for Bosch through innovations, the further strengthening of our software expertise, the growth of further business segments, and additional services.

The focal points of our strategy for further growth include driver assistance systems and automated driving, electrified vehicle powertrains, fuel cells, vehicle computers, software, semiconductors, partially integrated vehicle systems, as well as services related to mobility and logistics services. At the same time, we are driving forward existing business areas and growing our activities in segments such as e-bikes and motorcycles, as well as the broad range of commercial vehicles.

Both the fast pace of change and the convergence of different business areas – due to new electronics architectures featuring just a few central control units and new software operating systems – are making even more cross-business collaboration necessary. In the future, we want to reflect this in an appropriate management structure. This structure will be defined in more detail in the course of 2022.

In addition, further strategic steps have been taken. At the beginning of 2021, the Cross-Domain Computing Solutions division went into operation. Its activities focus on application-specific vehicle software and specific hardware for numerous vehicle areas such as driver assistance and infotainment. It was also decided to transfer the areas covered by the Connected Mobility Solutions division, which was dissolved at the end of 2021, to the Powertrain Solutions and Cross-Domain Computing Solutions divisions and to the subsidiary ETAS. This reassignment is a response to the changing market. In the future, therefore, basic vehicle software, middleware, cloud services, and development tools for universal application will be developed and sold under the ETAS umbrella. A total of 2,300 experts from different development areas of Bosch and ETAS are to be brought together there from mid-2022. In this way, we want to create a central framework and platform that will enable us – also together with partners – to develop application-independent software more quickly and efficiently. This solution is intended for automakers and automotive suppliers.

In February 2021, we entered into an alliance with Microsoft to jointly develop a software platform for seamlessly connecting cars and the cloud. This platform will be used to develop new software throughout a car's lifetime as well as to upload updates to ECUs and vehicle computers via the cloud. The software platform is based on Microsoft Azure and includes Bosch software modules. Through this alliance, we want to shorten innovation cycles and reduce development costs for vehicle software.

We are also adjusting the structures in the Mobility Solutions business sector to strengthen its competitiveness and prepare it for future business developments. In 2021, these adjustments included a series of personnel measures, which primarily affected the Powertrain Solutions, Automotive Steering, and Electrical Drives divisions. We also hived off or prepared the divestment of a number of businesses. This related to steering pumps, the sorting and preparation of used spare parts for reuse, brake and brake disk activities, and vacuum and hydraulic pumps. Overall, we are working to boost the business sector's profitability so that it can exploit its long-term opportunities for growth in those areas of future importance in which we are making considerable upfront investments.

Profound change in powertrain technology

Ever-tighter emissions regulations are making the changes in powertrain technology particularly acute, also with respect to diesel technology. As a company, we are committed to the very ambitious Paris climate targets. We pursue a technology-neutral approach 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.

We want to help make mobility carbon neutral. On the one hand, electric vehicles powered by electricity from renewables will help achieve this. On the other hand, 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. Using fuels such as renewable synthetic fuels can make diesel and gasoline engines carbon neutral as well. And as they can be mixed with conventional fuels, such alternative fuels can also reduce CO_2 emissions from the existing fleet. In addition, we supply components for vehicles powered by natural gas and ethanol. Moreover, thanks to technical advances, modern diesel engines now have very low exhaust emissions.

Electromobility as a major growth driver

In electromobility, our strategy is to use our broad product portfolio to assume 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. Moreover, electrical machines and inverters are not only designed for battery-powered vehicles, but are also suitable in principle for vehicles powered by fuel cells.

In 2021, we made additional upfront investments of around 700 million euros in electromobility, including fuel cells. Sales in this field have now passed the one-billion-euro mark. It remains our goal to grow our sales in this area to 5 billion euros by 2025. For fuel-cell powertrains, we equally aim to offer a comprehensive portfolio of components, modules, and stacks. The expansion of hydrogen infrastructure will also play a role in its ramp-up.

To spread risk and accelerate market entry, we have entered into partnerships with the commercial vehicle manufacturers Qingling Motors, Nikola, Iveco, and Weichai. In 2021, we joined forces with the commercial vehicle manufacturer Qingling Motors to establish the Bosch Hydrogen Powertrain Systems joint venture in Chongqing, China. The new company will develop, assemble, and market fuel-cell systems for the Chinese market. A test fleet of Qingling trucks equipped with our fuel-cell modules has been on the road since 2021. We have concluded a long-term supply agreement with Cellcentric, a joint venture between Daimler Truck AG and Volvo Group AB, following a major order for electric air compressors with integrated power electronics. These compressors

regulate the oxygen supply in the fuel-cell system, and will be part of the Cellcentric fuel-cell system that will feature in heavy trucks and stationary applications.

Following several years of development, we also started volume production of silicon carbide power semiconductors in 2021. These will extend the range of electric vehicles. To manufacture them, proprietary processes were developed and the clean-room space at the Reutlingen wafer fab was extended. In parallel, work is also being done on the second generation of silicon carbide chips, which are expected to be ready for volume production as of 2022 and will deliver even greater efficiency.

Driver assistance systems as a growth area

We expect the number of vehicles featuring Level 2 or Level 2 hands-free systems to more than double by 2030. Bosch pioneered vehicle safety and driver assistance systems such as ABS, ESP®, and the TCS traction control system, and has been a very successful supplier of these systems. We are systematically improving our driver assistance systems for automation levels 1 and 2 and also working on hands-free highway assist systems, which allow drivers to take their hands off the wheel for an extended period of time during partially automated driving on the freeway. Responsibility remains with the human driver. While not yet approved for use in Europe, these systems can be used in the United States and China. In addition, we are developing automated driving within the meaning of SAE Levels 3 and 4.

To make these driving functions available for all vehicle classes faster, we entered into a wide-ranging alliance with the Volkswagen Group subsidiary Cariad at the beginning of 2022. The aim of this engineering alliance is to make partially and highly 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 takes over all driving functions on the freeway (SAE Level 3).

We want to work together to develop the necessary software platform, which is to be applied in all privately used vehicle classes sold under Volkswagen Group marques in the future – and thus in one of the world's biggest vehicle fleets. As a further marketing opportunity, it will also be possible to integrate the solutions that the alliance develops into the vehicles and ecosystems of other automakers.

Collaboration in data exchange

The European, and especially the German, automotive industry also sees a need to quickly establish a process of data exchange based on openness, standardization, data sovereignty, and scalability. The aim is to meet legal requirements efficiently, among them the German Supply Chain Due Diligence Act and carbon footprint requirements. To this end, the Catena-X association was set up in 2021 as the first use case for GAIA-X, a recently established association for decentralized cloud services funded by the German economics ministry. Catena-X will use GAIA-X to create a standardized framework for commercial data services.

Catena-X's main task is to describe use cases and required solutions and to stimulate their implementation in this data ecosystem. The association uses certification to ensure that the solutions offered under its umbrella meet technical and legal standards. We want to actively help shape the future of Catena-X.

Significant expansion of in-house semiconductor capacity

In summer 2021, we inaugurated our new wafer fab in Dresden. Highly automated, fully connected machines and integrated processes, combined with methods of artificial intelligence (AI), make the Dresden plant a smart factory and a trailblazer in Industry 4.0. With a total investment of roughly one billion euros, it is the biggest single investment in Bosch's more than 130-year history.

One unusual feature of the wafer fab is that it exists twice – once in the real world, and once in the digital world as a digital twin. During construction, all parts of the factory and all relevant construction data relating to the plant as a whole were recorded digitally and visualized in a three-dimensional model. This allows Bosch to simulate both process optimization plans and renovation work without intervening in ongoing operations.

Moreover, against the backdrop of strong growth in demand for semiconductors, we announced another nine-figure investment in our chip manufacturing facilities just a few weeks after opening the new wafer fab in Dresden. In 2022 alone, we intend to invest more than 400 million euros in expanding our wafer fabs in Dresden and Reutlingen, Germany, and our semiconductor operations in Penang, Malaysia.

Most of this capital expenditure is earmarked for our new 300-millimeter wafer fab in Dresden, where manufacturing capacity is to be expanded even faster in 2022. Around 50 million euros of the planned sum will be spent on the wafer fab in Reutlingen near Stuttgart, where we are investing a total of 150 million euros in additional clean-room space from 2021 to 2023. In Penang, moreover, we are building a new test center for semiconductors and want to complete it by the end of 2022.

100 years of Bosch Car Service

In 2021, Bosch Car Service celebrated its 100th anniversary. This is another area in which digitalization and innovations play a significant part in market success. The rapid pace of developments means that workshops are ever more frequently coming up against their technical limits, especially when it comes to the diagnosis of the latest vehicle models.

With our new remote diagnostics service, we can offer all workshops, bodywork shops, and vehicle glass specialists a novel solution for complicated servicing tasks as well. Another innovation is a digital technical repair service: it is part of a connected after-sales ecosystem in which humans and machines exchange data as needed to efficiently repair and maintain vehicles. The system, which is continuously learning and evolving, is a hands-free, platform-agnostic solution that works with tablet, PC, and wearables.

Rising demand for e-bikes

Bosch eBike Systems is benefiting from a further increase in 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 during the coronavirus pandemic. The focal point of our activities is our core European market. There is additional growth potential particularly in North America, where we are already represented by our own sales organization. We are continuously expanding our range of drives, batteries and control units, and digital solutions for e-cyclists, as well as services for specialist bicycle dealers.

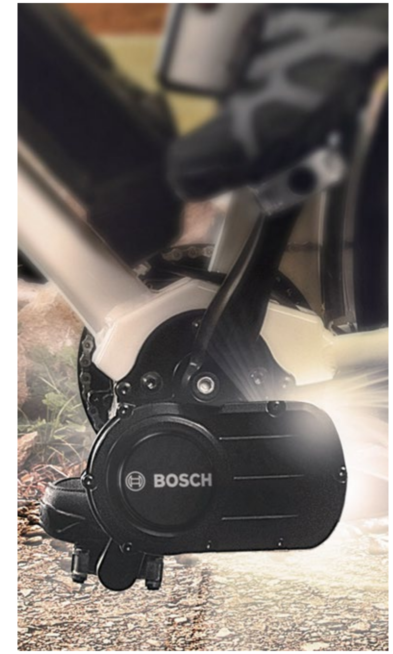
One innovative step we took in 2021 was to expand the information system for e-bikers by adding digital connectivity functions such as theft protection, improved navigation, and ride evaluation. This new generation supports the same kind of wireless system updates as on a smartphone. In addition, it gives bicycle makers and dealers the opportunity to check the wear and tear of e-bike components.

Expanding additional areas of business

The chip shortage also had an impact on the development of the **Two-Wheeler and Powersports** unit in 2021. We are an innovation leader in the premium motorcycle segment. Alongside MSC motorcycle stability control, one example is the advanced rider assistance system – radar-based functional solutions that went into production with several manufacturers in 2021. We have also launched a digital guardian angel and a corresponding app for automatic emergency calls from motorcycles. It uses a crash algorithm installed in the vehicle's inertial sensor unit to detect accidents. The smartphone app then transmits information about the accident scene and the rider to the Bosch Service Center, and from there to the emergency services, helping them find the victim more quickly.

We are gradually expanding the portfolio of functions. Due to strong customer demand for Bosch motorcycle ABS systems in the Asian market, we have decided to set up a further ABS production line at our Amata plant in Thailand. The start of production is scheduled for the first half of 2022.

In the **Commercial Vehicles and Off-Road** unit, we are working on innovations for trucks, off-highway vehicles, and digitalized agriculture. Following approval by all relevant antitrust authorities, a joint venture between Bosch and BASF Digital Farming was established in June 2021. In the future, this joint venture will market and sell smart farming technologies worldwide from a single source. The first products to be launched will be smart digital solutions for planting and fertilization and for the pinpointed application of herbicides.



In the NEVONEX ecosystem, we are working with 47 partners in the agricultural industry to enable digital services to run directly on agricultural machinery. The aim is to simplify work processes in agriculture. The next step will make NEVONEX accessible for existing machines through a retrofit kit. A further focal point in expanding these business activities is on the automation and electrification of off-highway vehicles. To this end, the unit can draw on the product portfolio of our Mobility Solutions business sector. It is also working closely with the Drive and Control Technology division.

Industrial Technology

Drive and Control Technology

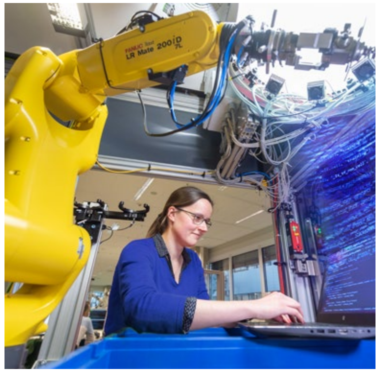
In the Drive and Control Technology division of our Industrial Technology business sector, we are continuing to expand the activities of our Bosch Rexroth subsidiary in its capacity as a provider of mobile and industrial hydraulics and of factory automation and connected manufacturing. We see the potential for connectivity as an attractive source of growth across all technologies. We will leverage this by further refining existing products and by developing product innovations.

We expect hydraulic systems to merge with electrical ones. This will likely result in increased cost pressure in the hydraulics area. At the same time, however, it will lead to additional opportunities for us as a solution provider, as customers are increasingly expecting precisely tailored solutions. Another strategic focus is on expanding our market position in factory automation and connectivity in manufacturing.

In our traditional core business of industrial hydraulics, we aim to generate additional business through connected, smart solutions. Our Cytro-generation products are Industry 4.0-compatible and enable IoT services in areas such as the condition monitoring of machines and systems. The subsea valve actuator that Bosch Rexroth has developed is the world's most compact electric actuator for the process industry. It minimizes energy consumption and is specially designed for sensitive habitats. Electrifying the actuators considerably reduces the carbon footprint of process plants, since it eliminates the need for miles of hydraulic lines and a central hydraulic power unit. The subsea valve actuator is also suitable for other applications such as hydrogen generation, CO_2 storage, and general process-industry applications.

By acquiring all the industrial property rights and know-how of the two companies EH-D GmbH and Onovum GmbH, Bosch Rexroth has strengthened its business with electrically controlled, servo-hydraulic compact axles. Up to now, these have been used primarily in industrial hydraulics. With the technology now acquired, Bosch Rexroth can extend its portfolio to include the power spectrum below 10 kilowatts.

In the off-highway segment, Bosch Rexroth is expanding its range of solutions. It offers a comprehensive portfolio of 700-volt components for the electrification of mobile machinery. With a wide range of possible configurations, the 700-volt eLION electric motor generators offer manufacturers a wide variety of design options for the electrification of existing and new vehicle architectures. Inverters, gearboxes for wheel and center drives, hydraulic and electrical components, and software modules complete the portfolio.



In the growth market of factory automation and connected manufacturing, Bosch Rexroth is expanding its range of products and services on various solution platforms. Several hundred companies are already integrating the ctrlX AUTOMATION system in their applications. Users choose from a wide range of apps in the ctrlX store and apply them to their automation architectures. New functions for even more efficient engineering open up additional possibilities for users. In addition to increasingly customized products, the market is also demanding fast and consistent availability. The SmartMechatroniX platform combines linear technology components, electronics, and software to create versatile subsystems for factory automation. They can be put into operation quickly and offer comprehensive process transparency. This boosts manufacturing productivity.

Other businesses

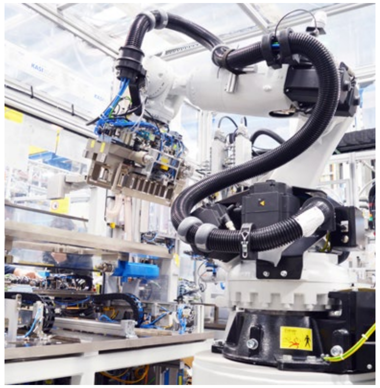
In 2021, we realigned **Bosch Manufacturing Solutions,** our global provider of automation and assembly systems, as it is clearly feeling the effects of structural changes in the Mobility Solutions business sector and its shift toward electromobility. Expanding its third-party business will further buttress its position and help secure profitability. In the course of this expansion, the systems provider will broaden its portfolio through joint Industrial Technology activities with Bosch Rexroth and Bosch Connected Industry. In spring 2021, for example, Bosch Manufacturing Solutions built a fully automated battery-module production plant. We expect good growth and business opportunities in the area of electromobility and new sources of energy. Bosch has signed a memorandum of understanding with the Volkswagen Group to explore the prospect of collaborating on solutions for commercializing battery-cell production in Europe.

The **Bosch Connected Industry** business unit is responsible for business with connected industry-related software solutions for in-house and third-party customers. At its core is the Nexeed industrial application system. In this work, Bosch Connected Industry is collaborating closely with the Drive and Control Technology division and with the Bosch Manufacturing Solutions business unit. Nexeed includes solutions ranging from monitoring and optimizing manufacturing processes to managing intralogistics. It is also the basis for internal applications in Bosch plants, where the first pilot installations went into use in 2021.

Work has also continued on the development of solutions involving digital twins. To enable the exchange of data across companies, open-source versions of selected software modules for creating digital twins have been published. This was done as part of the Open Manufacturing Platform (OMP) alliance, which helps manufacturing companies scale innovation. The OMP was established in 2019 under the umbrella of the Joint Development Foundation, which in turn is part of the Linux Foundation.

Consumer Goods

In the Consumer Goods business sector, we rely on our strong international and regional brands and product innovations. In the areas of both power tools and household appliances, we are anticipating long-term global market growth, especially in the emerging markets. In 2021, changes in consumer behavior as a result of the coronavirus pandemic once again meant significant increases in demand for both the business sector’s divisions.



Power Tools

In pursuit of its strategy of growth across its segments, Power Tools is using product innovations and modifications as well as novel services. User experience – the focus on user needs in product and service development – is a decisive success factor in this context, both in the professional segment in manufacturing, construction, and the trades, and in the do-it-yourself (DIY) segment in homes and gardens. As cordless tools offer users greater convenience, the division is continuously expanding its cordless range.

Over the past two years, more than 60 new cordless tools for professional users have been launched, more than 25 of them in 2021. By 2023, the range for manufacturing and the trades is set to comprise around 100 new cordless tools. These tools are now finding their way into performance classes that were previously reserved for corded models. One example of this is a new cordless hammer drill with an impact energy of 12.5 joules, which debuted in 2021.

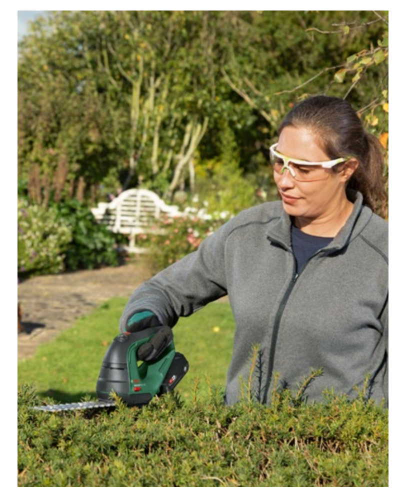
One focal point is the expansion of two battery platforms that Bosch initiated in 2020. Users save money, space, and time if the rechargeable batteries and chargers for the various products made by numerous manufacturers are compatible. In the DIY segment, our portfolio already includes some 75 tools with compatible batteries. By setting up a battery system that works with multiple manufacturers, we are enhancing user-friendliness for a wide range of applications throughout the home: DIY, gardening tools, cleaning and household appliances, and leisure and camping products. Powerful cordless grass and shrub shears were one of the products we added in 2021.

Likewise, we have added further professional brands to our 18-volt battery platform. All platform partners share a common goal: to offer professional users a standardized battery across many brands, and in this way to boost their efficiency. New partners are being added successively on both platforms, which will further increase the battery systems' attractiveness and range of applications.

The aim of our sustainability strategy, for power tools as elsewhere, is to save raw materials, conserve resources, and design our products to maximize their recyclability. In this context, we develop measures to increase the use of recycled materials in packaging and power tools, for example. The focus is on reducing the carbon footprint of our products over the long term and promoting the circular economy.

One example is a new cross-line laser launched in 2021. From the product development stage, the focus was not only on reducing energy consumption compared with predecessor models but also on manufacturing the housing and accessories mainly from recycled plastic. Moreover, packaging was reduced in volume and modified to comprise predominantly recycled paper, with no plastic films.

We are also continuously digitalizing more and more of our sales and marketing processes. Online commerce is an important strategic focus. We are expanding not only our strategic alliances with multi-channel and online retailers, but also the scope of information and interaction available online. We are also broadening our portfolio of professional tools for emerging markets to bring it even better into line with local requirements.



BSH Hausgeräte

The pillars of the growth strategy of our subsidiary BSH Hausgeräte are consumer-oriented innovations, the consolidation of integrated product and service offerings, the build-out of digital business models, and direct contact with consumers. To address local needs, BSH Hausgeräte opened additional Bosch brand stores in 2021 in countries such as Austria and Belgium.

BSH Hausgeräte has been offering Home Connect – an ecosystem with a cross-brand digital platform for home appliances – since 2014. Here, it collaborates with many different partners. Home Connect is now available in 55 countries and 28 languages. The increasing number of connected home appliances opens up numerous applications for the smart kitchen. One of the appliances playing a role here is the self-learning dishwasher. The appliance, which is connected via Home Connect, asks users for their feedback after each rinse cycle. This allows it to automatically optimize the rinse program until it finds the customer's ideal setting. Moreover, users can download additional special programs and updates.

One further innovation, which debuted in autumn 2021, was a portable electronic textile freshener. Using plasma technology, it releases active plasma particles to dissolve odor molecules. Unpleasant odors can thus be removed without water, detergents, or chemical additives.

BSH Hausgeräte is also tapping additional market potential through new business models. Under its BlueMovement service brand, the company rents out premium washing machines and dryers as well as dishwashers and refrigerators. If at some point an appliance is no longer usable, BlueMovement takes care of remanufacturing or recycling. Currently, this business model is available in the Netherlands and Germany.

When it comes to environmental sustainability, BSH Hausgeräte intends to continue improving the energy efficiency of its products, and to optimize its entire product portfolio to suit a more sustainable lifestyle. One example is a smart indoor herb garden that automatically creates ideal growing conditions for a variety of different herbs, edible flowers, leafy greens, and seedlings. An app also gives users suggestions on how to care for the plants.

BSH Hausgeräte has fleshed out its sustainability targets. By the end of this decade, the company will reduce its carbon emissions relating to both materials procurement and product use by 15 percent (compared to 2018). In addition, by 2030, almost all the materials the company uses to manufacture its home appliances will be recyclable. Moreover, our subsidiary wants recycled materials to make up half the materials that go into manufacturing its products by 2030. One example of this is again the herb garden, which is roughly 60 percent recycled plastic. For the housing brackets in its washing machines, the company uses steel made in electric furnaces that emit 66 percent less CO_2. Recycled materials are increasingly playing a role in packaging as well. Selected large appliances, for example, are packaged in expanded polystyrene based on chemically recycled plastics.

BSH Hausgeräte is also further strengthening its international presence. Since 2021, it has been producing washing machines and dryers, also as a combination appliance, in a new laundry care and dryer factory in Chuzhou, China. Factories for refrigerators and dishwashers have been located there for some time. In 2021, we also invested in our factory in Chennai, India, to expand its production capacity in the cooling sector. The subsidiary has also decided to build its first factory on the African continent. Located near Cairo in Egypt, the new factory for stoves will be an important step in further expanding the subsidiary's business in Africa and other emerging and developing countries.

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 increase 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 buildings. Its activities focus on the markets in Europe and North America. It also operates in Singapore and India. Once again in 2021, the division proved to be a stabilizing factor during the coronavirus pandemic thanks to a high proportion of revenue from services. Due to changing customer needs and against the backdrop of the increasing pace of digitalization, we are developing new IoT-based services for areas such as facility management. We are also 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 in order to achieve optimum efficiency.

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 the first cameras based on our newly developed Inteox platform, which combines artificial intelligence with a fully open operating system. The platform makes it possible to customize security solutions by adding apps, software, and services as needed.

Another innovation is a new camera family that delivers detailed images taken from different perspectives. Its integrated artificial intelligence supports predictive solutions in wide-area video surveillance applications. This information can, for instance, help urban planners identify bottlenecks hindering pedestrian or vehicle flows in public spaces or at traffic intersections. Another important step is the further development of our video-based, AI-supported fire detection system, which can now visually detect fires much faster in protected outdoor areas as well.

In 2021, Building Technologies made further acquisitions in the systems integration field. These included the security and fire alarm technology specialist Protec Fire and Security Group Ltd., headquartered in Nelson, United Kingdom. Protec is one of the United Kingdom's leading systems integrators for security and fire alarm technology, and has an extensive product portfolio of its own. The Netherlands is another important market for Protec, where the company operates under the Hacousto Protec brand. Through this acquisition, the division wants to grow further in the European market.

In addition, Hörburger AG, headquartered in Waltenhofen, Germany, was acquired. Hörburger AG's product and solution portfolio is focused on building automation and energy management, with a particular focus on the efficient and sustainable operation of buildings. Building Technologies wants this acquisition to strengthen its portfolio in the areas of building security, energy services, and building automation. We also acquired the assets of RGBS Enterprises, Inc., headquartered in Staten Island, NY (USA). RGBS is a systems integrator for building automation and energy management solutions. We want this acquisition to help our North American subsidiary Climatec, LLC, based in Phoenix, AZ (USA), grow its systems integrator business in the New York City area.

Other businesses

The Building Technologies division is also a member of the industry consortium Open Security & Safety Alliance, Inc. The consortium, an unlisted non-profit organization, is working to define a standardized platform for security solutions. Our subsidiary Security and Safety Things GmbH, based in Munich, Germany, is a partner in the alliance, which aims to offer an open, standardized IoT platform for camera apps in the fields of safety, security, and business process optimization. Numerous camera manufacturers and app developers have already decided to use this platform. In addition, it gained first major system integrators as strategic partners in 2021, among them Prosegur and Korea Telecom.

Thermotechnology

The building sector will play a crucial role in achieving climate targets. We are pursuing a multi-technology strategy in which electrification and renewable energy are becoming considerably more important. The two technologies that will offer the greatest potential for sustainability are heat pumps and hydrogen-fired boilers. While heat pumps are used in new buildings and in existing buildings that have been insulated, hydrogen-fired boilers are a medium- to long-term option for moving away from fossil fuels even when the housing stock is poorly insulated. 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.

In 2019, we set up a project to push forward the electrification of our product portfolio. Over a five-year period, we will invest several hundred million euros in developing and manufacturing heat pumps. 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 a Bosch energy manager to optimize efficiency and the use of locally generated electricity. For southern Europe, the focus is on developing affordable products. To this end, we established the joint venture Electra Industries Ltd. in Israel in 2020.

In the case of the European housing stock that has been renovated little if at all, investment is not only needed for the heating system but frequently also for insulating the building envelope and distributing heat within the building. For these types of buildings, the innovative “H_2-ready” boiler is a cost-effective alternative. In the United Kingdom, pilot projects have demonstrated the safety and efficiency of our new hydrogen-fired boiler. Forward-compatible “H_2-ready” boilers can initially run on natural gas and a hydrogen admixture of up to 20 percent; later, they can easily be converted to run completely on hydrogen. Hybrid solutions combining technologies such as air-source heat pumps and gas-fired condensing technology are another alternative that allows renewable energy to be used in existing buildings.

In addition, demand for air conditioners in Europe is growing steadily, and slowed only slightly during the pandemic. This is particularly true for residential buildings, where comfort is increasingly becoming an important purchase criterion for home-buyers. 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.

Moreover, we are also pursuing a systematic digitalization strategy in our Thermotechnology division. We have sold around 860,000 connected devices to date. For example, a Bosch energy manager makes it possible to link up the heat pumps and photovoltaic systems in the home. Output-regulated heat pump control offers precise control of the available photovoltaic electricity for heating, cooling, and hot water.

But Thermotechnology is also showing the way in other areas of digitalization. A smartphone app for service engineers, for example, uses advanced object recognition and artificial intelligence to identify spare parts. We want to create digital and connected solutions that are intuitive, flexible, and aligned with the respective needs of customers and markets. As a basis for this, we are developing customer relationship management solutions that, by integrating data from all touchpoints in the areas of sales, marketing, and service, enable a 360-degree view of customers as well as immediate customer feedback. This information will also be incorporated into the further, medium-term, development of Thermotechnology's product and service portfolio.

Other businesses

In the stationary fuel-cell field, we are working with our partner Ceres Power to prepare for large-scale production of distributed power generating systems based on solid-oxide fuel-cell (SOFC) technology. Our aim for SOFC systems is an annual production capacity of some 200 megawatts. To achieve this, we will be investing a nine-figure sum. Following a successful prototype construction phase, pre-commercialization is now going ahead. Volume production is scheduled to start in 2024. Manufacturing operations will be located primarily at our German locations in Bamberg, Wernau, and Homburg, while development will take place in Stuttgart-Feuerbach, Wernau, and Renningen, also in Germany.

In making this move, we will position ourselves as a systems supplier for stationary fuel-cell systems with our own high level of value creation in the cell and stack segment. One intended application for these systems is in small, distributed, connectivity-enabled power stations, which can then be used in cities, factories, trade and commerce, data centers, and ships. As part of the European Union's transnational IPCEI (important projects of common European interest) hydrogen program, we were the first company in Germany to receive approval for an early project start for the initial commercialization of stationary fuel-cell systems.

In February 2022, Bosch, Weichai Power, and Ceres Power Holdings plc signed a heads of terms document. We are planning to collaborate on SOFCs for the Chinese market and intend to set up two separate joint ventures in the Chinese province of Shandong. One of these will develop and manufacture SOFC systems for stationary and certain mobile applications in China. The other will manufacture and supply fuel-cell stacks.

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. One strategic focus is on expanding its monitoring services. In February 2021, the division launched a retrofit monitoring solution for elevators on the German market. Comprising sensors, software, and services, the solution helps reduce elevator downtime and bring down operating costs. In addition, Bosch Global Service Solutions has introduced manufacturer-agnostic monitoring for heating systems in apartment buildings. The AI-based retrofit solution reports faults early, which helps increase the heating systems' energy efficiency. In addition, Bosch Global Service Solutions plans to enter the pharmaceuticals services sector by acquiring the Swiss company Elpro Group AG, with a workforce of 220 people. The company provides monitoring solutions for sensitive goods such as pharmaceuticals. Furthermore, the Bosch Secure Truck Parking digital platform for booking truck parking spaces grew by opening additional parking lots. It also entered the Spanish market with a number of new locations.

Other businesses

The vision of our subsidiary **Bosch Smart Home GmbH** is to make life easier for users with solutions that improve convenience and security in the home. To this end, it is continuously expanding its portfolio of proprietary and partner products and using connectivity to create functions that provide additional benefit. One example is a security solution introduced in 2021. It features an outdoor siren and a smart door lock. Moreover, Bosch Smart Home has expanded its range of services: in addition to advisory and installation services, customers can now receive enhanced insurance cover for a monthly fee.

Selected companies not allocated to business sectors

Our subsidiary **Bosch Healthcare Solutions GmbH** offers customers connected products and services and is continuously further expanding its medical technology portfolio. For its analyzer for near-patient rapid PCR tests, it now offers not only its SARS-CoV-2 test for evaluating a single patient sample per test cartridge, but also various pooling variants for parallel testing of up to 15 samples. Furthermore, the scope of application of the analyzer has been expanded to include additional diseases. In addition, a connectivity solution based on the Bosch cloud manages the devices in the field and keeps the software up to date over the air.

Moreover, our Indian subsidiary Bosch Global Software Technologies Private Limited (formerly Robert Bosch Engineering and Business Solutions Private Ltd.) has further developed a monitor for the non-invasive determination of hemoglobin levels at the point of examination. At the same time, it has worked on other connected products to improve healthcare, particularly in emerging and developing countries, and offered 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 this network, new business models are evaluated and pursued in startup teams. The platform also considers alternative 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. Recent innovations include a system that can automatically recognize spare parts for machinery regardless of angle, and 3D-printed special ceramics.

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, IoT, mobility solutions, and future computer architectures. In the 2021 reporting year, Robert Bosch Venture Capital invested in startups in fields such as processor architecture for automated driving, cancer diagnostics, fleet management, communication and localization technologies, and silicon carbide power electronic components.

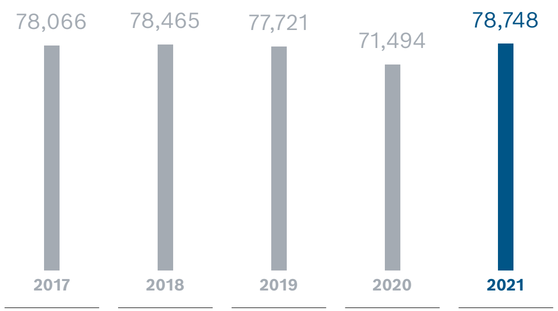
Report on economic position

The Bosch Group rose well to the challenges of 2021, and significantly exceeded expectations for sales and result. It generated sales of 78.7 billion euros. Sales thus increased roughly 10 percent over 2020, despite the ongoing coronavirus pandemic and supply shortages, particularly for semiconductors. Sales also surpassed their 2019, pre-crisis level. The Mobility Solutions business sector was hit particularly hard by supply bottlenecks. Although it increased its sales significantly year on year, they fell short of their 2019, pre-crisis level. Sales revenue in the Industrial Technology business sector grew at a double-digit rate. However, due to the divestment of the Packaging Technology division at the end of 2019, it has not yet returned to its pre-crisis level. The recovery of important engineering markets was instrumental in the strong increase in sales in 2021. The Consumer Goods business sector, which also disclosed double-digit sales growth, again benefited from increased demand for home-related products. In both Consumer Goods and the Energy and Building Technology business sector, which benefited from rising demand for low-emission heating technology, 2021 sales exceeded their pre-crisis levels.

Against the backdrop of the considerable burdens caused by the chip shortages, the sharp rise in raw materials and logistics costs, and the ongoing high level of restructuring cost in connection with our performance program, we see it as encouraging that our margin from operations rose to 4.0 percent, compared with 2.8 percent in the previous year. EBIT from operations increased by more than half to 3.2 billion euros. This improvement also reflects the efforts we have made as part of our performance program. It was achieved despite once again incurring considerable research and development expenditure in order to continue pursuing our work on projects of future importance. All our business sectors reported a positive result from operations. Result was particularly favorable in Industrial Technology. Consumer Goods again generated a high margin. Energy and Building Technology improved its margin. Free cash flow was positive, but below the previous year's figure due to increased inventories and a renewed rise in capital expenditure. Moreover, we repaid funds that we had borrowed as a precautionary measure in 2020.

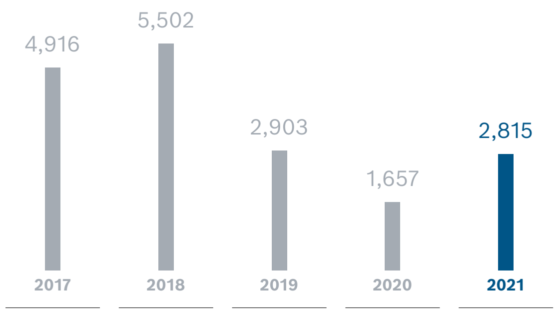
in millions of euros **G 05**

Development of sales revenue
Bosch Group, 2017 – 2021



in millions of euros **G 06**

Development of EBIT
Bosch Group, 2017 – 2021



Key performance indicators

For an unlisted company such as the Bosch Group, being able to strengthen and maintain profitability over the long term is crucial for financing future growth. The main basis for monitoring this is our internal reporting, which takes its lead from the International Financial Reporting Standards (IFRS). The performance indicators we use are sales growth, EBIT margin (earnings before financial result and taxes as a percentage of sales) – which essentially corresponds to the EBIT margin from operations disclosed in the management report – and, as an internal performance indicator, net working capital (NWC) as a percentage of sales.

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 and capitalized incremental costs of obtaining contracts, minus trade payables and contract liabilities. The indicator we use is the average value from monthly reports of this figure. The objective of NWC controlling is to keep the amount of capital tied up over the short term as low as possible. Additions to property, plant, and equipment are controlled via budgeting for capital expenditure.

The central internal reporting instrument is a monthly business report, which contains an up-to-date overview of the operating units' performance indicators. 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 methods applied focus on developing and carrying out measures designed to achieve the planning targets. This is a top-down planning model that is strongly geared toward targets and measures. The basis for setting these targets is external benchmark comparisons, which in turn serve as the foundation for determining target cost structures for the divisions and, as such, are the key frame of reference for our performance program.

The competitor-oriented benchmark values are used to define targets for the performance indicators. These 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. 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 the internal performance indicator of average NWC as a percentage of sales (weighted at 10 percent). For some divisions and key performance indicators, the 2020 benchmark values were heavily impacted by the coronavirus pandemic and therefore not suitable as a benchmark for 2021. 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 coronavirus pandemic again had a considerable impact on economic conditions in 2021, although in many places the restrictions on social and economic life were significantly less severe than in 2020. Serious additional burdens result from the chip shortage, partially disrupted supply chains, and increased raw materials prices and logistics costs, which are leading to rising prices and, in certain sectors, to marked restrictions in production. In some cases, prices are increasing at a faster rate than they have been for decades.

Despite these constraints, global economic output rose by 5.7 percent year on year in 2021; this exceeded our forecast of 3.9 percent. Once more, therefore, economic output is higher than before the crisis. In the previous year's forecast, we had already referred to considerable uncertainty as to the further course of the pandemic and the effect it would have on business developments. The data for economic output are taken from Feri AG and the International Monetary Fund.

Economic output in the Americas grew by 5.7 percent, which was considerably higher than our forecast of 3½ percent. In the United States, additional pandemic-related social transfers such as extended unemployment pay contributed to this, as well as major investments. With growth of 5.9 percent, economic output in Asia Pacific also exceeded our expectations of 4.9 percent. A major factor was the 8.1 percent increase in economic output in China, which was above our forecast of 7½ percent.

However, economic growth in China is coming under increasing pressure. Localized Covid-19 outbreaks as well as impaired transportation and distribution chains – such as port congestion – are contributing factors. There are also tensions on the real estate market, also as a result of the financing difficulties of major real estate companies, which are slowing construction activity and home sales. The economy in India recovered significantly after the deep pandemic-related slump in 2020; here, economic output rose year on year by 8.1 percent, and thus slightly more slowly than expected (8½ percent). This was mainly due to the severe wave of infections in late spring 2021, which was a drag on economic recovery.

In Europe, economic growth of 5.3 percent in 2021 also exceeded our forecast of some 3 percent. This was also due to the recovery in the European Union as a whole, which was stronger than expected. Growth here was 5.2 percent; we had expected roughly 3¼ percent. At 2.9 percent, growth in Germany was roughly on a par with our expectations (3 percent), but was thus weaker than in the European Union as a whole. Germany's more stringent pandemic measures compared with some European countries, coupled with the problems in international supply chains, meant that the slowdown in its economy was particularly pronounced. As forecast, the United Kingdom's exit from the European Union curbed the country's economic growth. Nonetheless, its growth of 7.5 percent significantly exceeds our expectations of 5 percent. This is likely due to the very quick start to the country's vaccination campaign in early 2021, which allowed early relaxations of coronavirus restrictions.

Once global automotive production (including heavy commercial vehicles) had begun to recover from the pandemic-related slumps starting in the second half of 2020, increasing chip shortages meant that it weakened significantly again from spring 2021. In 2021 as a whole, automotive production was 80.8 million units, only slightly above its 2020 level and 13 percent below its pre-crisis, 2019 level. This was significantly below market expectations of 86 million units for 2021.

Production in Europe was particularly affected, while in North America it stagnated. By contrast, automotive production in India above all, but also in ASEAN and South America, showed double digit growth, although it did not reach pre-crisis levels. In China, a strong recovery in the second half of 2021 meant that automotive production was 3.8 percent higher year on year, putting it slightly above its pre-crisis, 2019 level. The global production of heavy trucks merely matched the previous year's level. A decline in China of nearly 20 percent had an effect here.

The sources of the data for global automotive production in our mobility forecast process (MP) are the third-party forecasts of IHS Markit Ltd., London, and Bosch in-house marketing expertise in the regions and at headquarters.

The changes in the field of powertrain technology for passenger cars continued. Sales of electric vehicles grew strongly in 2021. Among passenger vehicles worldwide, the share of all-electric vehicles rose to 7.3 percent, up from 3.4 percent the previous year. Hybrid vehicles accounted for 10.8 percent, up from 7.2 percent. 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 is China; for hybrid vehicles, Europe and China are the biggest markets. The slight adjustments to the above figures for 2020 are due to a subsequent revision after the final market figures were presented. The share of diesel-powered passenger cars fell to around 22 percent in Europe compared with 28 percent in the previous year; in India it stagnated at 18 percent.

Global production in the machinery sector, another important market segment for the Bosch Group, rose significantly in 2021. The background to this is the return to stronger investment activity in the economy. In China, machinery production returned to pre-crisis levels as early as mid-2020; however, development was more subdued in 2021. One reason for this is weaker construction activity. In the other major markets such as the U.S. and Japan, machinery production was again higher than in 2019; in the European Union, however, it still fell short of its pre-crisis level.

Business developments

Development of sales

Bosch Group sales

In the Bosch Group, we generated sales of 78.7 billion euros in 2021, compared with 71.5 billion euros in the previous year. This means sales are up 10.1 percent year on year, or 10.9 percent after adjusting for exchange-rate effects. We thus significantly exceeded our forecast of 6 percent sales growth. Compared with 2020, there are only subordinate consolidation effects of some 130 million euros in the 2021 business year, as a result of the first-time inclusion of minor subsidiaries. The negative impact of exchange-rate effects amounts to 0.5 billion euros. Burdens as a result of the exchange rate of the euro against the Turkish lira, important American currencies such as the U.S. dollar and the Brazilian real, the Japanese yen, and the Indian rupee contrast with positive effects, most importantly as a result of the exchange rate against the Chinese renminbi.

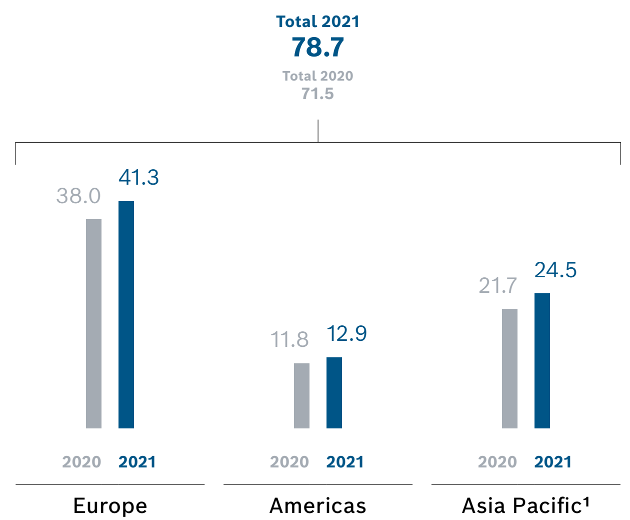
Sales by region

All regions were able to post increased sales in 2021, albeit to varying degrees. In Europe, sales over the year as whole amounted to 41.3 billion euros, 8.9 percent up on the previous year, or 10.0 percent after adjusting for exchange-rate effects. In Germany, sales rose 6.4 percent to 15.7 billion euros. Sales in North America were up 6.5 percent to roughly 11.4 billion euros. Adjusted for exchange-rate effects, the increase was 9.3 percent. In South America, where the coronavirus pandemic hit our businesses particularly hard in 2020, sales rose by 32.0 percent to some 1.4 billion euros, or by a full 45.1 percent after adjusting for exchange-rate effects. Sales in Asia Pacific (including other countries, also in Africa) saw double-digit growth of 13.1 percent to 24.5 billion euros; the increase was 11.7 percent after adjusting for exchange-rate effects. With the exception of North America, all regions have thus returned to their pre-crisis, 2019 level. In regional terms, the proportion of sales generated in Europe remained practically on the same level as in the previous year, at roughly 53 percent. The share of Asia Pacific (including other countries, also in Africa) increased by one point to 31 percent, while the share of the Americas decreased in equal measure to 16 percent.

in billions of euros **G 07**

Development of sales revenue, 2020 – 2021

Bosch Group sales by region

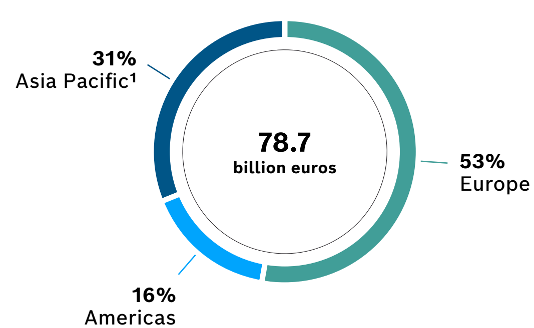


1. Including other countries, also in Africa

G 08

Structure of sales revenue, 2021

Bosch Group sales by region

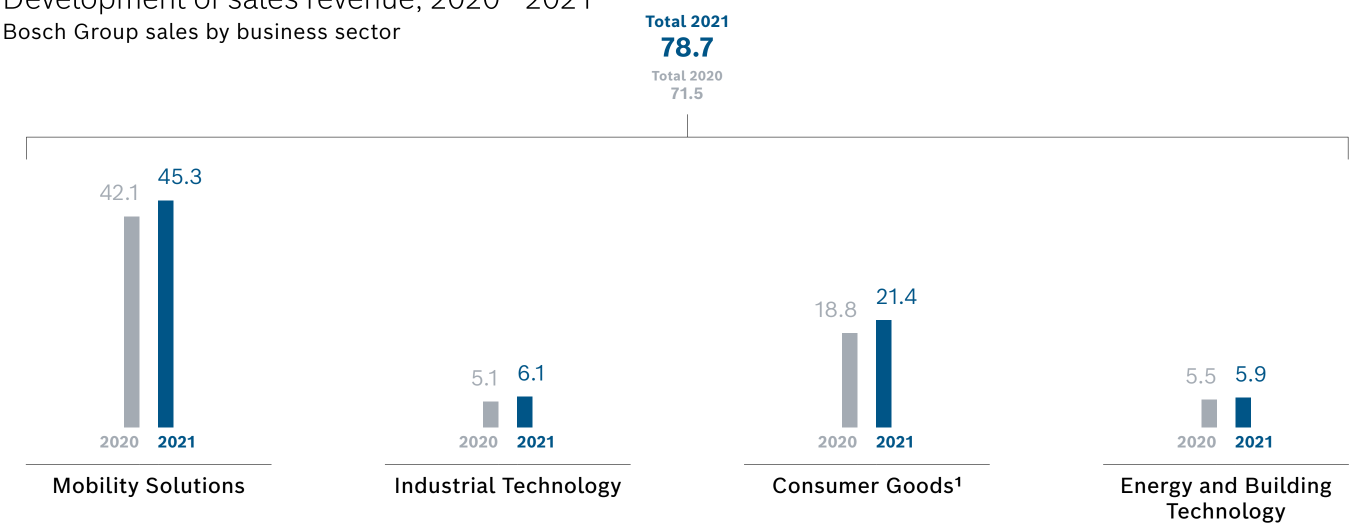


1. Including other countries, also in Africa

in billions of euros **G 09**

Development of sales revenue, 2020 – 2021

Bosch Group sales by business sector



1. Including other activities

Sales revenue by business sector

All business sectors increased sales. Our biggest business sector, Mobility Solutions, was hit particularly hard by chip supply shortages. Nonetheless, sales rose by 7.6 percent to 45.3 billion euros, or by 7.9 percent after adjusting for exchange-rate effects; this was, however, still lower than their pre-crisis, 2019 level. Despite the supply bottlenecks, sales were roughly in line with our forecast. Almost all the business sector's divisions were affected by chip supply shortages, particularly Cross-Domain Computing Solutions and Automotive Steering. Nonetheless, the development in the Automotive Aftermarket and eBike Systems divisions was very pleasing.

The Industrial Technology business sector benefited from the market recovery in key mechanical engineering segments as well as from the dwindling impact of the coronavirus crisis. Sales rose 18.9 percent to 6.1 billion euros; after adjusting for exchange-rate effects as well, sales were up 19.4 percent. This far exceeded our forecast of 6 percent. However, the sale of the Packaging Technology division at the end of 2019 means that it was not enough to bring the business sector back to its pre-crisis, 2019 level. All hydraulics and factory automation business units are benefiting from the positive market development, while the large-scale project business, which is up for sale, continues to fall short of expectations.

The Consumer Goods business sector benefited from sustained high demand for home appliances and power tools. The coronavirus pandemic caused consumers to focus more of their energies on their home environment. In consumer goods as well, however, we are also increasingly seeing the dampening effect of chip shortages and of supply bottlenecks for raw materials on activity. Sales (excluding other activities) rose 12.7 percent to 21.0 billion euros. After adjusting for exchange-rate effects, sales were up 14.4 percent. This favorable development benefited both the Power Tools division and BSH Hausgeräte. Here, we had planned cautiously for 2021 following the boom in demand in 2020, and had assumed that sales would grow just 3 percent.

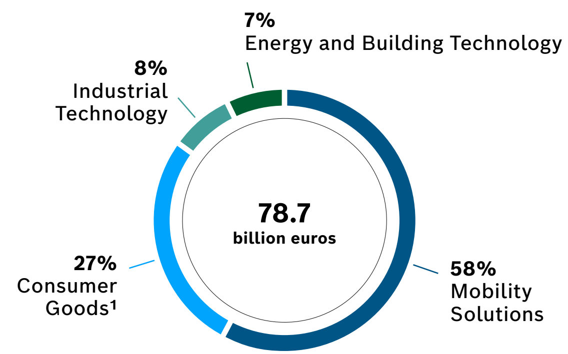
The Energy and Building Technology business sector significantly increased its sales in 2021. Sales rose by 7.8 percent to 5.9 billion euros. Adjusted for exchange-rate effects, the increase was 8.8 percent. A major driver of this growth was rising demand for climate-friendly heating technology. Here, subsidies for renewables in important markets such as Germany generated additional demand. The Building Technologies and Bosch Global Service Solutions divisions were also able to achieve encouraging sales growth.

The differences in our business sectors' fortunes mean that our sales structure has changed slightly. The share of sales attributable to the Mobility Solutions business sector has fallen slightly to 58 percent, from 59 percent the previous year. The share attributable to the Industrial Technology business sector rose to 8 percent from 7 percent, the Consumer Goods business sector's share (including other activities) rose to 27 percent, from 26 percent in the previous year. The share contributed by the Energy and Building Technology business sector is 7 percent, following 8 percent in the previous year.

G 10

Structure of sales revenue, 2021

Bosch Group sales by business sector



1. Including other activities

in millions of euros T01

Most important items of the statement of income

	2021	2020
Sales revenue	78,748	71,494
Cost of sales	–52,933	–48,946
Gross profit	**25,815**	**22,548**
Distribution and administrative cost	–16,384	–14,692
Research and development cost	–6,110	–5,890
Other operating income and expenses	–504	–305
Result from entities included at equity	–2	–4
EBIT	**2,815**	**1,657**
Financial result	484	–152
Profit before tax	**3,299**	**1,505**
Income taxes	–800	–756
Profit after tax	**2,499**	**749**

Results of operations

Bosch Group result

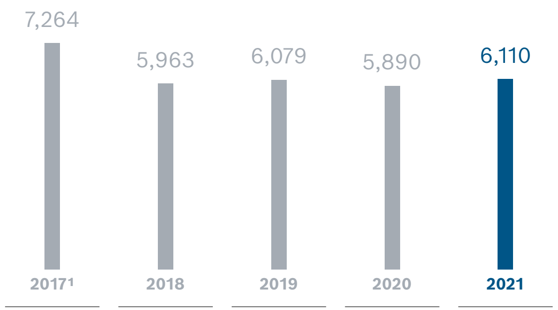
We report positive EBIT for 2021 of 2.8 billion euros, compared with 1.7 billion euros the previous year. Also as a result of sweeping cost-cutting measures, Bosch Group EBIT from operations rose to 3.2 billion euros in 2021, compared with the previous year's figure of 2.0 billion euros. The EBIT margin from operations thus rose to 4.0 percent of sales, compared with the previous year's figure of 2.8 percent. As a result, we have also exceeded our forecast margin from operations. The main reason for this was that sales in all our business sectors grew faster than we expected, especially in Industrial Technology and Consumer Goods.

We succeeded in achieving this improvement despite considerable burdens from the chip shortages, and despite higher costs for raw materials, primary products, and logistics, as well as continued high restructuring cost, including provisions. On top of that, we made further considerable upfront investments in promising areas. Restructuring cost fell somewhat compared with the previous 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. The provisions that have been set up concern all functional costs.

in millions of euros **G 11**

Research and development cost

Total cost, Bosch Group, 2017 – 2021

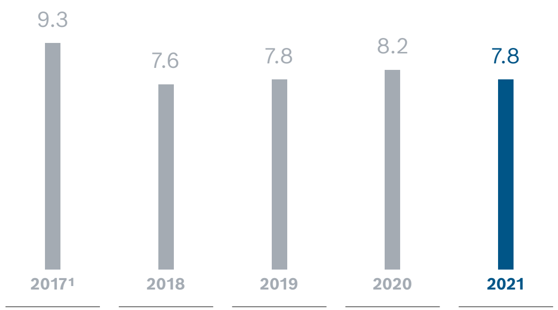


1. Including development work charged directly to customers

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

Research and development cost

Total cost, Bosch Group, 2017 – 2021



1. Including development work charged directly to customers

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 2021, and were thus roughly the same as in the previous year.

The factors mentioned are reflected in various income-statement items. In 2021, cost of sales rose 8.1 percent to 52.9 billion euros. It thus rose at a lower rate than sales, which grew 10.1 percent. As a result, the gross margin rose to 32.8 percent, from the previous year's level of 31.5 percent. At roughly 3.4 billion euros, depreciation of property, plant, and equipment was higher than the previous year's level of 3.3 billion euros. Distribution cost and administrative expenses rose year on year by 11.5 percent to 16.4 billion euros. They thus grew slightly faster than sales. The main reasons for this are increased transportation costs and the extraordinary logistics expenses we incurred in connection with the chip shortages.

Research and development cost came to 6.1 billion euros in 2021, compared with 5.9 billion euros the previous year. While the marked increase in sales means that research and development intensity, at 7.8 percent, is lower than the previous year's figure of 8.2 percent, it is still higher than its 2019, pre-crisis, level. On the graph, the drop from 2017 to 2018 is the result of the first-time application of IFRS 15. Up to 2017, research and development cost still contained development work charged directly to customers.

The Mobility Solutions business sector again accounted for the largest share of research and development cost in 2021, at 74 percent (previous year 75 percent). The main focus of these upfront investments continues to be electrification including fuel cells, driver assistance systems, also with a view to automated driving, automotive electronics, semiconductors, and sensors. The percentage attributable to the Consumer Goods business sector came to 16 percent (previous year 15 percent) and to the Industrial Technology business sector to 5 percent (previous year 6 percent). The corresponding figure in Energy and Building Technology is 5 percent (previous year 4 percent). Among other things, we are making upfront investments in heat pumps, stationary fuel cells (SOFC), and new products such as video technology and fire alarm systems. Other operating income and expenses grew more slowly than sales.

On balance, we disclose a positive financial result of 484 million euros in 2021, compared with a negative balance of 152 million euros the previous year. Capital gains from securities are a major factor here. Profit before tax thus came to 3.3 billion euros, corresponding to a margin of 4.2 percent. Both figures are up considerably on their previous-year levels of 1.5 billion euros and 2.1 percent respectively. The result after tax amounts to 2.5 billion euros, compared with 0.7 billion euros the previous year. Apart from the sharp increase in profit before tax, the positive financial result plays a role here.

At 26.9 percent, our in-house key performance indicator of NWC as a percentage of Bosch Group sales, although lower than the previous year's comparable internal figure of 27.5 percent, is higher than forecast. We had expected a more significant year-on-year decline. Especially in Mobility Solutions, however, the chip supply shortages had an adverse effect on supply chains. This caused our inventory range to increase slightly instead of falling. The higher than expected inventory range also affected NWC.

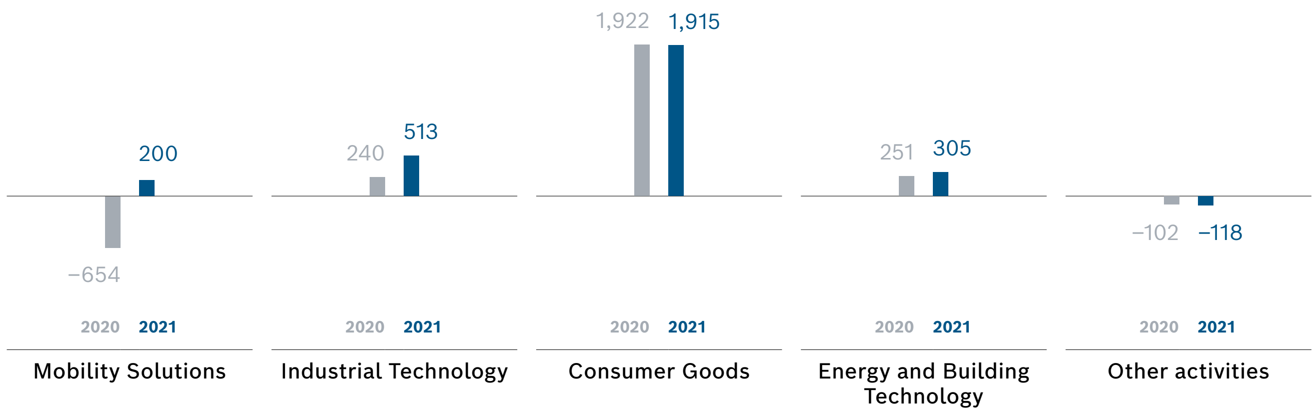
Result situation by business sector

The result situation differs from sector to sector, even if they all disclose positive EBIT. This is mainly due to differences in the pace of growth and in the burdens posed by the chip shortages and the increases in raw materials prices and logistics costs. There are also differences with respect to the scope of restructuring that is needed and to the intensity of upfront investments in promising areas.

All business sectors managed to achieve or exceed their forecasts. We had expected a considerable improvement in the Mobility Solutions business sector, a slight improvement in Industrial Technology, a margin from operations of 8 percent in Consumer Goods, and a slight deterioration in Energy and Building Technology due to increased upfront investments. As in previous years, the calculation of EBIT from operations for the Mobility Solutions and Consumer Goods business sectors 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.

in millions of euros **G 13**

EBIT by business sector
Bosch Group, 2020–2021



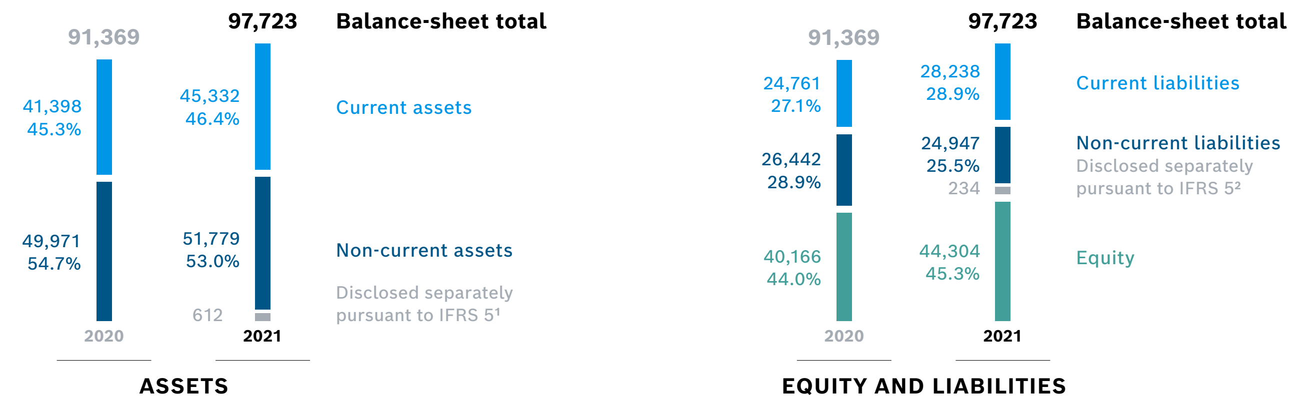
In the Mobility Solutions business sector, we report positive EBIT of 200 million euros, compared with negative EBIT of 654 million euros in the previous year. EBIT from operations came to 317 million euros, compared with the previous year's figure of minus 531 million euros. This results in a margin from operations of 0.7 percent, compared with minus 1.3 percent the previous year. Development is thus at the expected level despite the burdens.

The Industrial Technology business sector not only achieved a substantial increase in sales but was also able to more than double its result, reaching EBIT of 513 million euros (previous year: 240 million euros). It thus achieved an EBIT margin of 8.4 percent (previous year: 4.7 percent), and far exceeded our forecast. The business sector is benefiting from strong demand for hydraulics and factory automation.

The Consumer Goods business sector achieved EBIT of 1.9 billion euros. This puts it on the same very high level as in the previous year. At 2.1 billion euros, EBIT from operations was also on a par with the previous year. This means the business once again achieved a double-digit margin of 10.2 percent, following 11.5 percent in the previous year. Continued high demand for power tools and home appliances meant that it exceeded our forecast. The Energy and Building Technology business sector posted EBIT of 305 million euros, compared with 251 million euros the previous year. The margin from operations came to 5.1 percent, compared with 4.6 percent in 2020. Our expectations were therefore exceeded. The reason for this is heavy demand for low-emission heating technology.

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

Balance-sheet structure
Bosch Group, 2020–2021



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

All business sectors contributed to the year-on-year fall in average NWC as a percentage of sales. The figures for NWC by business sector relate to internal sales, including 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 fell only slightly to 27.3 percent, compared with 27.4 percent the previous year. We had forecast a significant drop. At 32.1 percent in Industrial Technology, NWC was considerably below the previous-year figure of 36.5 percent, and also lower than forecast. In Consumer Goods, the figure of 25.9 percent was also considerably less than forecast. The previous-year figure was 26.3 percent. Furthermore, Energy and Building Technology was able to improve its NWC to 19.0 percent from 20.5 percent. This was considerably lower than the forecast figure.

Net assets and financial position

Equity ratio und financial statement

The Bosch Group balance-sheet total as of the December 31, 2021, reporting date stood at 97.7 billion euros, exceeding the previous year's level of 91.4 billion euros. Compared to the previous year, the equity ratio rose by 1.3 points to 45.3 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, the sharp rise in equity resulting from the improved after-tax profit.

On the assets side, our liquidity as reported in the statement of financial position rose to 26.8 billion euros as of the reporting date, compared with the previous year's 25.7 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. This was mainly due to the positive free cash flow and capital gains 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.

The liabilities side saw changes mainly due to the early repayment of borrower's note loans and the maturity of a bond. There are therefore no longer any variable-interest borrower's note loans. The financing structure is very sound. For example, the net financial position (defined as balance-sheet liquidity minus financial liabilities and provisions for pensions and similar obligations) increased to 10.5 billion euros, compared with 6.6 billion euros in the previous year.

With a long-term rating of A (with a "stable" outlook) from the credit rating agency Standard & Poor's, Robert Bosch GmbH has a good rating. The financial liabilities of the Bosch Group include borrower's note loans and registered debentures with a nominal value of 2.2 billion euros and bearing interest between 0.582 percent and 2.098 percent, as well as bonds with a nominal value of 2.0 billion euros and bearing interest between 1.75 percent and 4.375 percent. As a result, the average interest rate has risen to 1.746 percent from the previous year's rate of 1.600 percent. The average residual term to maturity of the borrower's note loans and registered debentures is 5.99 years, compared with 5.85 years the previous year. The bonds' average residual term to maturity is 6.90 years, compared with 6.41 years the previous year. Most of the existing financial liabilities are denominated in euros.

We have concluded a syndicated loan facility with an ESG component for 3 billion euros, thereby continuing an existing loan facility as sustainable financing. We have renewed bilateral U.S. loan facilities. These facilities have not been used. In the reporting year, we repaid a 500-million-euro bond issued by our subsidiary Robert Bosch Investment Nederland B.V., Boxtel, Netherlands, that had fallen due. We also prematurely repaid around 1.3 billion euros on a borrower's note loan that served as a financial precaution at the start of the coronavirus pandemic. In the reporting year, we issued 150 million dollars under our revolving 2.0-billion-dollar commercial paper program.

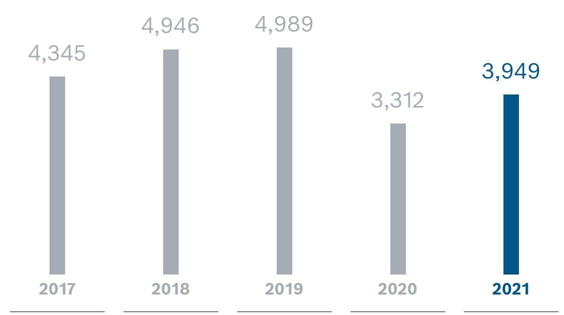
Capital expenditure

In 2021, we increased our capital expenditure year on year to 3.9 billion euros. The significantly lower figure of 3.3 billion euros posted for 2020 was a result of the coronavirus pandemic. The capex ratio is 5.0 percent of sales, compared with 4.6 percent in the previous year. This means capital expenditure reached 116.4 percent of depreciation. As of the reporting date, existing investment commitments as a result of orders already placed total 801 million euros, following a previous-year figure of 524 million euros. Thanks to our very good liquidity position, we have ample financial resources at our disposal. We invested 455 million euros in intangible assets, compared with 427 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 – 2.9 billion euros, following 2.5 billion euros the previous year – once again went to Mobility Solutions. The main increases in capital expenditure concern electric motors, e-axles, fuel cells, and power electronics in the area of electromobility, expanding capacity in the area of semiconductors and sensors in Automotive Electronics, driver assistance systems in Cross-Domain Computing Solutions, and, in Automotive Steering, the construction of the new plant for electric power steering systems in Maklar, Hungary. Other focal points were investments in the expansion of the development center in Budapest, Hungary, and of the IT campus in Adugodi, India.

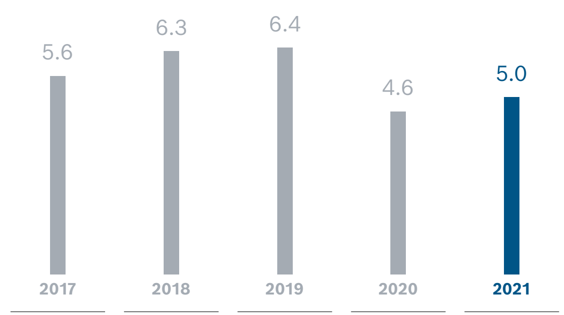
in millions of euros **G 15**

Capital expenditure
Bosch Group, 2017 – 2021



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

Capital expenditure
Bosch Group, 2017 – 2021



Capital expenditure in Industrial Technology rose to 198 million euros, compared with 119 million euros the previous year. At Drive and Control Technology, investment focused mainly on increasing capacity, the continuation of modernization measures, and localization in the regions.

In the Consumer Goods business sector, capital expenditure was 656 million euros, compared with 616 million euros in the previous year. The focus of investment at BSH Hausgeräte was on new generations of refrigerators in Çerkezköy, Turkey, and dishwashers and refrigerators in Łódź und Wrocław, Poland. In Germany, investment focused on refrigerators in Giengen, and ovens in Bretten, Traunreut, and Lipsheim. Capital expenditure at Power Tools focused on expanding production in the Accessories business unit as well as on cordless power tools and the associated batteries at various locations.

In Energy and Building Technology, capital investment fell to 85 million euros, compared with 93 million euros the previous year. The main investment focus at Thermotechnology was on SOFCs and the manufacture of heat pumps, including heat-pump storage units.

From a regional viewpoint, we invested 2.7 billion euros in our European locations, compared with 2.3 billion euros the previous year. Capital expenditure in Germany amounted to 1.6 billion euros, compared with 1.5 billion euros the previous year. In Asia Pacific, we invested 875 million euros, after 779 million euros the previous year. In the Americas, we invested a total of 368 million euros, compared to around 265 million euros in the previous year.

in millions of euros **T02**

Bosch Group, statement of cash flows

	2021	2020[1]
Liquidity at the beginning of the year (Jan. 1)	**8,955**	**4,558**
Cash flows from operating activities	+6,890	+9,016
Cash flows from investing activities	−7,379	−4,830
Cash flows from financing activities	−2,560	+484
Other activities	+290	−273
Liquidity at the end of the year (Dec. 31)	**6,196**	**8,955**

1. Values following correction and reclassification

Liquidity

The Bosch Group is financially strong, even if liquidity as per the consolidated statement of cash flows (cash and cash equivalents) had fallen to 6.2 billion euros by year-end, compared with 9.0 billion euros the previous year. In 2021, cash flow from operating activities fell to 6.9 billion euros or 8.7 percent of sales; the previous-year figure was 12.6 percent. The main reason for the decrease is additional commitments in current assets. One important reason is the build-up of inventories.

Cash flows from investing activities amounted to 7.4 billion euros, and were significantly up on the previous-year figure of 4.8 billion euros. The main reasons for this are the increase in capital expenditure and in capital outflows as a result of changes in securities and time deposits.

Cash flows from financing activities, including repayments of lease liabilities, disclosed an outflow of 2.6 billion euros in 2021, as opposed to an inflow of 0.5 billion euros the previous year. This was because a total of 1.8 billion euros was repaid on borrower's note loans and a bond in 2021.

In 2021, free cash flow comes to 2.1 billion euros. This is 3.0 billion euros, and thus significantly, lower than in 2020. Free cash flow is calculated by adding cash flow from operating activities, cash flow from investing activities (without participating interests and other financial investments), and the repayment of lease liabilities. The reasons for this decrease are the lower cash flow from operating activities and higher outflows from investing activities.

Non-financial indicators

CO_2 emissions

Once again in 2021, 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 around 8,042 gigawatt-hours (GWh) of energy in 2021 (previous year: 7,497 GWh). The 0.9 million metric tons of CO_2 that we emitted despite our varied measures were offset in the course of making the company carbon neutral. Even though energy consumption increased, emissions were slightly below their previous-year level. The end of production restrictions due to the coronavirus pandemic played a role in the significant increase in our energy consumption. 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

In the reporting year, the accident rate rose to around 1.6 accidents per million hours worked, compared with 1.5 in the previous year. The end of production restrictions due to the coronavirus pandemic, and the high proportion of associates working from home in 2020, are likely to have played a role in this increase. Unlike in the previous year, we regrettably had to report a fatal work-related accident in the reporting year. Overall, our target for accidents per million hours worked has been made more stringent. We now aim to achieve a rate of 1.45 by 2025. The total number of workplace accidents in 2021 was 1,123, compared with 951 in 2020.

Headcount

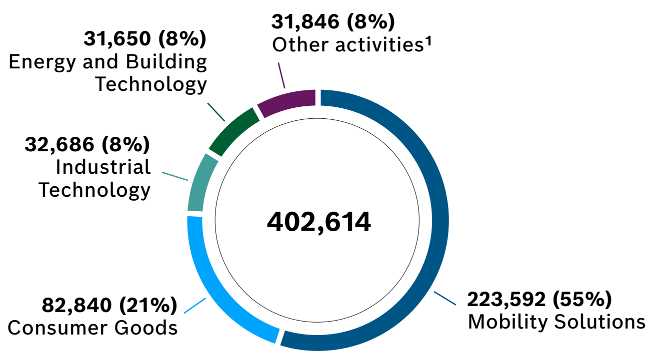
The total number of Bosch Group associates rose slightly to 402,614 at the end of 2021, compared with 395,034 at the end of 2020. The number of Bosch associates thus increased by 7,580. Consolidation effects play only a minor role.

In line with our strategic direction, the workforce in the Mobility Solutions business sector shrank to 223,592, compared with 229,069 at the end of 2020. The Powertrain Solutions, Chassis Systems Control, and Electrical Drives divisions were particularly affected. The number of associates in the Industrial Technology business sector increased to 32,686, compared with 31,364 at the end of 2020. The recovery in the mechanical engineering market was the main reason for this. The number of associates in the Consumer Goods business sector rose to 82,840, compared with 79,493 at the end of 2020. This was a result of continued strong demand for consumer goods in 2021. The number of associates in the Energy and Building Technology business sector rose to 31,650, compared with 29,779 at the end of the previous year. Of this number, some 740 associates were gained as a result of the acquisition of Protec. 31,846 associates are employed in other activities, compared with 25,329 in the previous year.

year-end figure **G 17**

Bosch Group headcount, 2021

by business sector

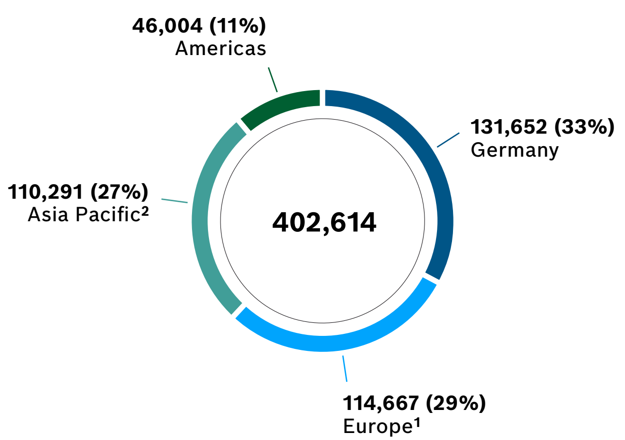


1. Corporate functions and research

year-end figure **G 18**

Bosch Group headcount, 2021

by region



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

The reason is mainly the organizational reassignment of associates to global service units and, in India, to cross-functional units. In terms of business sectors, this means the workforce structure shifted slightly year on year.

The number of associates in research and development across all units worldwide grew again by 2,949 to stand at 76,121 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 60 percent of associates in research and development, with Asia Pacific accounting for 40 percent. At 1,524, the number of associates worldwide in the corporate sector for research and advance engineering ("Other activities") at year-end was slightly below the 1,574 in the previous year.

The percentage distribution of Bosch Group associates by region stayed the same. Headcount increased in all regions except Germany. The strongest absolute increases were in Europe (excluding Germany) and in Asia Pacific.

Outlook

We expect the 2022 business year to be a challenging one as well. The contributing factors here will be the ongoing global supply shortages and the increasing prices for raw materials, energy, primary products, and transportation. Nonetheless, and assuming that the economy continues to recover from the Covid-19 pandemic, we expect sales growth of some 6 percent and an EBIT margin from operations that is roughly on a par with the previous year. We are observing the war in Ukraine, which has triggered sanctions on the part of a series of countries, with very great concern. At the time of writing, the effects this will have on the macroeconomic environment and the development of our business cannot be reliably estimated, and are therefore not reflected in the respective figures.

In 2022, we will again make considerable upfront investments in promising areas, including the expansion of semiconductor capacity, electromobility and automated driving, but also the electrification of areas such as heating technology. There will also be restructuring programs, and these will once again mainly affect the Mobility Solutions business sector.

Macroeconomic and sector-specific environment

Our planning is based on the assumption that the global economy will continue to recover, even if we were expecting the rate of growth to be slower than in 2021 even before the Russia-Ukraine conflict came to a head. At the time of writing, the effects the conflict will have on the macroeconomic environment cannot be reliably estimated. For 2022, we forecast that global GDP will grow by 4 to 4½ percent. However, uncertainty remains, also as concerns the course of the pandemic and the supply shortages. These can only be factored into our forecasts to a limited extent. In addition, many countries will likely be confronted with high rates of inflation for longer than expected, and this may affect consumption. In consequence, some of the major central banks are leaning toward a stricter monetary policy. As their point of reference, our forecasts take the estimates made by Feri AG, the IMF, and our own assessments.

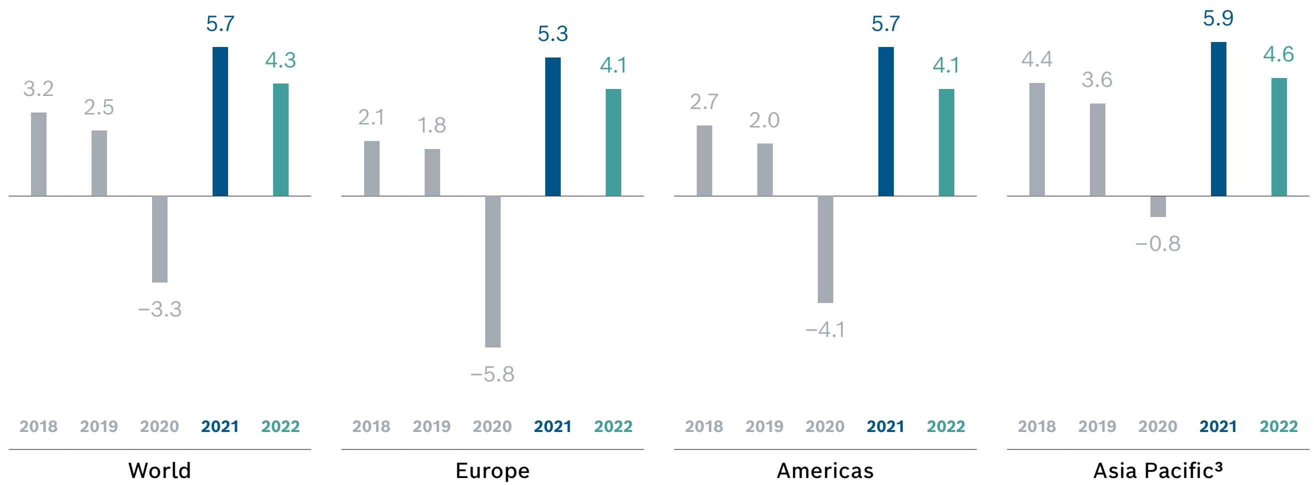
For the Americas, we expect that GDP will rise roughly 4 percent year on year in 2022. Our assumption here is that North America will grow 4¼ percent, and South America by just 2½ percent.

For Europe, the latest data suggest year-on-year growth of some 4 percent. And in the European Union as well, we forecast year-on-year growth of some 4 percent. For Germany, we expect growth of 3½ percent, and thus stronger growth than in 2021. The growth rates in Asia Pacific (including other countries) will likely also be in a similar range, at 4½ percent. In this context, the rate of growth in China is expected to slow to 4¾ percent.

percentage figures **G 19**

Economic growth by region, 2018 – 2022[1, 2]

Real GDP, percentage change on previous year



1. Some previous-year figures changed from the 2020 annual report following an audit
2. Forecast figures for 2022
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 by some 9 percent year on year in 2022, to roughly 88 million vehicles. This forecast is based on data from our in-house MP process and the company's own estimates. We therefore do not expect a return to the 2019, pre-crisis, level of more than 92 million vehicles until 2023 at the earliest.

As concerns the severe global scarcity of semiconductors, we currently expect this to ease further over the course of 2022. However, there will likely continue to be supply bottlenecks that adversely affect both our customers' and our own manufacturing operations. The bottlenecks will especially affect the Mobility Solutions business sector, but also the Consumer Goods business sector. The anticipated commercial risk has been evaluated, taking the necessary assumptions and estimates into consideration, and presented accordingly in the consolidated financial statements for 2021.

Bosch Group and business sectors

Sales forecast

In 2022, we expect Bosch Group sales to grow roughly 6 percent. This takes account of the adverse effects the chip shortages will continue to have on our customers' manufacturing operations and those of our own. By contrast, any grave adverse developments, such as a significant impact of the Russia-Ukraine conflict on the global economy or a resurgence of the adverse effects of the Covid-19 pandemic on the manufacturing industry, would slow the rate of growth. These effects cannot yet be estimated.

Looked at by business sector, our assumption for 2022 is year-on-year growth of more than 8 percent for the Mobility Solutions business sector. In the Industrial Technology and Consumer Goods business sectors, which grew strongly in 2021, we expect sales growth in the range of 2 to 3 percent. In Energy and Building Technology, we expect growth to be approximately 4 percent.

Result forecast

Despite all the burdens of supply shortages, increases in raw materials prices, adjustment measures, and upfront investments in our growth areas, our aim in the Bosch Group is to achieve an EBIT margin from operations that is at least roughly on a par with the previous year. In absolute terms, therefore, we expect EBIT from operations to grow. More specifically, for the Mobility Solutions business sector we expect a significant improvement in the EBIT margin from operations. Our assumption is that the chip shortages will gradually alleviate over the course of 2022, and that the automotive industry will then be able to work through its large order backlog. For the Industrial Technology and Consumer Goods business sectors, we disclosed especially high margins in 2021. In Industrial Technology, we expect a slight decline, and in Consumer Goods, a significant slowdown. The reasons for this include heavy upfront investments in areas such as control systems in factory automation and the electrification of the hydraulics portfolio in Drive and Control Technology, and cautious planning in the consumer goods area following the strong demand seen over the past two years of the Covid-19 pandemic. For Energy and Building Technology, we expect an EBIT margin from operations on a par with the previous year. Given the increasingly volatile way result is developing, we have for the first time extended the range of change that qualifies as "significant" in our forecast for 2022.

Expectation for NWC

Our average NWC (measured as a percentage of sales; indicator used in internal accounting) will rise slightly in 2022. There are two main reasons for this. First, we want to increase inventories to make our supply chains more robust and, in this way, reduce the risk of supply bottlenecks. Above all in the Mobility Solutions business sector, this will result in increased inventory range and a slight increase in average NWC. Second, the level of inventories in the Consumer Goods and Industrial Technology business sectors is low as a result of demand outstripping capacity. Here, we expect the level of inventories to return to normal, and thus to rise significantly. In the Energy and Building Technology business sector, the increase will likely only be slight.

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, electrification, the growing importance of sustainability, and 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. It is currently focusing on further fine-tuning its analyses of risk-bearing capacity and on 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 2022. From a current perspective, there are no risk exposures that could jeopardize the Bosch Group's continued existence as a going concern.

The long-standing conflict between Russia and Ukraine came to a head at the end of February. The war in Ukraine has not only triggered a series of economic sanctions. It can also be expected to have an impact on the global economy in the form of rising energy and raw materials prices, for example, and interruptions in supply chains.

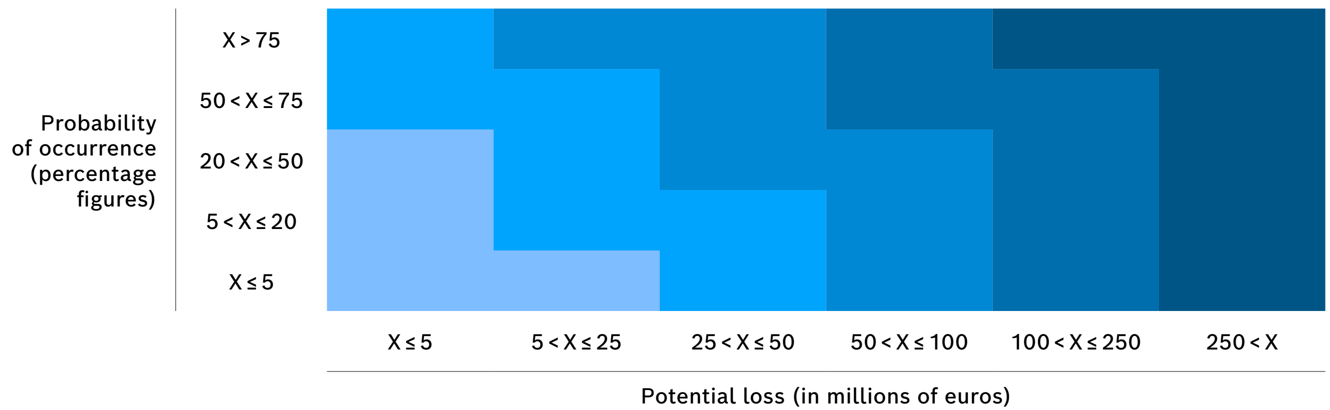
We regard the outbreak of war and the consequences related to it as material subsequent events that have no effect on the consolidated financial statements as of December 31, 2021. Depending on the duration of the hostilities and further events, it can be expected that there will be an impact on the consolidated financial statements as of December 31, 2022. This impact may result above all from impairment risks.

For the subsidiaries in Ukraine included in the consolidated financial statements, the sum total of property, plant, and equipment, inventories, and trade receivables comes to less than 1 percent of the respective carrying value in the consolidated financial statements as of December 31, 2021. For the subsidiaries in Russia included in the consolidated financial statements, the value is between 1 and 2 percent. Sales revenue in Russia in 2021 was roughly 1.2 billion euros, and in Ukraine some 170 million euros.

Our task forces are closely monitoring the risks for our workforce, from the sanctions, for supply chains, for payment transactions, and in the area of IT security, among other things.

G 20

Risk matrix of potential loss



Risk assessment on the basis of the risk management system

Basic principles

For **risk assessment** on the basis of the risk management system, which covers risks up to 2025, there have been no appreciable methodical changes since the previous year. Nor have there been any substantial changes in the risk situation. The number of reported risks (at year-end 2021) 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 6 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 potential international trade conflicts, especially between the United States and China, and from further burdens as a result of the Covid-19 pandemic. The five greatest risks each entail a monetary risk in excess of 330 million euros.

The digital transformation and the increased use of AIoT and cloud solutions is resulting in growing challenges for Bosch in the areas of data protection and cyber-security, and also as concerns conformity with internationally heterogeneous laws, regulations, and certifications. We have a cyber-security strategy in place to combat IT and data protection risks. This is because a systems failure caused by external attacks or internal errors can lead to considerable problems in product development, product manufacturing, and the continued operation of software-based products as well as in administrative processes, resulting in significant financial losses.

In addition, we have put in place 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. 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 in the AIoT domain arise from connected hardware products, software, or data being misused or wrongly used. With connected AIoT products, there is a risk of external attacks. We address these by means of a group-wide cyber-security management system, which is continuously revised and updated. Aspects of IT security are considered right from the product design stage. We also address the issue of security vulnerabilities by upgrading the update capability of Bosch products.

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.

Apart from these risks, trade conflicts may have a very harmful effect on Bosch's business operations. We are keeping a close watch on developments and, on the basis of scenarios, are designing countermeasures, especially with respect to trade relations between the United States and China. These include concepts for making our supply chains more robust and for avoiding critical overdependencies. We are also working on improving the regional balance of our business, and on growing in markets that have so far been under-represented.

The Covid-19 pandemic continues to pose a risk to the stability of our business operations. Its duration and its long-term effects on finance markets, supply chains, market players, and consumer behavior can only be estimated to a limited extent. With a wide variety of measures, we are employing task forces to attempt to keep the impact on supplies to our customers to a minimum.

Risks by business sector

None of the risks specific to the business sectors come under the five greatest risks identified in risk reporting. In addition, less than half the monetary risk is attributable to the business sector-specific risks.

Of the business sectors, Mobility Solutions has the highest financial risk. This business sector is especially affected by the current chip supply shortages. Here, we are taking extensive measures to keep the impact on customers to a minimum. We limit the risk of the insolvency or bankruptcy of critical suppliers in the Mobility Solutions business sector 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.

We are also preparing ourselves for further considerable burdens resulting from changes in powertrain technology. These changes will require further adjustments. Currently, the EU Commission is further deliberating the issue of pollutant emissions from motor vehicles (Euro 7/VII). A substantiated evaluation of this additional measure cannot be made until the EU Commission's decisions are published. This will not happen until later in 2022.

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 natural disasters on the supply chain. In Energy and Building Technology, the availability of raw materials and primary products is relevant, and there is now also the risk of increasing freight costs.

In the Consumer Goods business sector as well, where the financial risk is disproportionately lower than its 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, and to the required location structure.

Hedging policy and financial risks

Hedging policy principles and financial derivatives

The operative business of the Bosch Group is 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 related to investment and hedging transactions. According to these regulations, derivatives may only be used in connection with operative business, financial investments, or financing transactions; speculative transactions are not allowed. Trading limits are an important component of the guidelines. As a matter of principle, hedges are entered into via banks whose creditworthiness is regarded as impeccable; we take the rating given by leading agencies as well as current risk assessments of the financial markets into account. The creditworthiness of the banking partners of the Bosch Group 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 entered into as secured deposits in tri-party repo transactions. In these transactions, 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. The decision-making bodies are committees for commodities, foreign currencies, and investments that meet at regular intervals. Trading, settlement, and controlling are functionally segregated from each other. The 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 for the next month. Prescribed risk limits for the various investment categories limit the potential loss. Management is informed monthly about risk analyses and the results of investments and hedges.

Currency risks

Currency risks of the operative business are mitigated by the central management of selling and purchasing currencies. The currency risk is determined on the basis of the worldwide consolidated cash flow in the respective currencies. Based on the business plan, estimated inflows and outflows in the various countries 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 biggest net currency positions of the planned cash flow are in Chinese renminbi, British pound, Russian ruble, and Hungarian forint.

Hedging largely takes the form of forward exchange contracts; currency options and currency swaps to secure group financing 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 pertaining to the main operative foreign currency positions is determined using the value-at-risk concept, supplemented by worst-case analyses. These risk analyses and the hedge result are determined monthly and presented to management.

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, and the U.S. dollar, the effect of such a change on pre-tax profit would in each case run into a low eight-figure sum. The effects on earnings shown here mainly result 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. However, the currency risk for the statement of financial position does not correspond to the economic risk, which is determined on the basis of forecast cash flows.

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 swaps and interest futures. In a sensitivity analysis, the assets and liabilities subject to floating interest rates, fixed-rate securities, and interest derivatives were considered. Starting in the reporting year, pension and money-market funds have been included. In addition, the variable-interest debt instruments have been repaid. A change in the market interest rate would therefore have no effect on the profit before tax. In the previous year, the interest-rate risk was 50 million euros.

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.

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, 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 there is an intention on the part of the customer to settle the receivable based on the net amount 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 very good 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 2021, we did not register any unusual corruption-related risks within the organization. As before, the general risks mainly concern the handling of special payments to our customers and business partners whose risk profile is high. To minimize risk, we have revised the relevant company regulations and prepared the implementation of an IT tool to check integrity and monitor selected business partners. National and international laws and draft laws are increasingly tightening the requirements made of effective compliance, data protection, and information security management systems. At the same time, the investigating authorities have announced tougher action against corruption.

The corporate compliance organization was further modified in 2021, in terms of both content and staffing. In this context, we pushed ahead with the reorganization of data protection and information security and defined the associated roles and responsibilities more closely. The compliance committee, which was extended at the end of 2020 to include the corporate technology and risk management departments, has become established. The global anti-corruption risk analysis has been regularly repeated and carried out in a uniform IT system together with the antitrust risk analysis. In addition, we have continued the digitalization of our processes by introducing further IT tools.

With respect to our whistleblower system and whistleblower protection, we have developed the “Speak Up!” awareness campaign, which will be launched in 2022. In addition, we have rolled out refresher courses for our own mandatory web-based training courses, and included a course on handling sensitive information in our compliance training program for the first time. In the course of systematic competence management within the corporate compliance organization, we have set up a practically oriented Compliance Pro Academy, which will also start work in 2022.

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 2021. With respect to the events concerning various automakers’ diesel vehicle emissions, Bosch remains a defendant in a number of class and individual civil-law actions around the world. In a major class action in the United States and Canada, Bosch was able to reach a settlement of up to 63.3 million dollars. With this, Bosch neither acknowledges the validity of the claims brought forward, nor does it concede any liability.

In Germany, Bosch has won all the proceedings that have finally been closed. It also won its case at the German Federal Supreme Court. The court upheld Bosch’s assertion that it had not abetted Volkswagen AG and Porsche Automobil Holding SE in any violations of securities regulations, and is therefore not liable to stockholders of the two companies for any share price losses incurred in connection with the diesel affair. In addition, one of the class actions brought with respect to Bosch in the Netherlands was dismissed. This decision is final. Last year, new class actions were also filed in the Netherlands. Although these pending and potentially impending 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 discussions with customers regarding compensation in respect of potential civil-law risks associated with antitrust proceedings that have come to an end. Investigations by the antitrust authorities in the automotive supplier sphere, also against Bosch, are still continuing in certain countries. In addition, investigations against BSH Hausgeräte in France concerning a possible breach of antitrust law are still ongoing.

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 606 million euros. From the 2021 business year, the board of management knows of no 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, 2021

Consolidated income statement

for the period from January 1 to December 31, 2021

in millions of euros **T03**

	Note	2021	2020
Sales revenue	7	**78,748**	**71,494**
Cost of sales	8	–52,933	–48,946
Gross profit		**25,815**	**22,548**
Distribution and administrative cost	8	–16,384	–14,692
Research and development cost	8	–6,110	–5,890
Other operating income	9	2,336	1,818
Other operating expenses	10	–2,840	–2,123
Result from entities included at equity		–2	–4
EBIT		**2,815**	**1,657**
Financial income	11	2,728	2,570
Financial expenses	11	–2,244	–2,722
Profit before tax		**3,299**	**1,505**
Income taxes	12	–800	–756
Profit after tax		**2,499**	**749**
of which attributable to non-controlling interests		484	433
of which attributable to parent company		2,015	316

Consolidated statement of comprehensive income

for the period from January 1 to December 31, 2021

in millions of euros T04

	2021	2020
Profit after tax	**2,499**	**749**
Change in debt instruments, measured at fair value	–216	98
reclassified to profit or loss	–80	–14
Currency translation of entities outside the euro zone	808	–1,548
reclassified to profit or loss	–12	
Items that will be reclassified to profit or loss	**592**	**–1,450**
Change in equity instruments, measured at fair value	608	739
Remeasurement of pension provisions	802	–224
Items that will not be reclassified to profit or loss	**1,410**	**515**
Other comprehensive income	**2,002**	**–935**
Comprehensive income	**4,501**	**–186**
of which attributable to non-controlling interests	690	357
of which attributable to parent company	3,811	–543

Consolidated statement of financial position

for the year ended December 31, 2021

in millions of euros T05

Assets

	Note	12/31/2021	12/31/2020
Current assets			
Cash and cash equivalents	14	6,196	8,955
Trade receivables	15	14,034	13,696
Other financial assets	16	7,897	5,031
Contract assets	17	955	865
Income tax receivables		450	352
Other assets	18	2,148	1,961
Inventories	19	13,652	10,538
		45,332	**41,398**
Non-current assets			
Financial assets	16	15,864	15,273
Contract assets	17	434	468
Income tax receivables		183	151
Property, plant, and equipment	20	21,404	20,751
Right-of-use assets	32	2,000	1,977
Intangible assets	21	9,150	9,288
Investments measured at equity	6	24	0
Other assets	18	964	733
Deferred taxes	12	1,756	1,330
		51,779	**49,971**
Assets held for sale	6	**612**	
Total assets		**97,723**	**91,369**

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in millions of euros T05

Equity and liabilities

	Note	12/31/2021	12/31/2020
Current liabilities			
Trade payables	22	9,948	8,335
Lease liabilities	32	510	491
Other financial liabilities	23	1,370	1,495
Contract liabilities	24	1,359	1,278
Income tax liabilities	12	728	667
Other liabilities	25	7,802	6,596
Other provisions	25	6,521	5,899
		28,238	**24,761**
Non-current liabilities			
Financial liabilities	23	4,395	5,656
Lease liabilities	32	1,556	1,541
Contract liabilities	24	614	345
Other liabilities	25	31	163
Pension provisions	26	11,663	12,811
Other provisions	25	6,056	5,384
Deferred taxes	12	632	542
		24,947	**26,442**
Liabilities directly associated with assets held for sale	6	**234**	
Equity	27		
Issued capital		1,200	1,200
Capital reserve		4,557	4,557
Retained earnings		36,180	32,472
Equity attributable to parent company		**41,937**	**38,229**
Non-controlling interests		2,367	1,937
		44,304	**40,166**
Total equity and liabilities		**97,723**	**91,369**

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
1/1/2020	**1,200**	**4,557**	**37,498**	**−62**	**−468**	**1,342**	**−5,081**	**−4,207**	**38,986**	**2,093**	**41,079**
Profit after tax			316						316	433	749
Other comprehensive income					−1,469	835	−225	−859	−859	−76	−935
Comprehensive income			**316**		**−1,469**	**835**	**−225**	**−859**	**−543**	**357**	**−186**
Dividends			−119						−119	−504	−623
Changes in ownership interests in subsidiaries			−3						−3	−5	−8
Other changes			−60			−36	4	−32	−92	−4	−96
12/31/2020	**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**

Consolidated statement of cash flows

in millions of euros **T 07**

	Note 28	2021	2020
EBIT		2,815	1,657
Depreciation and amortization[1]		4,995	4,866
Gains/losses on disposal of non-current assets		61	70
Result from investments measured at equity		2	4
Other expenses and income, not cash effective		24	−399
Change in inventories		−2,840	250
Change in receivables and other assets		−186	−223
Change in liabilities		2,117	1,822
Change in pension provisions and other provisions		1,053	1,692
Interest paid		−208	−204
Interest and dividends received		451	395
Other financial expenses and income, cash effective		−140	151
Income taxes paid		−1,254	−1,065
Cash flows from operating activities (A)		**6,890**	**9,016**
Acquisition of subsidiaries		−322	−2
Disposal of subsidiaries		103	709
Additions to non-current assets		−4,660	−3,958
Proceeds from disposal of non-current assets		487	549
Change in securities and time deposits (term of more than 90 days)		−2,987	−2,128
Cash flows from investing activities (B)		**−7,379**	**−4,830**

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

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in millions of euros T 07

	Note 28	2021	2020
Acquisition of non-controlling interests		20	–2
Borrowing		232	2,189
Repayment of financial liabilities		–1,902	–541
Repayments of lease liabilities		–560	–539
Dividends paid		–350	–623
Cash flows from financing activities (C)		**–2,560**	**484**
Change in liquidity (A+B+C)		**–3,049**	**4,670**
Liquidity at the beginning of the period (January 1)		**8,955**	**4,558**
Exchange-rate related change in liquidity		302	–272
Change in liquidity due to changes in the consolidated group		9	–1
Liquidity held for sale		–21	
Liquidity at the end of the period (December 31)		**6,196**	**8,955**

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, 2021, 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] were 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, 2021, were authorized for publication by the board of management on March 10, 2022. The consolidated financial statements and group management report will be filed with the German Federal Gazette [*Bundesanzeiger*] and published there.

2 — Changes in financial reporting

Accounting standards applied for the first time in the fiscal year 2021

The following amendments became effective for the first time in the fiscal year:
- Amendments to IFRS 4 *Insurance Contracts* (Extension of the Temporary Exemption from Applying IFRS 9),
- Amendments to IFRS 9 *Financial Instruments*, IAS 39 *Financial Instruments: Recognition and Measurement,* IFRS 7 *Financial Instruments: Disclosures,* IFRS 4 *Insurance Contracts,* and IFRS 16 *Leases* (Interest Rate Benchmark Reform – Phase 2),
- Amendments to IFRS 16 *Leases* (Covid-19-Related Rent Concessions beyond June 30, 2021).

The Bosch Group has not adopted the amendments to IFRS 4 and IFRS 16. The amendments from the Interest Rate Benchmark Reform – Phase 2 had no material effects on the consolidated financial statements of Robert Bosch GmbH.

Accounting standards not adopted early

In June 2021, the EU endorsed the following amendments to accounting standards that were not effective for the reporting year:

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

All above amendments will become effective for fiscal years beginning on or after January 1, 2022.

In addition, the EU endorsed IFRS 17 *Insurance Contracts* in November 2021. The standard is 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 amendments to IFRS 3, IAS 16, IFRS 17, and the Annual Improvements is not expected to have any material effects on the consolidated financial statements of Robert Bosch GmbH. It is not possible to reliably estimate at present the effects from first-time adoption of the amendments to IAS 37.

Correction of the previous year’s figures

In accordance with IAS 8.42, the presentation of effects from revenue recognition over time in the statement of cash flows has been reassessed with regard to the extent it affects cash, and corrected within cash flows from operating activities. The comparative amounts for the previous year in the statement of cash flows have been restated retrospectively; the effects are presented in the table below:

in millions of euros **T08**

	2020 before restatement		2020 after restatement
EBIT	1,657		1,657
Depreciation and amortization	4,866		4,866
Gains/losses on disposal of non-current assets	70		70
Result from investments measured at equity	4		4
Other expenses and income, not cash effective	−657	258	−399
Change in inventories	238	12	250
Change in receivables and other assets	47	−270	−223
Change in liabilities	1,822		1,822
Change in pension provisions and other provisions	1,692		1,692
Interest paid	−204		−204
Interest and dividends received	395		395
Other financial expenses and income, cash effective	151		151
Income taxes paid	−1,065		−1,065
Cash flows from operating activities (A)	**9,016**		**9,016**

3 — Currency translation

In the separate financial statements of the group companies, all 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.

The financial statements of the consolidated companies outside the euro zone 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 =	12/31/2021	12/31/2020	2021	2020
Australia	AUD	1.56	1.59	1.57	1.65
Brazil	BRL	6.37	6.37	6.38	5.89
China	CNY	7.22	8.02	7.63	7.87
Czech Republic	CZK	24.92	26.24	25.64	26.46
Hungary	HUF	369.00	365.13	358.57	351.17
India	INR	84.26	89.66	87.45	84.64
Japan	JPY	130.44	126.49	129.89	121.85
Korea	KRW	1,347.56	1,336.00	1,353.99	1,345.58
Mexico	MXN	23.24	24.42	23.99	24.52
Poland	PLN	4.60	4.56	4.56	4.44
Russian Federation	RUB	84.89	91.47	87.16	82.72
Switzerland	CHF	1.04	1.08	1.08	1.07
Turkey	TRY	14.72	9.11	10.50	8.05
United Kingdom	GBP	0.84	0.90	0.86	0.89
United States	USD	1.13	1.23	1.18	1.14

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.

With respect to the consideration of climate-related issues in the preparation of the consolidated financial statements, the relevant legislation is continuously monitored. Any effects are already considered in medium-term planning. In the reporting year, there were no effects on the accounting and valuation rules for assets and liabilities.

Despite the continuing uncertainties associated with the Covid-19 pandemic, 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.

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. 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 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 440 (previous year: 438) fully consolidated entities. The group developed as follows:

T10

	Germany	Outside Germany	Total
Included in consolidation at January 1, 2020	88	351	439
Additions/formations in fiscal year 2020	1	8	9
Disposals/mergers in fiscal year 2020	–5	–4	–9
Included in consolidation at December 31, 2020	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**

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

In fiscal year 2021, the following companies were consolidated for the first time:

- AJNS New Media GmbH, Berlin, Germany,
- AquaEasy Pte. Ltd., Singapore, Singapore,
- Bosch (Chengdu) Information Technology Service Co., Ltd., Chengdu, China,
- Bosch (Shanghai) Digital Technology Ltd., Shanghai, China,
- Bosch Automotive Workshop Services LLC, Wilmington, DE, United States,
- Bosch General Aviation Technology GmbH, Vienna, Austria,
- Bosch Hydrogen Powertrain Systems (Chongqing) Co., Ltd., Chongqing, China,
- Bosch Rexroth Nederland B.V., Boxtel, Netherlands,
- ETAS Automotive India Private Ltd., Bengaluru, India,
- ETAS Korea Co., Ltd., Seoul, Korea,
- Gaggenau Home Appliances (Shanghai) Co., Ltd., Shanghai, China,
- Le-HydrauliX (Suzhou) Co., Ltd., Suzhou, China,
- Protec Fire and Security Group Ltd., Nelson, United Kingdom,
- Protec Fire Detection plc, Nelson, United Kingdom,
- Protec Netherlands B.V., Berkel en Rodenrijs, Netherlands,
- Pump Technology Solutions (US) LLC, Wilmington, DE, United States,
- Pump Technology Solutions PS GmbH, Berlin, Germany,
- Robert Bosch Ltd., Kyiv, Ukraine,
- Robert Bosch India Manufacturing and Technology Private Ltd., Bengaluru, India,
- Robert Bosch Technical and Business Solutions GmbH, Stuttgart, Germany,
- Tecnologia de Bombas Automotivas do Brasil Ltda., Sorocaba, Brazil,
- The KOBI Company B. V., Leuven, Belgium.

Due to changes to the consolidated group, sales revenue increased by EUR 131 million and total assets by EUR 49 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	
	2021	2020	2021	2020
Current assets	2,046	1,507	2,205	1,663
Non-current assets	469	393	1,456	1,377
Current liabilities	1,202	940	1,486	1,208
Non-current liabilities	4	1	214	199
Sales revenue	2,115	2,058	3,434	2,955
Profit after tax	445	465	406	349
Comprehensive income	564	447	615	308
Cash flows from operating activities	285	726	559	581
Cash flows from investing activities	–70	–48	–152	–186
Cash flows from financing activities	–215	–681	–276	–405
Share of capital attributable to non-controlling interests	34.0%	34.0%	49.0%	49.0%
Profit/loss attributable to non-controlling interests	151	158	199	171
Equity attributable to non-controlling interests	445	326	961	800
Dividends paid to non-controlling interests	73	231	130	214

in millions of euros **T12**

	Bosch HUAYU Steering Systems Group, Shanghai, China		Bosch Ltd., Bengaluru, India	
	2021	2020	**2021**	2020
Current assets	1,287	1,571	964	956
Non-current assets	601	520	979	773
Current liabilities	1,103	1,354	559	537
Non-current liabilities	12	3	39	38
Sales revenue	1,529	1,582	1,303	991
Profit after tax	176	196	143	17
Comprehensive income	255	174	230	–109
Cash flows from operating activities	106	262	48	101
Cash flows from investing activities	–76	–33	–19	–67
Cash flows from financing activities	–218	–80	–41	–39
Share of capital attributable to non-controlling interests	49.0%	49.0%	29.5%	29.5%
Profit/loss attributable to non-controlling interests	86	96	42	5
Equity attributable to non-controlling interests	379	360	397	340
Dividends paid to non-controlling interests	61	38	12	11

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 entities are joint ventures in accordance with IFRS 11 and were recognized in the consolidated financial statements as of December 31, 2021, using the equity method in accordance with IAS 28:
- Bosch BASF Smart Farming GmbH, Cologne, Germany (50 percent),
- KB Wiper Systems Co., Ltd., Daegu, Korea (50 percent).

The share of capital indicated corresponds to the share of voting rights.

As in the previous year, there were no unrecognized commitments to joint ventures as of the reporting date that could lead to a future outflow of cash or other resources.

Condensed financial information on individually immaterial joint ventures

in millions of euros **T13**

	2021	2020
Carrying amount of the investments	3	0
Group share of profit after tax	–2	–4
Group share of other comprehensive income of the period	0	0
Group share of comprehensive income	–2	–4

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

For reasons of materiality, no other joint ventures are currently accounted for using the equity method.

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 entity is accounted for using the equity method in accordance with IAS 28 for the first time as of December 31, 2021:
- ads-tec Energy plc, Dublin, Ireland (21.4 percent).

Determined on the basis of financial statements as of June 30, 2021, the carrying amount of the investment as of December 31, 2021, was EUR 21 million.

For reasons of materiality, no other associated entities are currently accounted for using the equity method.

Business combinations

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 provisional purchase price for the shares came to EUR 345 million; the business combination was financed mainly by transferring cash. The entity has been included in the consolidated financial statements of Robert Bosch GmbH as of December 31, 2021, and allocated to the Energy and Building Technology business sector.

Protec Fire and Security Group Ltd. operates as a system integrator for security and fire alarm technology primarily in the United Kingdom and the Netherlands. The acquisition will strengthen the European business of the Building Technologies division.

The measurement of the assets and liabilities of the acquired entity on the acquisition date and the purchase price allocation had not yet been completed at the time the consolidated financial statements as of December 31, 2021, were released for publication. Therefore, only provisional values are available for the assets and liabilities acquired. Assets amounting to EUR 144 million (including cash and cash equivalents of EUR 3 million) were acquired and liabilities amounting to EUR 25 million assumed as of the date of first-time consolidation. The acquisition resulted in provisional goodwill of EUR 226 million, which is allocated to the Building Technologies division. The goodwill is not deductible for tax purposes. It represents the value of the workforce, part of the expected synergy potential, and, according to preliminary analyses, intangible assets to an immaterial extent.

Assuming that the acquisition of Protec Fire and Security Group Ltd. had already taken place as of January 1, 2021, the Bosch Group's sales revenue would have amounted to EUR 78,850 million and profit after tax to EUR 2,511 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. 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.

As of December 31, 2021, the following operations meet the criteria for classification as a disposal group within the meaning of IFRS 5:

On March 30, 2021, an agreement was signed to sell the steering and gear pumps business, which is part of the Mobility Solutions business sector. The transaction was closed on January 31, 2022. The companies affected by the disposal are 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 July 15, 2021, an agreement was signed to sell the company Robert Bosch Aftermarket Solutions GmbH, Göttingen, Germany, which is assigned to the Mobility Solutions business sector. The entity sorts and reconditions used spare parts and produces components such as vehicle starters and electrohydraulic brakes. The transaction is to be closed at the end of March 2022.

On September 29, 2021, an agreement was signed for the sale of the large-scale project business of Bosch Rexroth B.V., Boxtel, Netherlands. The operations are assigned to the Industrial Technology business sector. The transaction is expected to be completed at the end of May 2022.

Furthermore, the planned divestment of the vacuum and hydraulics business as well as the passenger car brake disc business (both Mobility Solutions business sector) was announced; it is planned to complete the transactions in the second half of 2022 and at the end of 2022 respectively.

As part of the classification of the above operations as a disposal group, an expense of EUR 146 million was recognized in sundry other operating expenses in the reporting year. Of that amount, EUR 66 million is attributable to the impairment of non-current assets and EUR 80 million to the recognition of provisions.

In the reporting year, the investments in Knorr-Bremse Systeme für Nutzfahrzeuge GmbH, Munich, Germany, and Knorr-Bremse Commercial Vehicle Systems Japan Ltd., Saitama, Japan, were classified as non-current assets held for sale. In the fiscal year 2018, the decision was taken to exercise the existing put option with regard to the minority interests and to sell both investments to Knorr-Bremse AG, Munich, Germany. The investments are allocated to the Mobility Solutions business sector. It is currently expected that the divestment will be completed in the fiscal year 2022.

As of December 31, 2021, the main groups of assets held for sale and related liabilities are as follows:

in millions of euros **T14**

	2021
Cash and cash equivalents	21
Trade receivables	56
Inventories	84
Property, plant, and equipment	58
Intangible assets	6
Other financial and non-financial assets	387
Assets held for sale	**612**
Trade payables	49
Pension provisions	74
Other provisions	51
Other financial and non-financial liabilities	60
Liabilities directly associated with assets held for sale	**234**

The accumulated other comprehensive income related to non-current assets held for sale and disposal groups amounts to EUR 352 million. Of this amount, EUR 346 million relates to the revaluation reserve from equity instruments and EUR 6 million to currency translation differences.

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 to 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. 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 comprises an amount of EUR 1,093 million (previous year: EUR 1,195 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 11 million (previous year: EUR 4 million) is expected to be realized as sales revenue within the next two years and an amount of EUR 4 million (previous year: EUR 10 million) thereafter. These amounts relate to long-term construction contracts.

Sales revenue recognized over time amounts to EUR 38,789 million (previous year: EUR 36,493 million) in the Mobility Solutions business sector, EUR 39 million (previous year: EUR 14 million) in the Industrial Technology business sector, and EUR 225 million (previous year: EUR 253 million) in the Energy and Building Technology business sector.

A breakdown of sales revenue by business sector and 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 T15

	2021	2020
Administrative cost	3,892	3,718
Distribution cost	12,492	10,974
	16,384	**14,692**

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 T16

	2021	2020
Total research and development cost	6,328	6,044
Development cost capitalized in the reporting period	–219	–197
Impairment losses on capitalized development cost	1	43
	6,110	**5,890**

Cost of materials amounted to EUR 36,622 million in the reporting year (previous year: EUR 33,146 million).

9 — Other operating income

in millions of euros T17

	2021	2020
Income from exchange-rate fluctuations	1,032	738
Income from derivatives	215	193
Income from the reversal of loss allowances on trade receivables and other financial assets	72	58
Income from the disposal of non-current assets	69	98
Income from rent and leases	8	10
Income from the reversal of provisions	327	117
Sundry other operating income	613	604
	2,336	**1,818**

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

The line item “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 206 million (previous year: EUR 366 million, including EUR 110 million attributable to the reimbursement of social security contributions in connection with wage subsidy programs in Germany).

10 — Other operating expenses

in millions of euros T18

	2021	2020
Expenses from exchange-rate fluctuations	931	821
Expenses from derivatives	295	123
Loss allowances on trade receivables and other financial assets	94	166
Expenses from the disposal of non-current assets	130	168
Other taxes	45	37
Expenses from the recognition of provisions	854	565
Impairment of goodwill	108	
Sundry other operating expenses	383	243
	2,840	**2,123**

The line item “expenses from derivatives” includes expenses from foreign exchange and commodity derivatives allocated to operating activities.

11 — Financial result

in millions of euros T19

	2021	2020
Interest and similar income	437	401
Interest and similar expenses	−299	−355
Interest result	**138**	**46**
Investment income	84	37
Income from securities	541	320
Expenses from securities	−117	−192
Income from exchange-rate fluctuations	1,074	585
Expenses from exchange-rate fluctuations	−683	−1,293
Income from derivatives	571	1,224
Expenses from derivatives	−1,096	−809
Other income	21	3
Other expenses	−49	−73
Other financial result	**346**	**−198**
Financial result, total	**484**	**−152**
of which financial income	2,728	2,570
of which financial expenses	−2,244	−2,722

The line item “interest and similar income” contains dividend income from shares of EUR 67 million (previous year: EUR 55 million) and income from investment funds of EUR 27 million (previous year: EUR 17 million). The line item “interest and similar expenses” includes negative interest income of EUR 20 million (previous year: EUR 8 million).

The line item “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.

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

in millions of euros **T20**

	2021		2020	
	Interest income	**Interest expenses**	Interest income	Interest expenses
Financial assets measured at amortized cost (AC)	105	20	91	8
Financial assets measured at fair value through other comprehensive income (FVOCI wR)	152		152	
Financial liabilities measured at amortized cost (AC)		125		124
	257	**145**	**243**	**132**

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 **T21**

	2021	2020
Current taxes	1,149	890
Deferred taxes	–349	–134
	800	**756**

Current taxes contain tax effects not related to the reporting year totaling EUR 139 million (previous year: EUR 120 million).

Deferred taxes break down as follows:

in millions of euros T22

	2021	2020
Temporary differences	–434	–240
Tax losses and tax credits	85	106
	–349	**–134**

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 29 percent, unchanged on the previous year. The tax rates outside Germany range between 9 percent and 35 percent (previous year: between 9 percent and 34 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 T23

	2021		2020	
	Assets	Liabilities	Assets	Liabilities
Receivables, other assets, and inventories	948	585	713	473
Securities, investments	14	221	8	324
Property, plant, and equipment	219	646	189	608
Right-of-use assets		415		428
Intangible assets	195	1,028	191	1,114
Other assets	111	58	85	0
Liabilities	1,152	142	987	116
Lease liabilities	412		413	
Provisions	1,351	51	1,308	44
Other liabilities	1	262	4	216
Unused tax losses and tax credits	129		213	
Total	**4,532**	**3,408**	**4,111**	**3,323**
Netting	–2,776	–2,776	–2,781	–2,781
	1,756	**632**	**1,330**	**542**

Of the reported deferred tax assets, EUR 42 million (previous year: EUR 49 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 **T24**

	2021	2020
Temporary differences	6,079	6,809
Tax losses	9,289	6,990
Tax credits	140	21
	15,508	**13,820**

The utilization of 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 23 million (previous year: EUR 26 million).

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

in millions of euros **T25**

	2021	2020
Within one year	52	45
Later than one year and no later than two years	31	46
Later than two years and no later than three years	79	47
Later than three years	464	422
Without expiry date	8,663	6,430
	9,289	**6,990**

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 7,331 million (previous year: EUR 11,755 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.

Deferred taxes recognized directly in equity are presented in the following table:

in millions of euros **T26**

	2021	2020
Reserve from financial instruments (equity instruments)	24	–30
Reserve from financial instruments (debt instruments)	96	–40
Reserve from pensions	–131	32
	–11	**–38**

A deferred tax expense of EUR 33 million (previous year: EUR 5 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 29 percent, as in the previous year. The difference between expected and disclosed income tax expense is attributable to the following factors:

in millions of euros **T27**

	2021	2020
Profit before tax	3,299	1,505
Expected income tax expense	957	436
Variances due to tax rate	–168	–173
Non-deductible expenses	229	237
Zero-rated income	–294	–165
Recognition/measurement of deferred tax assets	251	775
Tax effects not related to the reporting year	–282	–307
Other differences	107	–47
Income tax expense disclosed	**800**	**756**
Effective tax rate	24%	50%

The line item “variances due to tax rate” includes effects resulting from changed tax rates. In the reporting year, these resulted in deferred tax income of EUR 11 million (previous year: EUR 13 million).

13 — Personnel expenses and headcount

Disclosures on personnel expenses

Personnel expenses break down as follows:

in millions of euros T28

	2021	2020
Remuneration	19,732	18,581
Social security costs	3,274	2,981
Post-employment benefit costs	760	921
	23,766	**22,483**

Headcount

T29

	Annual average 2021	Annual average 2020
EU countries	218,679	216,953
Rest of Europe	26,691	25,625
Americas	45,935	44,046
Asia, Africa, Australia	108,398	108,405
	399,703	**395,029**

Notes to the statement of financial position

14 — Cash and cash equivalents

in millions of euros T30

	2021	2020
Bank balances (term up to 90 days)	6,195	8,955
Cash and reserve bank deposits	1	0
	6,196	**8,955**

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 14,034 million (previous year: EUR 13,696 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 **T31**

	2021		2020	
	up to 1 year	**more than 1 year**	up to 1 year	more than 1 year
Securities	3,888	13,138	2,575	12,357
Investments		2,235		2,524
Bank balances (term of more than 90 days)	3,454	76	1,804	5
Loan receivables	93	15	88	28
Derivatives	72	71	131	63
Receivables from finance leases	36	143	38	159
Sundry other financial assets	354	186	395	137
	7,897	**15,864**	**5,031**	**15,273**

The securities classified as current 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 1,386 million (previous year: EUR 1,205 million) were sold and the cumulative gains on sale of EUR 285 million (previous year: EUR 36 million) were reclassified from gains/losses on financial instruments to retained earnings. Disposals of investments in corporations are carried out based on business policy decisions.

The pledged securities have a carrying amount of EUR 1,527 million (previous year: EUR 1,435 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. As of the reporting date, the carrying amount of the secured deposits is EUR 1,000 million (previous year: EUR 700 million). The bank provided collateral of the same amount in the form of securities.

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 **T32**

	2021		2020	
	up to 1 year	more than 1 year	up to 1 year	more than 1 year
From revenue recognition over time	581	1	505	1
From development work	374	433	360	467
	955	**434**	**865**	**468**

18 — Other current and non-current assets

in millions of euros **T33**

	2021		2020	
	up to 1 year	more than 1 year	up to 1 year	more than 1 year
Prepaid expenses	225	57	186	59
Receivables from tax authorities (without income tax receivables)	1,451	125	1,318	131
Incremental costs of obtaining the contract	105	392	115	372
Sundry other assets	367	390	342	171
	2,148	**964**	**1,961**	**733**

Assets recognized for the incremental costs of obtaining a contract are amortized on a straight-line basis over the term of the contract.

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 T34

	2021	2020
Raw materials, consumables, and supplies	5,121	3,559
Work in process	2,846	2,331
Finished goods and merchandise	5,591	4,598
Prepayments	94	50
	13,652	**10,538**

Of the total amount of inventories, an amount of EUR 1,044 million (previous year: EUR 1,374 million) is carried at net realizable value. In the reporting year, the change in impairment losses of EUR 255 million was recognized as an expense in profit or loss (previous year: income of EUR 336 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:

T35

	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 7 million (previous year: EUR 9 million) were capitalized. The underlying borrowing rate is 1.5 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 **T36**

	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 1/1/2020	**11,752**	**34**	**27,602**	**12,405**	**3,307**	**55,100**
Changes in consolidated group	11		–10	3	11	15
Additions	140		675	733	1,764	3,312
Reclassifications	445	1	1,334	469	–2,249	
Disposals	–193	–3	–1,236	–777	–125	–2,334
Exchange-rate differences	–369	–2	–1,009	–333	–117	–1,830
Gross values 12/31/2020	**11,786**	**30**	**27,356**	**12,500**	**2,591**	**54,263**
Depreciation 1/1/2020	**4,972**	**9**	**18,922**	**9,272**	**31**	**33,206**
Changes in consolidated group	1		–10		11	2
Additions	319		1,803	1,160		3,282
Reclassifications	–19	1	32	–13	–1	
Disposals	–117		–1,097	–729	–10	–1,953
Write-ups			–1			–1
Exchange-rate differences	–130	–1	–658	–236	1	–1,024
Depreciation 12/31/2020	**5,026**	**9**	**18,991**	**9,454**	**32**	**33,512**
Carrying amounts 12/31/2020	**6,760**	**21**	**8,365**	**3,046**	**2,559**	**20,751**

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in millions of euros **T36**

	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	0	–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**

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

- Land and buildings: EUR 7 million (previous year: EUR 4 million),
- Plant and equipment: EUR 64 million (previous year: EUR 38 million),
- Other equipment, fixtures, and furniture; assets under construction: EUR 30 million (previous year: EUR 14 million).

The corresponding expenses are recognized in functional costs.

The impairment losses of the reporting year contain an amount of EUR 49 million attributable to plant and equipment, to other equipment, fixtures, and furniture, as well as to assets under construction of the Chassis Systems Control division (Mobility Solutions business sector). The impairment losses were necessary due to significant idle capacity.

An amount of EUR 32 million concerns land and buildings, plant and equipment, other equipment, fixtures, and furniture, and assets under construction of the BSH Hausgeräte division (Consumer Goods business sector). The impairment losses are attributable to the market development falling short of expectations, together with increasing competitive pressure.

EUR 11 million concerns plant and equipment, other equipment, fixtures, and furniture, and assets under construction of the Automotive Steering division (Mobility Solutions business sector). The impairment losses were recognized against the backdrop of increasingly demanding customer specifications and tough competition.

Purchase commitments for items of property, plant, and equipment amounted to EUR 801 million (previous year: EUR 524 million); there were no restrictions on title in either the reporting year or the previous year. Government grants for assets of EUR 42 million (previous year: EUR 84 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 39 million (previous year: EUR 22 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 4 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 any 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 T 37

	Acquired intangible assets (without goodwill)	Acquired goodwill	Internally generated intangible assets	Total
Gross values 1/1/2020	9,335	5,558	1,892	16,785
Additions	185		242	427
Disposals	–487	–2	–287	–776
Exchange-rate differences	–152	–67		–219
Gross values 12/31/2020	**8,881**	**5,489**	**1,847**	**16,217**
Amortization 1/1/2020	**4,790**	**703**	**1,195**	**6,688**
Additions	695		317	1,012
Disposals	–379	–2	–303	–684
Exchange-rate differences	–84	–3		–87
Amortization 12/31/2020	**5,022**	**698**	**1,209**	**6,929**
Carrying amounts 12/31/2020	**3,859**	**4,791**	**638**	**9,288**

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in millions of euros T37

	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**

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 5 million),
- Internally generated intangible assets: EUR 1 million (previous year: EUR 43 million).

The impairment losses recognized on internally generated intangible assets relate to capitalized development projects and are attributable to the Mobility Solutions business sector. They are recognized in research and development cost. They 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. Value in use is derived from the future cash flows. 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 is based on expectations with respect to future market shares, growth in the respective markets, and the profitability of products and services. 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 T38

	Mobility Solutions		Industrial Technology		Consumer Goods		Energy and Building Technology	
	2021	2020	2021	2020	2021	2020	2021	2020
Growth rate	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Pre-tax discount rate	12.6	11.4	12.5	11.3	11.1	9.4	10.7	9.8

A risk-free interest rate of 0.3 percent (previous year: 0.0 percent) and a market-risk premium of 7.0 percent (previous year: 7.0 percent) are assumed. The standard tax rate used is 29 percent (previous year: 29 percent).

As of the reporting date, the recoverable amount of each cash-generating unit corresponds with its value in use. In the reporting year, the annual impairment test indicated that an impairment loss of EUR 108 million had to be recognized on goodwill. This was attributable in full to the Automotive Steering division (Mobility Solutions business sector), with the corresponding expenses recognized in other operating expenses. The impairment losses were attributable to delays achieving 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 considers the following assumed changes: an increase in the pre-tax discount rate of 1.0 percentage points, a reduction in the growth rate of 0.5 percentage points, and a reduction in EBIT of 5 percent. None of the aforementioned changes would have required the recognition of an additional impairment loss on goodwill.

Goodwill of EUR 5,026 million (previous year: EUR 4,791 million) is attributable to the divisions (cash-generating units) as follows:

in millions of euros **T39**

Division	**Reportable segment**	**2021**	**2020**
Powertrain Solutions	Mobility Solutions	400	376
Automotive Aftermarket	Mobility Solutions	350	323
Automotive Steering	Mobility Solutions		108
Drive and Control Technology	Industrial Technology	1,550	1,551
Power Tools	Consumer Goods	415	377
BSH Hausgeräte GmbH	Consumer Goods	548	548
Building Technologies	Energy and Building Technology	698	447
Thermotechnology	Energy and Building Technology	1,000	996
Others		65	65
		5,026	**4,791**

22 — Trade payables

in millions of euros **T40**

	2021	2020
Trade payables	9,927	8,331
Notes payable	21	4
	9,948	**8,335**

The Bosch Group has concluded reverse factoring agreements for a share of the trade payables amounting to EUR 521 million (previous year: EUR 469 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.

In the reporting year, there were no trade payables due in more than one year (previous year: EUR 2 million).

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 T41

	2021		2020	
	up to 1 year	more than 1 year	up to 1 year	more than 1 year
Bonds	21	1,990	500	2,006
Promissory loans, registered notes	25	2,200		3,495
Liabilities to banks	227	8	262	9
Commercial papers	132			
Loans	72	40	67	33
Derivatives	230	9	41	6
Sundry other financial liabilities	663	148	625	107
	1,370	**4,395**	**1,495**	**5,656**

The sundry other financial liabilities also include financial liabilities to associates.

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 from development services include advance payments from customers for separately contracted research and development services. Contract liabilities from other items mainly include advance payments from customers for deliveries of goods and other outstanding performance obligations. From reporting year 2021 onwards, accruals for tooling cost subsidies and other accruals recognized as revenue, which were previously recognized under other liabilities, will also be reported under contract liabilities from other items.

in millions of euros T42

	2021		2020	
	up to 1 year	more than 1 year	up to 1 year	more than 1 year
From revenue recognition over time	23	0	26	0
From development work	764	334	696	282
From other items	572	280	556	63
	1,359	**614**	**1,278**	**345**

25 — Other liabilities, other provisions, and contingent liabilities

Other liabilities

in millions of euros T43

	2021		2020	
	up to 1 year	more than 1 year	up to 1 year	more than 1 year
Accruals in the personnel area	2,919		2,311	
Accruals in the sales and marketing area	2,532		1,877	
Other accruals	1,112		907	
Tax liabilities (without income taxes)	819		836	
Deferred income	81	8	320	107
Sundry other liabilities	339	23	345	56
	7,802	**31**	**6,596**	**163**

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.

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

in millions of euros **T44**

	2021		2020	
	up to 1 year	**more than 1 year**	up to 1 year	more than 1 year
Tax provisions (without income taxes)	30	16	28	13
Provisions in the personnel area	1,243	3,239	1,406	2,974
Provisions in the sales and marketing area	2,416	1,710	2,242	1,422
Sundry other provisions	2,832	1,091	2,223	975
	6,521	**6,056**	**5,899**	**5,384**

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. From the fiscal year 2021 onwards, obligations previously recognized as contract liabilities will also be reported under sales-related provisions. 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 **T45**

	1/1/2021	**Amounts used**	**Amounts reversed**	**Amounts added**	**Other changes**	**12/31/2021**
Tax provisions (without income taxes)	41	−20	−2	26	1	46
Provisions in the personnel area	4,380	−942	−209	1,275	−22	4,482
Provisions in the sales and marketing area	3,664	−1,186	−493	2,083	58	4,126
Sundry other provisions	3,198	−360	−425	1,494	16	3,923
	11,283	**−2,508**	**−1,129**	**4,878**	**53**	**12,577**

Of the increase in provisions, an amount of EUR 11 million (previous year: EUR 20 million) relates to the reversal of discount.

Other changes include effects from changes in the consolidated group, 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 2021. With respect to the events concerning various automakers' diesel vehicle emissions, Bosch remains a defendant in a number of class and individual civil-law actions around the world. In a major class action in the United States and Canada, Bosch was able to reach a settlement of up to USD 63.3 million. With this, Bosch neither acknowledges the validity of the claims brought forward, nor does it concede any liability.

In Germany, Bosch has won all the proceedings that have finally been closed. It also won its case at the German Federal Supreme Court. The court upheld Bosch's assertion that it had not abetted Volkswagen AG and Porsche Automobil Holding SE in any violations of securities regulations, and is therefore not liable to stockholders of the two companies for any share price losses incurred in connection with the diesel affair. In addition, one of the class actions brought with respect to Bosch in the Netherlands was dismissed. This decision is final. Last year, new class actions were also filed in the Netherlands. Although these pending and potential 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 discussions with customers regarding compensation in respect of potential civil-law risks associated with antitrust proceedings that have come to an end. Investigations by the antitrust authorities in the automotive supplier sphere, also against Bosch, are still continuing in certain countries. In addition, investigations into BSH Hausgeräte in France concerning a possible breach of antitrust law are still ongoing.

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 606 million (previous year: EUR 855 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 some semiconductor manufacturers having to close factories due to the coronavirus pandemic. 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 **T46**

	2021	2020
Contingent liabilities related to notes issued and transferred	12	9
Contingent liabilities from guarantees	50	13
Other contingent liabilities	13	16
	75	**38**

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 the reversal of 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, or 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 policy is derived from the corresponding governance guidelines. External asset managers are tasked with handling the investment of 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. Owing to the low likelihood of claims being made against Bosch, the 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), generally 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 plan.

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

All the benefits are paid out in the form of lump-sum payments on termination, death, or reaching retirement age. Annuity payments are possible for associates in some CPPs 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 as either a lump sum or a lifelong annuity.

United Kingdom

Bosch finances a closed final-salary-based defined benefit plan. The 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 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 plans. The Bosch pension plan is a cash balance plan under which the benefits depend on age, years of service, and salary. Benefits are paid out on reaching retirement age or in the event of death. The 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 T47

	Germany		Japan		Switzerland		U.K.		U.S.		Total	
	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
Discount factor	1.0	0.5	0.5	0.4	0.3	0.1	2.0	1.4	2.7	2.4	1.3	0.8
Projected salaries	3.0	3.0	2.9	2.3	1.6	1.6	3.2	2.7	3.5	3.5	3.0	3.0
Projected pensions	1.5	1.5	n.a.	n.a.	0.0	0.0	2.9	2.7	n.a.	n.a.	1.4	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, 2021, the following mortality tables are used:

T48

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

As of December 31, 2020, the following mortality tables were used in the key countries:

T49

Germany	Heubeck 2018G mortality tables
Japan	2020 MHLW Standard Table
Switzerland	BVG 2015 with CMI_2016 improvement factors, long-term improvement of 1.5 percent
United Kingdom	105 percent for males, 96 percent for females of S2PXA tables with 2017 CMI projections and 1.25 percent long-term improvement
United States	Pri-2012, projected by MP2020; 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 **T50**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
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**
12/31/2020					
Germany	16,544	−4,389			12,155
Japan	229	−295	11	87	32
Switzerland	917	−940	32		9
United Kingdom	388	−364	6		30
United States	1,829	−1,682	21		168
Other	655	−246	8		417
	20,562	**−7,916**	**78**	**87**	**12,811**

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

in millions of euros **T51**

	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			77
Other	1	5			6
	715	**–75**			**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				86	86
	–463	**–572**		**86**	**–949**

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in millions of euros **T51**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
Contributions					
Employer		–446			–446
Beneficiaries	14	–14			0
	14	**–460**			**–446**
Benefits paid[1]	–802	301			–501
Special events (plan settlement)	–1	1			0
Transfers					
Currency translation	173	–207			–34
Changes in consolidated group	–2	2			0
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.

in millions of euros **T52**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
1/1/2020	**20,070**	**–7,535**	**43**	**70**	**12,648**
Pension cost charged to profit or loss					
Current service cost	592				592
Past service cost	–3				–3
Gains/losses from plan settlements not related to past service cost	–4				–4
Net interest income/expense	247	–111			136
Other		4			4
	832	**–107**			**725**
Remeasurement					
Return on plan assets (excluding amounts included in net interest)		–371			–371
Gains/losses arising from changes in demographic assumptions	–584				–584
Gains/losses arising from changes in financial assumptions	1,078				1,078
Experience gains/losses	166				166
Other adjustments		0		20	20
	660	**–371**		**20**	**309**

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in millions of euros **T52**

	Present value of the obligation	Plan assets	Other assets	Unrecognized asset	Provision
Contributions					
Employer		–379			–379
Beneficiaries	14	–14			0
	14	**–393**			**–379**
Benefits paid[1]	–774	298			–476
Special events (plan settlement)	–1				–1
Transfers					0
Currency translation	–244	194		–3	–53
Changes in consolidated group	5	–2			3
Changes in other assets			35		35
12/31/2020	**20,562**	**–7,916**	**78**	**87**	**12,811**

1. Including EUR 70 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 **T53**

	Germany		Japan		Switzerland		U.K.		U.S.	
	2021	2020	**2021**	2020	**2021**	2020	**2021**	2020	**2021**	2020
Cash and cash equivalents	**3**	2	**2**	1	**3**	2			**1**	1
Equity instruments	**50**	46	**28**	30	**30**	30	**40**	36	**10**	34
of which Europe	57	55	10	10	43	42	34	40	12	16
of which North America	22	22	41	35	35	35	46	37	73	69
of which Asia Pacific	12	14	49	55	6	6	16	20	7	6
of which emerging markets	8	8			13	14	4	3	8	9
of which other	1	1			3	3				
Debt instruments	**44**	48	**66**	65	**30**	31	**57**	60	**89**	65
of which government bonds	34	41	72	82	21	15	44	43	39	30
of which corporate bonds	63	57	24	13	56	60	56	57	56	70
of which other debt instruments	3	2	4	5	23	25			5	
Property	**3**	2			**33**	34				
of which owner-occupied	76	89								
of which non-owner-occupied	24	11			100	100				
Insurance		2	**4**	4			**3**	4		
Other					**4**	3				

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, 2021, is 13.0 years (previous year: 14.1 years).

Estimated maturities of the undiscounted estimated pension payments

in millions of euros T54

	2021	2020
Less than one year	892	849
Between one and two years	911	876
Between two and three years	1,031	957
	2,834	**2,682**

The estimated contributions to plan assets in fiscal year 2022 amount to EUR 436 million (previous year: EUR 449 million).

The estimated benefits to be paid directly in fiscal year 2022 amount to EUR 561 million (previous year: EUR 545 million).

Sensitivity of the defined benefit obligation in relation to actuarial parameters

percentage figures T55

	Germany		Japan		Switzerland		U.K.		U.S.	
	2021	2020	2021	2020	2021	2020	2021	2020	2021	2020
Discount factor										
Increase of 0.25 percentage points	–2.0	–2.5	–2.0	–2.2	–3.1	–3.1	–3.7	–4.3	–3.0	–3.0
Decrease of 0.25 percentage points	2.1	2.9	2.1	2.4	3.3	3.6	4.2	4.7	3.1	3.4
Projected salaries										
Increase of 0.25 percentage points	n.a.	n.a.	0.8	0.8	0.2	0.2	0.4	0.4	0.0	0.0
Decrease of 0.25 percentage points	n.a.	n.a.	–0.8	–0.8	–0.2	–0.2	–0.4	–0.4	0.0	0.0
Projected pensions										
Increase of 0.25 percentage points	0.6	0.6	n.a.	n.a.	2.5	2.5	1.7	1.7	n.a.	n.a.
Decrease of 0.25 percentage points	–0.6	–0.6	n.a.	n.a.	–2.4	–2.4	–1.7	–1.7	n.a.	n.a.
Life expectancy										
Increase by one year	2.2	2.2	n.a.	n.a.	3.0	3.0	3.6	3.6	2.6	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.

The sensitivity related to the discount factor was changed in the reporting year from previously 0.5 percentage points to 0.25 percentage points, and the previous year’s figures were restated accordingly.

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 1,576 million (previous year: EUR 1,301 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 T 56

	Share-holding	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. Of the amount recognized outside profit and loss in the reporting year under financial instruments, EUR 607 million (previous year: EUR 737 million) relates to equity instruments and EUR –216 million (previous year: EUR 98 million) to debt 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 143 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 taxes and before the financial result. 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.

The line item “interest and dividends received” contains interest received of EUR 411 million (previous year: EUR 355 million) and income received from equity investments of EUR 41 million (previous year: EUR 40 million).

The liquidity reported in the statement of cash flows includes cash and cash equivalents of EUR 6,196 million (previous year: EUR 8,955 million). In the fiscal year, there were cash restrictions on the transfer of cash and cash equivalents of EUR 26 million (previous year: EUR 53 million).

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 57

		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**

in millions of euros T 58

		Cash-effective changes		Non-cash changes			
	1/1/2020	Borrowing	Repayment	Changes in consolidated group	Exchange rate related changes	Other changes	12/31/2020
Bonds	3,004		–500			2	2,506
Promissory loans, registered notes	1,498	1,996				1	3,495
Other financial liabilities	146	193	–41		–27		271
Lease liabilities	2,111		–539	5	–58	513	2,032
	6,759	**2,189**	**–1,080**	**5**	**–85**	**516**	**8,304**

29 — Segment reporting

Disclosures on business sectors

in millions of euros T59

	Mobility Solutions		Industrial Technology		Consumer Goods	
	2021	2020	**2021**	2020	**2021**	2020
External sales	45,319	42,120	6,099	5,131	21,022	18,659
Intersegment sales	2	1	270	219	197	202
Total sales	**45,321**	**42,121**	**6,369**	**5,350**	**21,219**	**18,861**
EBIT from operations	317	–531	513	240	2,136	2,139
of which: result from entities included at equity	–2	–4				
Non-cash expenses (without depreciation and amortization)	4,074	4,394	331	364	757	842
Amortization and depreciation of intangible assets, right-of-use assets, and property, plant, and equipment[1]	3,339	3,336	214	206	934	963
Impairment losses on intangible assets, right-of-use assets, and property, plant, and equipment	179	97		5	32	2
Non-cash income	872	613	102	96	138	167
Additions to property, plant, and equipment	2,900	2,451	198	119	656	616
Net working capital	12,412	11,594	2,128	2,037	5,511	4,964

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

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in millions of euros **T59**

	Energy and Building Technology		Other		Consolidation		Group	
	2021	2020	**2021**	2020	**2021**	2020	**2021**	2020
External sales	5,934	5,502	374	82			78,748	71,494
Intersegment sales	30	2	2		–501	–424		
Total sales	**5,964**	**5,504**	**376**	**82**	**–501**	**–424**	**78,748**	**71,494**
EBIT from operations	305	251	–118	–102			3,153	1,997
of which: result from entities included at equity							–2	–4
Non-cash expenses (without depreciation and amortization)	393	357	94	35			5,649	5,992
Amortization and depreciation of intangible assets, right-of-use assets, and property, plant, and equipment[1]	207	214	78	34			4,772	4,753
Impairment losses on intangible assets, right-of-use assets, and property, plant, and equipment							211	104
Non-cash income	114	64	16	12			1,242	952
Additions to property, plant, and equipment	85	93	110	33			3,949	3,312
Net working capital	1,193	1,178	–102	–79			21,142	19,694

1. After offsetting write-ups of EUR 4 million (previous year: EUR 1 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 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, and capitalized costs of obtaining a contract, 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 **T60**

	2021	**2020**
Sales		
Sales of reportable segments	78,873	71,836
Sales of "Other"	376	82
Consolidation	−501	−424
Group sales	**78,748**	**71,494**
Result		
EBIT from operations of reportable segments	3,271	2,099
EBIT from operations of "Other"	−118	−102
Adjustments from purchase price allocations	−338	−340
Financial income	2,728	2,570
Financial expenses	−2,244	−2,722
Profit before tax	**3,299**	**1,505**
Net working capital		
Net working capital of reportable segments	21,244	19,773
Net working capital of "Other"	−102	−79
Reconciliation of average values to carrying amounts as of 12/31	−1,294	−1,743
Valuation allowances on segment assets	−2,132	−1,887
Group net working capital	**17,716**	**16,064**

Disclosures by key countries

in millions of euros T61

	Sales by registered office of the customer		Non-current assets[1]	
	2021	2020	**2021**	2020
Europe	**41,337**	37,969	**21,003**	21,047
of which Germany	15,714	14,764	13,168	13,279
of which United Kingdom	3,444	3,159	532	357
of which France	2,965	2,776	419	422
of which Italy	2,406	2,012	564	598
Americas	**12,863**	11,815	**3,855**	3,670
of which United States	9,609	8,826	3,318	3,173
Asia	**23,326**	20,728	**7,543**	7,152
of which China	16,031	14,151	5,448	5,129
of which Japan	2,271	2,197	511	518
Other regions	**1,222**	982	**153**	147
Group	**78,748**	71,494	**32,554**	32,016

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 for investments in corporations and for 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 whether 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. In these cases, 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 instrument. A significant increase in credit risk is assumed when 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. 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.

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 is 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 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 the asset and the liability are 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 **T 62**

	2021	2020
Financial assets measured at amortized cost (AC)	435	–177
Financial assets measured at fair value through other comprehensive income (FVOCI wR)	516	–112
Financial assets and financial liabilities measured at fair value through profit or loss (FVPL)	–138	585
Equity instruments measured at fair value through other comprehensive income (FVOCI nR)	99	93
Financial liabilities measured at amortized cost (AC)	–291	–462

The net gain/loss contains gains and losses from measuring receivables and loans, from the reversal of the gains/losses on financial instruments in equity, exchange-rate gains and losses, interest income and expenses, investment income, dividend income, and gains and losses from derivatives. The dividend income of EUR 99 million (previous year: EUR 93 million) reported in net gains/losses from investments in equity instruments includes dividend income amounting to EUR 5 million (previous year EUR 4 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 T63

Assets

		2021		2020	
	Category pursuant to IFRS 9	Carrying amount	Fair value	Carrying amount	Fair value
Cash and cash equivalents	**AC**	**6,196**		**8,955**	
Trade receivables	**AC**	**14,034**		**13,696**	
Current other financial assets		**7,897**		**5,031**	
Securities	FVPL	3,434	3,434	2,404	2,404
	FVOCI wR	454	454	171	171
Bank balances	AC	3,454		1,804	
Loan receivables	AC	93		88	
Derivatives	FVPL	72	72	131	131
Receivables from finance leases	n.a.	36		38	
Sundry other financial assets	AC	354		395	
Non-current financial assets		**15,864**		**15,273**	
Securities	FVOCI nR	3,396	3,396	3,101	3,101
	FVOCI wR	5,119	5,119	5,313	5,313
	FVPL	4,623	4,623	3,943	3,943
Investments	FVPL	151	151	100	100
	FVOCI nR	1,939	1,939	2,276	2,276
	n.a.	145		148	
Bank balances	AC	76	76	5	5
Loan receivables	AC	15	15	28	29
Derivatives	FVPL	71	71	63	63
Receivables from finance leases	n.a.	143	143	159	159
Other financial assets	AC	186	187	137	139

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

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in millions of euros T 63

Equity and liabilities

		2021		2020	
	Category pursuant to IFRS 9	Carrying amount	Fair value	Carrying amount	Fair value
Trade payables	**AC**	**9,948**		**8,335**	
Current other financial liabilities		**1,370**		**1,495**	
Bonds	AC	21		500	
Promissory loans, registered notes	AC	25			
Liabilities to banks	AC	227		262	
Commercial papers	AC	132			
Loans	AC	72		67	
Derivatives	FVPL	230	230	41	41
Sundry other financial liabilities	AC	663		625	
Non-current financial liabilities		**4,395**		**5,656**	
Bonds	AC	1,990	2,317	2,006	2,420
Promissory loans, registered notes	AC	2,200	2,348	3,495	3,748
Liabilities to banks	AC	8	8	9	10
Loans	AC	40	40	33	36
Derivatives	FVPL	9	9	6	6
Other financial liabilities	AC	148	148	107	109

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 **T64**

	2021	2020
Financial assets measured at amortized cost (AC)	24,408	25,108
Financial assets measured at fair value through other comprehensive income (FVOCI wR)	5,573	5,484
Equity instruments measured at fair value through other comprehensive income (FVOCI nR)	5,335	5,377
Financial assets measured at fair value through profit or loss (FVPL)	8,351	6,641
Financial liabilities measured at fair value through profit or loss (FVPL)	239	47
Financial liabilities measured at amortized cost (AC)	15,474	15,439

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 **T65**

		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

in millions of euros T66

		2020			
	Category pursuant to IFRS 9	Level 1[1]	Level 2[2]	Level 3[3]	Total
Financial assets					
Securities	FVPL	242	5,906	199	6,347
	FVOCI wR	61	5,423		5,484
	FVOCI nR	3,100	1		3,101
Investments	FVPL			100	100
	FVOCI nR	1,261		1,015	2,276
Derivatives	FVPL	1	193		194
Financial liabilities					
Derivatives	FVPL	1	46		47

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 401 million; previous year: EUR 443 million), in Nikola Corporation (EUR 101 million; previous year: EUR 234 million), in Powercell Sweden AB (EUR 106 million; previous year: EUR 190 million), and in Weifu High Technology Group Co., Ltd. (EUR 391 million; previous year: EUR 376 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, or 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. 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 **T 67**

	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	4	151
Securities	199	21				51		271

in millions of euros **T 68**

	1/1/2020	Additions	Disposals	Reclassifications	Changes recognized in other comprehensive income	Changes recognized in profit or loss	Other changes	12/31/2020
Investments FVOCI nR	1,193	96	−66	−202	1		−7	1,015
Investments FVPL	86	23	−5			−3	−1	100
Securities	165	23				11		199

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 reporting year and 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. 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, 2021, the Bosch Group's equity ratio as a percentage of total assets was 45 percent (previous year 44 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. There also exist bilateral and syndicated loan facilities with banks.

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. Trading 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 entered into as secured deposits in tri-party 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 for the next few months. Prescribed risk limits for the various investment categories limit the potential loss. The board of management is informed monthly about risk analyses and the results of investments and hedges.

Currency risk

Currency risks of business operations are mitigated by the central management of selling 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, GBP, RUB, 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 value-at-risk concept, supplemented by worst-case analyses. These risk analyses and the hedge result are determined monthly and presented to management.

To present the currency risks for the most important foreign currencies 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 implications for the profit before tax:

in millions of euros **T 69**

	10% increase in EUR		10% decrease in EUR	
	2021	2020	**2021**	2020
CHF	13	20	–13	–20
CNY	35	22	–35	–22
CZK	–15	–28	15	28
GBP	28	36	–28	–36
HUF	–18	–16	18	16
INR	–10	–8	10	8
JPY	–8	–17	8	17
KRW	1	4	–1	–4
MXN	–15	–11	15	11
PLN	–8	–3	8	3
RUB	–11	–16	11	16
TRY	–13	–20	13	20
USD	–32	–7	32	7

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 implications for the profit before tax:

in millions of euros **T 70**

	10% increase in USD		10% decrease in USD	
	2021	2020	**2021**	2020
CNY	–7	–6	7	6

The effects on earnings shown here mainly result from foreign currency positions relating to operations and from loans within the Bosch Group if, by way of an exception, these loans were 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 does not correspond to the economic risk, which is determined on the basis of forecast cash flows.

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, and interest derivatives. Starting in the reporting year, pension and money-market funds are included in the sensitivity analysis.

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 **T71**

	Increase in market interest level by 100 basis points		**Decrease in market interest level by 100 basis points**	
	2021	**2020**	**2021**	**2020**
Reserve from financial instruments	–289	–301	289	301
Profit before tax	0	50	0	–50

Share-price risks

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 6,052 million (previous year: EUR 5,722 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 T72

	10% increase in share price		10% decrease in share price	
	2021	2020	**2021**	2020
Reserve from financial instruments	448	436	–448	–436
Profit before tax	157	136	–157	–136

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 T73

	10% increase in forward rates		10% decrease in forward rates	
	2021	2020	**2021**	2020
Profit before tax	48	51	–48	–51

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 **T74**

	2021	**2020**
Trade receivables (before offsetting of credit notes)	14,894	14,548
Offsetting of credit notes	−860	−852
Trade receivables (carrying amount)	14,034	13,696
Financial guarantee contracts (received)	−2,060	−2,243
Remaining credit risk	**11,974**	**11,453**

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 **T75**

	Trade receivables	Loan receivables and sundry other financial assets	
		Level 1	Level 2/3
1/1/2020	**301**	**8**	**29**
Changes in consolidated group	−3		0
Amounts added	73	2	105
Amounts utilized	−49		−7
Amounts reversed	−45	−3	−1
Exchange-rate differences	−16	−1	0
12/31/2020	**261**	**6**	**126**
Changes in consolidated group	3		0
Amounts added	76	3	12
Amounts utilized	−42		0
Amounts reversed	−47	−3	−30
Exchange-rate differences	−1		0
12/31/2021	**250**	**6**	**108**

As of December 31 of the reporting year, allowances for contract assets amount to EUR 14 million (previous year: EUR 13 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 **T76**

	2021	2020
Trade receivables	14,284	13,957
of which not exposed to default	4,538	4,932
of which credit-impaired	262	284
of which not credit-impaired	9,484	8,741
not due	8,679	7,976
up to 30 days past due	489	429
31–90 days past due	155	155
91–180 days past due	50	60
more than 180 days past due	111	121

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 **T77**

	Level 1	**Level 2/3**
12/31/2020	**16**	**66**
Changes in consolidated group		
Additions	9	17
Amounts utilized		
Amounts reversed	–22	–43
Reclassifications	10	–10
Exchange-rate differences		
12/31/2021	**13**	**30**

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 **T78**

	2021	2020
Derivatives with a positive fair value	143	194
Amounts not offset in the statement of financial position		
Derivatives	–34	–22
Cash collateral received	–13	–72
Remaining credit risk	**96**	**100**

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 10,084 million (previous year: EUR 11,530 million). In addition, a U.S. commercial paper program with a volume of USD 2,000 million is available, under which USD 150 million was drawn on a revolving basis in the reporting year. In addition, there are bilateral U.S. loan facilities with a volume of USD 350 million. An existing syndicated loan facility of EUR 3,000 million was renewed. 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 **T79**

	2021	2020
Trade payables (before offsetting of credit notes)	10,808	9,187
Offsetting of credit notes	−860	−852
Trade payables (carrying amount)	9,948	8,335
Financial guarantee contracts (granted)	−3	−3
Remaining liquidity risk	**9,945**	**8,332**

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 **T80**

	2021	2020
Derivatives with a negative fair value	239	47
Amounts not offset in the statement of financial position		
Derivatives	−34	−22
Cash collateral provided	−7	0
Remaining liquidity risk	**198**	**25**

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

in millions of euros T 81

	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	

in millions of euros **T82**

	Carrying amount	Undiscounted cash flows					
	2020	2021	2022	2023	2024	2025	2026 et seq.
Non-derivative financial liabilities							
Trade payables	8,335	8,333	2				
Bonds	2,506	552	67	48	791	35	1,452
Promissory loans, registered notes	3,495	40	534	636	32	646	1,894
Liabilities to banks	271	267	2	2	2	1	0
Lease liabilities	2,032	552	446	305	228	191	575
Loans	100	68	5	5	6	5	12
Other financial liabilities	732	626	13	5	4	1	85
Derivatives							
Gross settlement	32						
Cash outflows		2,547	15	15			
Cash inflows		2,516	15	14			
Net settlement	15						
Cash outflows		10	5	1			

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 **T83**

	2021		2020	
	Carrying amount	Depreciation	Carrying amount	Depreciation
Land and buildings	1,700	397	1,702	403
Plant, fixtures, and furniture	87	30	52	18
Vehicles	213	142	223	142
	2,000	**569**	**1,977**	**563**

Additions to right-of-use assets came to EUR 615 million in the reporting year (previous year: EUR 558 million).

The following amounts were additionally recognized in the income statement:

in millions of euros **T84**

	2021	2020
Interest expenses relating to lease liabilities	51	55
Expenses relating to short-term leases	112	106
Expenses relating to leases of low-value assets	63	58
Expenses for variable lease payments	19	15

Cash outflows from leases totaled EUR 805 million in the reporting year (previous year: EUR 774 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 **T85**

	2021	2020
Gross capital expenditures on finance leases, not discounted		
due no later than one year	42	45
due later than one year and no later than two years	36	39
due later than two years and no later than three years	30	34
due later than three years and no later than four years	25	28
due later than four years and no later than five years	21	21
due later than five years	47	56
	201	**223**
Present value of outstanding minimum lease payments		
due no later than one year	36	38
due later than one year and no later than two years	32	34
due later than two years and no later than three years	27	30
due later than three years and no later than four years	22	25
due later than four years and no later than five years	19	19
due later than five years	45	53
	181	**199**
Unearned finance income	**20**	**24**

In relation to finance leases, finance income in the reporting year came to EUR 7 million (previous year: EUR 8 million) and losses on disposal amounted to EUR 3 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 **T86**

	2021	2020
Due no later than one year	32	36
Due later than one year and no later than two years	6	10
Due later than two years and no later than three years	4	9
Due later than three years and no later than four years	2	7
Due later than four years and no later than five years	1	1
Due later than five years	2	2
	47	**65**

In the reporting year, income from operating leases came to EUR 47 million (previous year: EUR 38 million).

A review of the contracts previously classified as operating leases in the Building Technologies division has shown that, based on the current assessment, some of these contracts no longer satisfy the criteria for leases. Therefore, the contracts concerned are no longer included in the above disclosures on operating leases. The previous year's figures have been restated accordingly (reducing outstanding minimum lease payments under operating leases by a total of EUR 363 million and income from operating leases by EUR 70 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 17 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 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 minority interests are held (investees). Transactions with these entities are presented in the following table:

in millions of euros T 87

	Goods and services sold		Goods and services purchased		Receivables		Liabilities	
	2021	2020	2021	2020	2021	2020	2021	2020
Joint ventures	10	7	4	2	9	8	1	2
Associated entities and investees	130	61	465	441	32	26	28	79

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 **T88**

	2021	2020
Short-term benefits	36	31
Post-employment benefits	17	5
Other long-term benefits	7	7
Termination benefits	4	0

For obligations from pensions and deferred compensation, provisions totaling EUR 141 million (previous year: EUR 177 million) have been recognized.

Share-based payments are not made.

Beyond this, 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 42 million in fiscal year 2021 (previous year: EUR 32 million), and that of the former members of the board of management and their dependants to EUR 20 million (previous year: EUR 17 million). An amount of EUR 362 million (previous year: EUR 296 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 **T89**

	2021	2020
Fees for		
Audit services	6	6
Audit-related services	0	0
Tax advisory services	1	0
Other services	4	5

36 – Events after the reporting date

The long-standing conflict between Russia and Ukraine came to a head at the end of February. The war in Ukraine has not only triggered a series of economic sanctions. It can also be expected to have an impact on the global economy in the form of rising energy and raw materials prices, for example, and interruptions in supply chains.

We regard the outbreak of war and the consequences related to it as material subsequent events that have no effect on the consolidated financial statements as of December 31, 2021. Depending on the duration of the hostilities and further events, it can be expected that there will be an impact on the consolidated financial statements as of December 31, 2022. This impact may result above all from impairment risks. For the subsidiaries in Ukraine included in the consolidated financial statements, the sum total of property, plant, and equipment, inventories, and trade receivables comes to less than 1 percent of the respective carrying value in the consolidated financial statements as of December 31, 2021. For the subsidiaries in Russia included in the consolidated financial statements, the value is between 1 and 2 percent.

List of shareholdings of the Bosch Group

as of December 31, 2021

A. Subsidiaries

1. Fully consolidated entities

Region/country	Company name	Registered office	Percentage share of capital
Germany	AJNS New Media GmbH	Berlin	**87.5**
	AS Abwicklung Dritte Produktion GmbH i. L.	Stuttgart	**100.0**
	AS Abwicklung und Solar-Service Deutschland GmbH i. L.	Stuttgart	**100.0**
	AS Abwicklung und Solar-Service GmbH	Stuttgart	**100.0**
	AS Guss Beteiligungsgesellschaft mbH	Stuttgart	**100.0**
	Bosch Access Systems GmbH	Würselen	**100.0**[1]
	Bosch Automotive Service Solutions GmbH	Pollenfeld	**100.0**[1]
	Bosch Energy and Building Solutions GmbH	Ditzingen	**100.0**[1]
	Bosch Engineering GmbH	Abstatt	**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 Guss GmbH	Lohr am Main	**100.0**[1]
	Bosch Rexroth Vermögensverwaltung GmbH	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]
	Bosch Service Solutions Magdeburg GmbH	Magdeburg	**100.0**[1]

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Region/country	Company name	Registered office	Percentage share of capital
	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.IO GmbH	Berlin	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]
	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 Deutsche Auftragsagentur GmbH	Hamburg	100.0[1]
	ESCRYPT GmbH	Bochum	100.0[1]
	ETAS GmbH	Stuttgart	100.0[1,2]
	EVI Audio GmbH	Straubing	100.0[1]
	Gaggenau Hausgeräte GmbH	Munich	100.0[1]
	GFR-Gesellschaft für Regelungstechnik und Energieeinsparung mbh	Verl	100.0[1]
	grow platform GmbH	Stuttgart	100.0[1]

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Region/country	Company name	Registered office	Percentage share of capital
	Holger Christiansen Deutschland GmbH	Wilnsdorf	100.0[1]
	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
	Pump Technology Solutions PS GmbH	Berlin	100.0[1]
	Residential IoT Services GmbH	Stuttgart	100.0[1]
	Robert Bosch Aftermarket Solutions GmbH	Göttingen	100.0[1]
	Robert Bosch Steering Columns GmbH	Stuttgart	100.0[1]
	Robert Bosch Automotive Steering GmbH	Schwäbisch Gmünd	100.0[1,2]
	Robert Bosch Car Multimedia GmbH	Hildesheim	100.0[1]
	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 Technical and Business Solutions GmbH	Stuttgart	100.0[1]
	Robert Bosch Venture Capital GmbH	Gerlingen	100.0[1]
	Robert Bosch Wohnungsgesellschaft mbH	Stuttgart	100.0[1]

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Region/country	Company name	Registered office	Percentage share of capital
	Security and Safety Things GmbH	Munich	**100.0**
	SEG Hausgeräte GmbH	Munich	**100.0**[1]
	sia Abrasives Deutschland GmbH	Solingen	**100.0**
	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**

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Region/country	Company name	Registered office	Percentage share of capital
	sia Abrasives Belgium N.V./S.A.	Mollem	**100.0**
	The KOBI Company B.V.	Leuven	**100.0**
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 Diesel 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**
	Holger Christiansen A/S	Esbjerg	**100.0**
	Robert Bosch A/S	Ballerup	**100.0**
Finland	Bosch Rexroth Oy	Vantaa	**100.0**
	BSH Kodinkoneet Oy	Helsinki	**100.0**
	Robert Bosch Oy	Vantaa	**100.0**
France	Bosch Automotive Service Solutions SAS	Cergy Saint-Christophe	**100.0**
	Bosch Rexroth DSI S.A.S.	Vénissieux	**100.0**
	Bosch Rexroth S.A.S.	Vénissieux	**100.0**

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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**
	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**
	sia Abrasives France S.A.S.	Drancy	**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**
	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**
	Bosch Rexroth Oil Control S.p.A.	Milan	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
	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
	VHIT S.p.A.	Offanengo	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 Power Tools B.V.	Breda	100.0
	Bosch Rexroth B.V.	Boxtel	100.0
	Bosch Rexroth Nederland 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

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Region/country	Company name	Registered office	Percentage share of capital
	Nefit Vastgoed B.V.	Deventer	**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 IC Financing 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 A/S	Oslo	**100.0**
	Robert Bosch AS	Trollåsen	**100.0**
Poland	Bosch Rexroth Sp.z o.o.	Warsaw	**100.0**
	BSH Sprzęt 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**
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**

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Region/country	Company name	Registered office	Percentage share of capital
	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**
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**
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**

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Region/country	Company name	Registered office	Percentage share of capital
	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**
	Buderus Heiztechnik AG	Pratteln	**100.0**
	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.Ş.	Istanbul	**100.0**
Ukraine	MBT Trade T.B.O.	Kyiv	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
	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**
	Protec Fire and Security Group Limited	Nelson	**100.0**
	Protec Fire Detection Plc	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 Direção Automotiva Ltda.	Sorocaba	**100.0**
	Robert Bosch Ltda.	Campinas	**100.0**
	Tecnologia de Bombas Automotivas do Brasil Ltda.	Sorocaba	**100.0**
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**
	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**

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Region/country	Company name	Registered office	Percentage share of capital
	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**
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 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**
	ETAS Inc.	Wilmington, DE	**100.0**
	FHP Manufacturing Company	Fort Lauderdale, FL	**57.0**
	Freud America Inc.	High Point, NC	**100.0**
	Nimbus Holdings LLC	Wilmington, DE	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
	Pump Technology Solutions (US) LLC	Wilmington, DE	**100.0**
	Robert Bosch Asset Management I LLC	Wilmington, DE	**100.0**
	Robert Bosch Asset Management I LP	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**
	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**
	Robert Bosch (Australia) Pty. Ltd.	Clayton	**100.0**
	sia Abrasives Australia Pty. Ltd.	Rowville	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
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**
	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) 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 Steering Jincheng (Nanjing) Co., Ltd.	Nanjing	**70.0**
	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**

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Region/country	Company name	Registered office	Percentage share of capital
	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) Ltd.	Hangzhou	**100.0**
	Bosch Powertrain Systems Co., Ltd.	Wuxi	**66.0**
	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-HydrauliX (Suzhou) Co., Ltd.	Suzhou	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
	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 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 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 Engineering and Business Solutions Private Ltd.	Bengaluru	**100.0**
	Robert Bosch India Manufacturing and Technology Private Limited	Bengaluru	**100.0**
Indonesia	P.T. Robert Bosch	Jakarta	**100.0**
	PT BSH Home Appliances	Jakarta	**100.0**
Israel	BSH Home Appliances Ltd.	Herzlia	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
Japan	Bosch Corporation	Tokyo	**100.0**
	Bosch Engineering K.K.	Tokyo	**100.0**
	Bosch Rexroth Corporation	Tsuchiura-shi	**99.9**
	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**
	Robert Bosch Korea Limited Company	Daejeon	**100.0**
Malaysia	Bosch Power Tools Engineering Sdn. Bhd.	Penang	**100.0**
	Bosch Rexroth Sdn. Bhd.	Shah Alam	**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.	Kuala Lumpur	**100.0**
Morocco	BSH Electroménagers (SA)	Casablanca	**100.0**
	Robert Bosch Morocco S.A.R.L.-A.U.	Casablanca	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
Mozambique	Bosch Rexroth Mozambique Lda.	Maputo	**100.0**
	Bosch Rexroth Matola Lda.	Matola	**100.0**
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**
	Robert Bosch (South East Asia) Pte. Ltd.	Singapore	**100.0**
	Robert Bosch Security Solutions Pte. Ltd.	Singapore	**100.0**
South Africa	Bosch Rexroth Africa Development (RF) (Pty.) Ltd.	Kempton Park	**100.0**
	Bosch Rexroth South Africa (RF) (Pty) Ltd.	Johannesburg	**100.0**
	BSH Home Appliances (Pty.) Ltd.	Johannesburg	**100.0**
	Corgam Property Investments Pty. Ltd.	Kempton Park	**100.0**
	Hydraulic and Automation Warehouse Pty. Ltd.	Kempton Park	**100.0**
	Hytec Engineering Pty. Ltd.	Kempton Park	**100.0**
	Hytec Fluid Technology Pty. Ltd.	Kempton Park	**100.0**
	Hytec South Africa (RF) (Pty) Ltd.	Kempton Park	**75.0**
	Robert Bosch (Pty.) Ltd.	Brits	**100.0**
	Tectra Automation Pty. Ltd.	Kempton Park	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
Taiwan	Bosch Rexroth Co. Ltd.	Taipei	**100.0**
	BSH Home Appliances Private Limited	Taipei	**100.0**
	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**
	Robert Bosch Engineering and Business Solutions Vietnam 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**
	Drivelog GmbH	Hildesheim	**100.0**
	eAx solutions GmbH	Stuttgart	**100.0**
	ECP Energiecontracting GmbH	Heidelberg	**81.0**
	for you Insurance Services GmbH	Stuttgart	**100.0**
	GFI Gesellschaft für Infrastrukturdienste mbH	Reutlingen	**100.0**
	Home Connect GmbH	Munich	**100.0**
	Koller + Schwemmer GmbH	Nuremberg	**100.0**
	Mobility Media GmbH	Gerlingen	**100.0**
	NEVONEX GmbH	Stuttgart	**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**
Estonia	Robert Bosch OÜ	Tallinn	**100.0**
France	ETAS S.A.S.	Saint-Ouen	**100.0**
Georgia	Robert Bosch Ltd.	Tbilisi	**100.0**
Greece	Bosch Rexroth S.A.	Athens	**100.0**
Hungary	Bosch Electronic Service Kft.	Kecskemét	**100.0**
Italy	DECA S.r.l.	Lugo	**100.0**
Lithuania	UAB Robert Bosch	Vilnius	**100.0**
Netherlands	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**

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Region/country	Company name	Registered office	Percentage share of capital
	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**
	Protec Brandbeveiliging B.V.	Berkel en Rodenrijs	**100.0**
Romania	Bosch Servicii Termotehnica SRL	Bucharest	**100.0**
	BSH Electrocasnice Manufacturing S.R.L.	Bucharest	**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**
	Noustique Perfumes S.L.	Barcelona	**100.0**
Switzerland	Bosch Automotive Service Solutions AG	Horw	**100.0**
United Kingdom	Bosch Automotive Training Limited	Motherwell	**100.0**
	Camerfield Limited	Nelson	**100.0**
	ETAS Ltd.	York	**100.0**
	Face Macanda Limited	Nelson	**100.0**
	Firepro Systems Limited	Nelson	**100.0**
	Gas Alarm Systems Limited	Nelson	**100.0**
	LAGTA Group Training Limited	Motherwell	**100.0**
	Lynteck Limited	Nelson	**100.0**
	Protec Camerfield Limited	Nelson	**100.0**
	Protec Fire Detection (Export) Limited	Nelson	**100.0**

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Region/country	Company name	Registered office	Percentage share of capital
	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	**99.9**
	Metapar Usinagem Ltda.	Curitiba-Paraná	**100.0**
	Robert Bosch Centro de Comunicação Limitada	Campinas	**100.0**
	sia Abrasivos Industriais Ltda.	São José dos Pinhais	**100.0**
Canada	ETAS Embedded Systems Canada Inc.	Kitchener, ON	**100.0**
Colombia	Robert Bosch Caribe S.A.S.	Bogotá	**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**

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Region/country	Company name	Registered office	Percentage share of capital
	ITK Engineering, LLC	Howell, 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 SRL	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
	Protec Fire Detection Pty. Ltd.	Sydney	100.0
Bangladesh	Robert Bosch (Bangladesh) Ltd.	Dhaka	100.0
Cambodia	Robert Bosch (Cambodia) Co., Ltd.	Phnom Penh	100.0
China	Bosch (Shanghai) Smart Life Technology Ltd.	Shanghai	100.0
	Freud International Trading (Shanghai) Co., Ltd.	Shanghai	100.0

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Region/country	Company name	Registered office	Percentage share of capital
	ITK Engineering Technology (Wu Xi) Co., Ltd.	Wuxi	100.0
	Shanghai Boyuan Jiacheng Venture Investment Partnership	Shanghai	99.0
	VHIT Automotive Systems (Wuxi) Co., Ltd.	Wuxi	100.0
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
	MIVIN Engineering Technologies Private Ltd.	Bengaluru	100.0
	Newtech Filter India Private Limited	Nalagarh	100.0
	Precision Seals Manufacturing Ltd.	Chakan	100.0
Indonesia	PT Robert Bosch Automotive	Jakarta	100.0
	PT Bosch Rexroth	Jakarta	100.0
Iran	Bosch Tejarat Pars	Tehran	100.0
Israel	Robert Bosch Technologies Israel Ltd.	Tel Aviv	100.0
Japan	Bosch Engineering Solutions 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

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Region/country	Company name	Registered office	Percentage share of capital
Kenya	Robert Bosch East Africa Ltd.	Nairobi	**100.0**
Laos	Robert Bosch (Lao) Sole Co., Ltd.	Vientiane	**100.0**
Malaysia	Pacific BBA (Malaysia) Sdn. Bhd.	Shah Alam	**100.0**
	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**
Nigeria	Robert Bosch Limited	Lagos	**100.0**
Saudi Arabia	BSH Home Appliances Saudi Arabia LLC	Jeddah	**51.0**
	Robert Bosch Saudi Arabia Limited Liability Company	Riyadh	**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.	Rayong	**50.1**
	FMP Group (Thailand) Ltd.	Rayong	**50.7**
	Pacific BBA (Thailand) Ltd.	Bangkok	**100.0**
Tunisia	Robert Bosch Tunisie SARL	Tunis	**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**
Ireland	ads-tec Energy plc	Dublin	**21.4**
Korea	KB Wiper Systems Co., Ltd.	Daegu	**50.0**

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**
	Aranea Battery Solutions GmbH	Heilbronn	**50.0**
	BS Systems GmbH & Co. KG	Zusmarshausen	**50.0**
	ETAS NI Systems GmbH & Co. KG	Stuttgart	**50.0**
	European Center for Information and Communication Technologies – EICT GmbH	Berlin	**20.0**
	Knorr-Bremse Systeme für Nutzfahrzeuge GmbH	Munich	**20.0**
	MAGURA Bosch Parts & Services GmbH & Co. KG	Bad Urach	**50.0**
	MAGURA Bosch Parts & Services Verwaltungs-GmbH	Bad Urach	**50.0**
	RE'FLEKT GmbH	Munich	**30.2**
	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	BOXT Limited	Leeds	**20.0**

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**
	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)			
Australia	Autocrew Australia Pty. Ltd.	Lawnton	**50.0**
	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**
	Hinduja Renewables One Pvt. Ltd.	Mumbai	**26.0**
	Prebo Automotive Pte. Ltd.	Pune	**40.0**
	Simyog Technology Pvt. Ltd.	Bengaluru	**24.7**
	ZF Steering Gear (India) Ltd.	Pune	**26.0**
Israel	Electra Industries Ltd.	Rishon Le’Zion	**40.0**
Japan	Advanced Driver Information Technology Corporation	Kariya-shi	**50.0**
	Knorr-Bremse Commercial Vehicle Systems Japan, Ltd.	Tokyo	**20.0**
Singapore	WhatsEGG Pte. Ltd.	Singapore	**20.0**

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	**26.3**

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**

Stuttgart, March 10, 2022

Robert Bosch Gesellschaft mit beschränkter Haftung
The board of management

Dr. Stefan Hartung
Dr. Christian Fischer
Filiz Albrecht
Dr. Markus Forschner
Dr. Markus Heyn
Rolf Najork

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, 2021, the consolidated statement of financial position as of December 31, 2021, the consolidated statement of changes in equity and the consolidated statement of cash flows for the fiscal year from January 1 to December 31, 2021, 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, 2021. 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, 2021, and of its financial performance for the fiscal year from January 1 to December 31, 2021, 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. Our opinion on the group management report does not cover the content of the corporate governance statement 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 corporate governance statement mentioned above pursuant to Sec. 289f (4) HGB (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 2021”, “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 Section 315e (1) of the 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 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 for one 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 10, 2022

Ernst & Young GmbH
Wirtschaftsprüfungsgesellschaft

Prof. Dr. Wollmert	Somes
Wirtschaftsprüfer	Wirtschaftsprüferin
[German Public Auditor]	[German Public Auditor]

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Ten-year summary of the Bosch Group

in millions of euros **T90**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	**2021**
Sales	**52,464**	**46,068**	**48,951**	**70,607**	**73,129**	**78,066**	**78,465**	**77,721**	**71,494**	**78,748**
of which generated outside Germany (as a percentage)	77	77	78	80	80	80	79	80	79	80
Research and development cost[1]	4,787	4,543	4,959	6,378	6,954	7,264	5,963	6,079	5,890	6,110
as a percentage of sales revenue	9.1	9.9	10.1	9.0	9.5	9.3	7.6	7.8	8.2	7.8
Capital expenditure	3,151	2,539	2,585	4,058	4,252	4,345	4,946	4,989	3,312	3,949
of which in Germany	1,115	913	1,098	1,394	1,580	1,546	1,757	1,718	1,469	1,598
of which outside Germany	2,036	1,626	1,487	2,664	2,672	2,799	3,189	3,271	1,843	2,351
as a percentage of sales revenue	6.0	5.5	5.3	5.7	5.8	5.6	6.3	6.4	4.6	5.0
as a percentage of depreciation	107	126	138	146	141	140	159	146	101	116
Depreciation of property, plant, and equipment	2,948	2,008	1,868	2,788	3,022	3,095	3,103	3,421	3,282	3,393
Annual average number of associates (thousands)	306	280	286	369	384	403	407	408	395	400
of which in Germany	119	108	105	131	133	137	138	136	133	131
of which outside Germany	187	172	181	238	251	266	269	272	262	269
as of 12/31 of the year	306	281	290	375	389	402	410	398	395	403
Personnel expenses	15,663	14,907	15,325	20,369	21,056	22,266	22,219	23,824	22,483	23,766
Total assets	**56,326**	**55,725**	**61,924**	**77,266**	**81,875**	**81,870**	**83,654**	**87,861**	**91,369**	**97,723**
Equity	26,884	27,686	29,541	34,424	36,084	37,552	39,176	41,079	40,166	44,304
as a percentage of total assets	48	50	48	45	44	46	47	47	44	45
Cash flows from operating activities	3,687	4,276	3,835	5,959	6,137	6,799	7,267	7,752	9,016	6,890
as a percentage of sales revenue	7.0	9.3	7.8	8.4	8.4	8.7	9.3	10.0	12.6	8.7
Profit after tax	2,342	1,251	2,637	3,537	2,374	3,274	3,574	2,060	749	2,499
Dividend of Robert Bosch GmbH	88	88	102	142	138	241	242	119	67	143

1. Up to 2017, including development work charged directly to customers

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