About ABB

ABB is a technology leader in electrification and automation, enabling a more sustainable and resource-efficient future. The company's solutions connect engineering know-how and software to optimize how things are manufactured, moved, powered and operated. Building on more than 130 years of excellence, ABB's approximately 105,000 employees are committed to driving innovations that accelerate industrial transformation.

Organizational structure

We operate in over 100 countries across three regions: Europe, the Americas, and Asia, Middle East and Africa, and generate revenues in numerous currencies. We are headquartered in Zurich, Switzerland and we govern our company through our four Business Areas: Electrification, Motion, Process Automation, and Robotics & Discrete Automation. For a breakdown of our consolidated revenues (i) by Business Area, (ii) by geographic region, and (iii) by product type, see "Analysis of results of operations—Revenues" and "Note 23 - Operating segment and geographic data" to our Consolidated Financial Statements. Until June 30, 2020, we also operated the Power Grids business, which is reported as discontinued operations in the Consolidated Financial Statements (see "Discontinued operations" section below). On July 1, 2020, we completed the divestment of 80.1 percent of the Power Grids business to Hitachi Ltd (Hitachi). We retained a 19.9 percent ownership interest through our investment in Hitachi Energy Ltd, (Hitachi Energy) which beneficially owns or controls all the subsidiaries of the Power Grids business until December 2022, when we sold the remaining investment in Hitachi Energy to Hitachi.

Our principal corporate offices are located at Affolternstrasse 44, CH 8050 Zurich, Switzerland, telephone number +41 43 317 7111. Our agent for U.S. federal securities law purposes is ABB Holdings Inc., located at 305 Gregson Drive, Cary, North Carolina 27511. Our internet address is www.abb.com or global.abb. The information contained on or accessible from our Web site is not incorporated into this annual report, and you should not consider it to be a part of this annual report. The United States Securities and Exchange Commission (SEC) maintains a website at www.sec.gov which contains in electronic form each of the reports and other information that we have filed electronically with the SEC.

Employees

A breakdown of our employees by geographic region is as follows:

December 31,	2022	2021	2020
Europe	49,700	50,000	49,200
The Americas	26,400	25,600	27,600
Asia, Middle East and Africa	29,000	28,800	28,800
Total	**105,100**	**104,400**	**105,600**

The proportion of our employees that are represented by labor unions or are subject to collective bargaining agreements varies based on the labor practices of each country in which we operate.

History of the ABB Group

The ABB Group was formed in 1988 through a merger between Asea AB and BBC Brown Boveri AG. Initially founded in 1883, Asea AB was a major participant in the introduction of electricity into Swedish homes and businesses and in the development of Sweden's railway network. In the 1940s and 1950s, Asea AB expanded into the power, mining and steel industries. Brown Boveri and Cie. (later renamed BBC Brown Boveri AG) was formed in Switzerland in 1891 and initially specialized in power generation and turbines. In the early to mid-1900s, it expanded its operations throughout Europe and broadened its business operations to include a wide range of electrical engineering activities.

In January 1988, Asea AB and BBC Brown Boveri AG each contributed almost all of their businesses to the newly formed ABB Asea Brown Boveri Ltd, of which they each owned 50 percent. In 1996, Asea AB was renamed ABB AB and BBC Brown Boveri AG was renamed ABB AG. In February 1999, the ABB Group announced a group reconfiguration designed to establish a single parent holding company and a single class of shares. ABB Ltd was incorporated on March 5, 1999, under the laws of Switzerland. In June 1999, ABB Ltd became the holding company for the entire ABB Group. This was accomplished by having ABB Ltd issue shares to the shareholders of ABB AG and ABB AB, the two companies that formerly owned the ABB Group. The ABB Ltd shares were exchanged for the shares of those two companies, which, as a result of the share exchange and certain related transactions, became wholly-owned subsidiaries of ABB Ltd.

As described above, on July 1, 2020, we divested 80.1 percent of our ownership in the Power Grids business to Hitachi, and in December 2022, Hitachi purchased the remaining 19.9 percent of Hitachi Energy.

ABB Ltd shares are currently listed on the SIX Swiss Exchange, the NASDAQ OMX Stockholm Exchange and the New York Stock Exchange (in the form of American Depositary Shares).

ABB today

As a global technology leader in electrification and automation enabling sustainability and resource efficiency, our offering is relevant for the global transition towards low-carbon energy, increased energy efficiency, and the transition to more adaptive manufacturing and automation, putting us right in the center of long-term secular trends.

The ABB Purpose

ABB's purpose is to enable a more sustainable and resource-efficient future with our technology leadership in electrification and automation.

Our core competencies

Our leadership in resource efficiency is based on our core competencies, each of which constitutes a barrier to entry: decades-long domain expertise, cutting-edge technology and innovation as well as the ability to scale operations and distribution.

With its long history, ABB not only invented or pioneered many power and automation technologies but has retained technology and market leadership in many of these areas. Being present in various vertical markets for decades with close long-term relationships with customers and channel partners has resulted in our unique deep domain expertise, enabling a thorough understanding of customers' needs and operations.

We continuously evolve our offering to remain a relevant and trusted partner to our customers. Our annual non-order related research and development spending in 2022 amounted to approximately 4 percent of revenues. We focus our research and development expenditures on key areas of innovation and have spent approximately $7.8 billion since the beginning of 2016, focusing on developing best-in-class products and services in the fields of electrification and automation with the goal of helping our customers to create resource-efficient value.

All our four Business Areas are market leaders in their respective areas being in either the number 1 or 2 position. Our global reach along with our extensive local presence assists us in scaling innovations to achieve stronger returns, which supports higher absolute investments for future growth. Active globally, our revenues are well-balanced across regions with customers served directly and through a strong channel partner network.

The ABB Way

The ABB Way is the glue that unites our Group and comprises a select number of common processes covering our business model, our people and culture, the ABB brand and our governance framework. It facilitates accountability, transparency and speed in ABB.

In our operating model, the Divisions represent the highest level of operating decisions. They are closest to their respective markets and customer needs. Each Division progresses through the strategic mandates and priorities of stability and profitability before growth. In order to deploy full focus on organic and acquired growth to the extent of consolidating the market, the business' structure should be robust and profitability should be at least in line with industry peers.

Each Division has full accountability for its results and carries the responsibility for business development, and research and development for leading technology to secure a number 1 or 2 market position. During 2022, we completed the implementation of the decentralized way of working at ABB within all our Divisions. Our focus area in 2023 will be to increasingly shift our focus to profitable growth, and further increase the number of our Divisions with this mandate. Strong performance management is key in a decentralized business model. We apply a monthly scorecard system for the Divisions and Business Areas, based on a standardized set of Key Performance Indicators, to support full transparency of operational performance. It is accompanied by a mandatory target to make annual productivity improvements of at least 3 percent each year.

The corporate functions focus on necessary strategic, financial and governance activities, with a lean headcount of approximately 900 employees.

Enhanced growth profile

Over the past several years, we have taken significant organic and inorganic actions to align our business portfolio to more attractive growth markets, increasing our focus on discrete industries, as well as transport and infrastructure, that offer better growth opportunities. Additionally, we have increased the proportion of sales stemming from short-cycle businesses, meaning a reduced proportion from project-related activities, which we believe should reduce the risk and volatility in our earnings. This ongoing shift towards better quality of revenues is now an integral part of governance and business execution.

The responsibility for growth has been fully transferred to the Divisions, as they are closest to customers. This includes both organic and acquired growth. The Divisions have the best insights into current and future customer needs and are accountable for building their respective business accordingly. With more Divisions transitioning over time from stability and profitability to growth, we expect to see a gradual strengthening of our growth profile.

Finally, environmental, social and governance (ESG) drivers are accelerating and translating into increased demand for our electrification and automation offering. The demand for electricity is growing twice as fast as other energy sources, resulting in approximately 50 percent higher average annual investments into distribution networks over the next 10 years (source: IEA World Energy Outlook 2021, Announced Pledges Scenario). The share of low-carbon sources in the global energy mix is expected to increase to 50 percent by 2050 from only 20 percent today (source: IEA World Energy Outlook 2021, Announced Pledges Scenario). The need to improve energy efficiency has never been more relevant, from both the perspective of sustainable operations and reducing operating costs in a high energy cost environment. Today approximately 45 percent of the world's electricity is converted into motion by electric motors yet only approximately 20 percent of the world's electric motors are optimized through the control of drives. Lastly, the global number of working age people (25 to 64 years) per retiree (65 years or over) is expected to fall by about 20 percent over the next 10 years (source: United Nations World Population Prospects 2019), supporting demand for robotics and automation solutions. We believe ABB's offering is well positioned to address these trends.

Businesses

Our markets

ABB is a technology leader in electrification and automation with a comprehensive and increasingly digitalized offering of electrification, motion and automation solutions. Our exposure to customers is geographically balanced while catering to multiple end-markets and segments. We believe our customer offering is well positioned to benefit from secular growth drivers, including urbanization, labor shortage, shift to electrification, automation and robotization, as well as other data and digitalization trends.

We are focused on creating superior customer value through our comprehensive, modular offering, combining traditional products and services with software-enabled products and systems as well as digital services and software that we sell both separately and combined as scalable solutions. Our advanced software is a key differentiation of our digital offering and about 60 percent of our approximately 7,500 employees in research and development are active in software development.

The majority of our businesses are market leaders within their respective segments. We believe market leadership is critical, as it provides the opportunity for price leadership, which in turn supports profitability, enabling us to invest further in research and development to sustain our technological leadership. For a discussion of the geographic distribution of our total revenues, see “Analysis of results of operations—Revenues.”

Industry market

Approximately half of our revenues are derived from customers within the industrial segment where we serve production facilities and factories all around the world, from process industries such as oil and gas, pulp and paper as well as mining, to discrete industries including automotive, food and beverage and consumer electronics. Demand for our electrification and automation offerings with embedded digital solutions increased as the energy crisis and tight labor markets served as a prominent reminder to companies of the importance of energy efficiency and flexibility in automated production. This has accelerated customer demand for the digital services and solutions we offer.

In discrete industries, demand from end-markets such as food and beverage, machine builders and general industry grew strongly in 2022 as did the automotive segment due to broadly accelerating investments in the EV segment. As supply chain constraints eased in the latter part of 2022, we saw a normalization of customers’ order patterns following a period of pre-buying due to extended delivery lead times.

Later-cycle process industries improved across nearly all customer segments. We saw an increase in gas-related demand during the second half of the year. Early signs of headwind were noted in energy intensive industries such as metals as a result of higher energy prices.

Transport & infrastructure market

Approximately one-third of our customers operate in the transport & infrastructure market. Our expertise provides efficient, reliable and sustainable solutions for these customers, with a focus on energy efficiency and reduced operating costs.

In transport & infrastructure, there was a very strong order development across data centers and the e-mobility business. The buildings segment improved in both the residential and non-residential segments, although softness in residential building in China was noted, as well as general weakness in residential-related demand towards the second half of the year. In the marine segment there were positive developments for the cruise ship sector as well as general marine and ports demand.

Utilities market

We deliver solutions mainly for distribution utilities and renewables customers, while continuing to service conventional power generation customers with our control and automation solutions.

During 2022, the renewables markets continued to see strong growth. Business levels in the conventional power generation market remained stable. Demand from electrical distribution utilities remained strong, with ongoing investments to increase grid reliability and resilience due to increased integration of renewables.

We serve industry, transport & infrastructure and utilities through our operating Divisions which are included in our Business Areas. Developments in these Business Areas are discussed in more detail below. Revenue figures presented in this Businesses section are before intersegment eliminations.

Electrification Business Area

Overview

Electrification provides leading electrical distribution and management technologies, solutions and services to electrify the world in a safe, smart and sustainable way. The portfolio includes medium- and low-voltage electrical components, switchgear, digital devices, enclosures, breakers, power conversion products and charging solutions for electric vehicles, among others. With our products, solutions and services, we collaborate with customers to improve power delivery and security, enhance energy management, efficiency and operational reliability, as we seek to achieve a low carbon society.

The Electrification Business Area delivers products through a global network of channel partners and end customers. Approximately half of the Business Area's revenue is derived from distributors and approximately a quarter is derived from direct sales to end-users. The remaining revenues are generated from original equipment manufacturers (OEMs), engineering, procurement, construction (EPC) contracting companies, system integrators, utilities and panel builders. The proportion of direct compared to channel partner sales varies by segment, product technology and geographic markets.

The Electrification Business Area had approximately 52,300 employees as of December 31, 2022, and generated $14.1 billion of revenues in 2022.

Customers

The Electrification Business Area serves a wide range of customer segments, including residential, commercial and industrial buildings, utilities, oil and gas, chemicals, data centers, e-mobility, renewables, food and beverage, transport and infrastructure, among others. From some of the world's tallest buildings to the busiest airports, the Business Area's products and solutions cover a wide range of applications and business segments.

Products and Services

The Electrification Business Area's products and services are delivered through seven operating Divisions.

The Distribution Solutions Division helps utility, industry and transport & infrastructure customers improve power quality and control, reduce outage time and enhance operational reliability and efficiency. The Division offers products, solutions and services that largely serve the power distribution sector, often providing the requisite medium-voltage link between high-voltage transmission systems and low-voltage users. With ABB Ability™ enabled digital solutions at its core, the offering includes low-voltage switchgear (up to 1 kilovolt) and medium-voltage equipment (1 to 66 kilovolts), indoor and outdoor circuit breakers, reclosers, fuses, contactors, relays, instrument transformers, sensors, motor control centers, as well as a wide range of air- and gas-insulated switchgear. The Division also produces indoor and outdoor modular systems and other segment-specific solutions to facilitate efficient and reliable distribution, protection and control of power, adding value through design, engineering and project management.

The Smart Power Division helps protect, control, and connect people, plants, and systems with a portfolio of low-voltage products and systems. The product offering includes, molded-case and air-circuit breakers, safety products including sensors, switches, contactors, relays, and power protection solutions such as uninterruptible power supply (UPS) solutions, status transfer switches and power distribution units.

The Smart Buildings Division enables optimization of energy efficiency, safety, security and comfort for any building type, through new installations or retrofit solutions. The Division offers integrated digital technologies for HVAC, lighting, shutters, and security, in addition to energy distribution solutions including DIN rail products, enclosures and emergency lighting through to industrial plugs and sockets and conventional wiring accessories, accommodating for single family homes, multiple dwellings, commercial buildings, infrastructure and industrial applications. The Division's highly innovative technologies and digital solutions serve rising global demand among real estate developers, owners, and investors for smart building technologies that optimize energy distribution and building automation. The scalable solutions aim to deliver significant sustainable and financial benefits, meeting social and environmental demands, while being able to address even the most complex of customers' carbon reduction strategies.

The Installation Products Division helps manage the connection, protection and distribution of electrical power. The Division's products are engineered to provide ease of installation and perform in demanding and harsh conditions, helping to ensure safety and continuous operation for our customers and people around the world. The Commercial Essentials product segment includes electrical junction boxes, commercial fittings, strut and cable tray metal framing systems for commercial and residential construction. The Premier Industrial product segment includes multiple product lines, such as Ty-Rap® cable ties, T&B Liquidtight Systems® protection products, PVC coated and nylon conduit systems, power connection and grounding systems, and cable protection systems of conduits and fittings for harsh and industrial applications. The Division also manufactures solutions for medium-voltage applications used in utility and industrial applications under its marquee brands including Elastimold™ reclosers and switchgear, capacitor switches, current limiting fuses, the High Tech Valiant™ full-range current limiting fuse for fire mitigation, faulted current indicators and distribution connectors, cable accessories and apparatus with products for overhead and underground distribution. Manufacturing includes made-to-stock and custom-made solutions.

The Power Conversion Division designs, develops and manufactures end-to-end solutions to power and safeguard life's everyday moments. The Division supports customers in rapidly changing, disruptive industries where power reliability, efficiency, and quality matter most, and customers rely on the Division to solve their most difficult power challenges. Customers include businesses in telecom/5G, networking, data centers, and industrial applications such as EV charging, robotics, laser, test & measurement, and utilities. The Division is powering the technology behind today's connected world, helping to enable industrial advancement with the realization of 5G and to advance data center power architectures as the cloud becomes more business-critical than ever before.

The E-mobility Division is contributing to a zero-emission mobility future with smart, reliable and emission-free electric vehicle charging solutions including market leading charging hardware, ABB Ability™ enabled digital services and energy and fleet management solutions. ABB E-mobility offers a leading portfolio of EV charging solutions from smart chargers for the home to high-power chargers for the highway stations of the future, solutions for the electrification of fleets and opportunity charging for electric buses and trucks.

The Service Division partners with our customers to address their energy challenges for today and tomorrow. Our team of world-class engineers collaborate globally across ABB's Electrification portfolio to service customers in utilities, transportation, infrastructure and industry, assisting to maintain uninterrupted power supply, maximizing energy efficiency while lowering cost and carbon emissions. We bring greater reliability, predictability and sustainability to their operations, and through our digital service portfolio, we drive new levels of optimization, responsiveness and connectivity.

Sales and Marketing

Sales and marketing is generally conducted within the Divisions in Electrification. This enables the Divisions to manage their respective end-to-end activities and create demand across all channels, products and solutions. They increase focus and speed for our customers to drive faster growth. Where necessary, the Divisions work together on joint services, such as the management of accounts, channels, and segment-sales, engaging in a range of promotional activities, both internal and external.

Competition

The Electrification Business Area's principal competitors vary by product group and include Chint, Eaton, Hubbell, Legrand, LS Electric, Panasonic, Schneider Electric, Siemens and Vertiv.

Capital Expenditures

The Electrification Business Area's capital expenditures for property, plant and equipment totaled $385 million in 2022, compared to $345 million in 2021. Investments in 2022 were higher than in 2021 driven by capacity expansion for e-mobility products and some investments which were previously delayed in 2021 and 2020 due to the COVID-19 pandemic. Investments in 2022 principally related to real estate investments, capacity expansion, as well as equipment replacement and upgrades. Geographically, in 2022, Europe represented 55 percent of the capital expenditures, followed by the Americas (33 percent) and Asia, Middle East and Africa (12 percent).

Motion Business Area

Overview

The Motion Business Area provides pioneering technology, products, solutions and related services to industrial customers to increase energy efficiency, improve safety and reliability, and maintain precise control over processes. The portfolio includes motors, generators and drives for a wide range of applications in all industrial sectors.

The Motion Business Area designs, manufactures and sells drives, motors, generators and traction converters. Building on long-standing experience in electric powertrains, the Business Area combines domain expertise and technology to deliver the optimum solution for a wide range of applications for a comprehensive range of industrial segments. In addition, the Business Area, along with its channel partners, has an industry-leading global service presence.

The Motion Business Area had approximately 21,100 employees as of December 31, 2022, and generated $6.7 billion of revenues in 2022.

Customers

The Motion Business Area serves a wide range of customers in different industrial segments such as pulp and paper, oil and gas, metals and mining, food and beverage, HVAC, water and wastewater, transportation, power generation, marine and offshore.

Products and Services

At December 31, 2022, the Motion Business Area's products and services are delivered through seven operating Divisions. The Business Area divested its Mechanical Power Transmission Division on November 1, 2021, which designed, manufactured and sold various mechanical power transmission products sold under the Dodge® brand.

The Drive Products Division serves the industries and infrastructure segments with world-class drives and programmable logic controllers (PLC). With its products, global scale and local presence, the Division helps customers to improve energy efficiency, productivity and safety.

The System Drives Division supplies high-power, high-performance drives, drive systems and packages for industrial process and large infrastructure applications. The Division offers global support to help customers, partners and equipment manufacturers with asset reliability, performance improvement and energy efficiency in mission critical applications.

The Service Division serves customers worldwide and aims to help customers by maximizing uptime, extending life cycle and enhancing the performance and energy efficiency of their electrical motion solutions. The Division is leading the way in digitalization by securely connecting motors and drives to help customers prevent expensive downtime while also optimizing operations profitably, safely and reliably.

The Traction Division is a recognized leader in traction technologies that drive innovation in rail, bus and other modes of electric transportation. A comprehensive range of high performance propulsion, auxiliary and energy storage solutions help improve energy efficiency and contributes to making transportation more sustainable.

The IEC Low Voltage Motors Division is a global market leader that provides a full range of energy efficient low voltage motors, including ultra-efficient motors such as synchronous reluctance motors (SynRM) to help customers reduce power bills and cut emissions. Through a global footprint, application expertise and with rugged designs, the Division's products support customers with IEC low-voltage motor solutions that improve reliability and productivity in the most demanding applications.

The Large Motors and Generators Division offers a comprehensive product portfolio of large AC motors and generators. The Division's robust, reliable and highly efficient offerings power critical infrastructure and transportation across all major industries and applications often in remote and demanding locations.

The NEMA Motors Division is a marketer, designer and manufacturer that offers Baldor-Reliance® industrial electric motors, primarily in North America. The Division focuses on quality, reliability and efficiency to provide a comprehensive offering of NEMA motors in the market across most industrial segments and applications.

Sales and Marketing

Sales are made both through direct sales forces and through channel partners, such as distributors and wholesalers, as well as installers, OEMs and system integrators. The proportion of direct sales to end users compared to channel partner sales varies among the different industries, products and geographic markets.

Competition

The principal competitors of the Motion Business Area include Schneider, Siemens, Toshiba, WEG Industries, SEW EURODRIVE and Danfoss.

Capital Expenditures

Capital expenditures in the Motion Business Area for property, plant and equipment totaled $150 million in 2022, compared to $230 million in 2021, which included the purchase of a formerly leased property in China. Principal expenditures in 2022 related to real estate investments, capacity expansion, equipment replacement and upgrades across various countries including Finland, the United States, China and India. Geographically, in 2022, Europe represented 60 percent of the capital expenditures, followed by the Americas (28 percent) and Asia, Middle East and Africa (12 percent).

Process Automation Business Area

Overview

The Process Automation Business Area offers customers in process, hybrid and maritime industries a broad range of integrated automation, electrical, motion and digital systems, solutions and related services that are designed to optimize productivity, energy efficiency, sustainability and safety of industrial processes and operations, based on the Business Area's deep domain knowledge and expertise of each end market.

The Business Area's offering can be grouped into two categories, with approximately half of the offering related to solutions for new and brownfield projects and half related to service, mainly for installed own products. In some cases, the Business Area integrates offerings from the Electrification, Motion and Robotics & Discrete Automation Business Areas into its integrated systems. The Business Area's offerings are sold primarily through its direct sales force with a smaller share through partners and distributors.

The Business Area had approximately 20,100 employees as of December 31, 2022, and generated revenues of $6.0 billion in 2022.

Customers

The Process Automation Business Area's end customers include companies across process, hybrid and maritime industries. These industries include oil, gas, chemicals and plastics, mining and minerals, metals, pulp and paper, pharmaceuticals, food and beverage, power generation, marine and ports.

Products and Services

The offering of the Process Automation Business Area includes an extensive portfolio of products, solutions, digital applications and services for the control of the simplest to the most complex and critical of processes and infrastructure. These systems can link various process and information flows, allowing customers to manage and control their entire business process based on real-time information. The Business Area's control platform includes ABB Ability™ Distributed Control System (DCS), System 800xA®, which is also an electrical control system, a safety system and a collaboration enabler with the capacity to improve engineering efficiency, operator performance and asset utilization. Other control solutions include Symphony® Plus (designed to address the open automation platform needs of the Hydropower and Water industry segments) and our Freelance DCS solution. Components for basic automation solutions, process controllers, I/O modules, panels, and Human Machine Interfaces (HMI), are available through the Compact Product Suite offering. The product portfolio is complemented by a suite of ABB Ability™ Advanced Digital Services and by ABB Care, a subscription-based lifecycle management program that provides services to maintain and continually advance and enhance ABB's distributed control systems and optimize customers' lifecycle costs. The ABB Ability™ Genix Industrial Analytics and Artificial Intelligence Suite unlocks greater value by contextualizing and integrating data from IT, engineering, and operations systems to provide deep, meaningful and actionable insights. The portfolio is complemented by a range of industry-specific products in each Division.

As of December 31, 2022, the Process Automation Business Area's products and services are delivered through four operating Divisions. The Business Area spun off its Turbocharging Division in October 2022, which manufactured and serviced turbochargers for diesel and gas engines for marine- and land-based power generation.

The Energy Industries Division enables safe, smart, and sustainable projects and operations for businesses across the oil and gas, chemicals, life sciences, power generation and water sectors. It is committed to driving more sustainable use of our planet's resources through innovative solutions that enable energy efficient and low carbon operations across traditional industries and support the development of new and renewable energy models. The Division serves the energy market with leading integrated solutions that automate, digitalize and electrify operations across industries. The Division's goal is to help customers adapt and succeed in the rapidly changing global energy transition. Harnessing data, machine learning and artificial intelligence (AI), the Division brings over 50 years of domain expertise delivering solutions designed to improve energy, process and production efficiency, as well as reduce risk, operational cost and capital cost, while minimizing waste for all customers, from project start-up and throughout the entire plant lifecycle.

The Process Industries Division serves the mining, minerals processing, metals, aluminum, cement, pulp and paper, battery manufacturing, and food and beverage, as well as their associated service industries. The Division brings deep industry domain expertise coupled with the ability to integrate both automation and electrical systems, increase productivity and reduce overall capital and operating costs for customers. For mining, metals and cement customers, solutions include specialized products and services, as well as total production systems. The Division designs, plans, engineers, supplies, erects and commissions integrated electrical and motion systems, including electric equipment, drives, motors, high power rectifiers and equipment for automation and supervisory control within a variety of areas including mineral handling, mining operations, aluminum smelting, hot and cold steel applications and cement production. The offering for the pulp and paper industries includes control systems, quality control systems, drive systems, on-line sensors, actuators and field instruments. Digitalization solutions, including collaborative operations and augmented reality, help improve plant and enterprise productivity, and reduce maintenance and energy costs.

The Marine & Ports Division serves the shipping industry through its extensive portfolio of integrated marine systems and solutions that improve the flexibility, reliability and energy efficiency of vessels. By coupling power, propulsion, automation, marine software and services that ensure maximum vessel uptime, we are well positioned to help improve the profitability and sustainability of our customers' business throughout the entire lifecycle of a fleet. With ABB Ability™ Marine software solutions and ABB Ability™ Collaborative Operations Centers around the world, shipowners and operators can run their fleets at lower fuel and maintenance costs, while improving crew, passenger and cargo safety as well as overall productivity of their operations. Further, the Division delivers automation, electrical systems and digital solutions for container and bulk cargo handling, from ship to gate. These solutions help terminal operators meet the challenge of larger ships, taller cranes and bigger volumes per call, and make terminal operations safer, greener and more productive.

The portfolio of the Measurement & Analytics Division consists of analyzers (measuring compositions of gases and liquids), instrumentation (measuring the typical process variables of temperature, pressure, flow, and level) as well as specialized measurements for specific industries. With this offering the Division serves virtually all process, hybrid and marine industries, the largest among them being the oil, gas and chemical value chain, water and power generation industries. The Division also provides advanced digital solutions to help customers improve productivity, safety and environmental sustainability.

Sales and Marketing

The Process Automation Business Area's sales are primarily made through its direct sales force as well as third-party channel partners, such as distributors, system integrators and OEMs. The majority of revenues are derived through the Business Area's own direct sales channels.

Competition

The Process Automation Business Area's principal competitors vary by industry or product group. Competitors include: Emerson, Honeywell, Schneider Electric, Siemens, Siemens Energy, Yokogawa, Endress + Hauser, Kongsberg and Valmet.

Capital Expenditures

The Process Automation Business Area's capital expenditures for property, plant and equipment totaled $100 million in 2022, compared to $85 million in 2021. Principal investments in 2022 primarily related to purchases of land and building, mainly in the Energy Industries Division. Geographically, in 2022, Europe represented 76 percent of the capital expenditures, followed by Asia, Middle East and Africa (13 percent) and the Americas (11 percent).

Robotics & Discrete Automation Business Area

Overview

The Robotics & Discrete Automation Business Area provides robotics, and machine and factory automation including products, software, solutions and services. Revenues are generated both from direct sales to end users as well as from indirect sales mainly through system integrators and machine builders.

The Robotics & Discrete Automation Business Area had approximately 10,700 employees as of December 31, 2022, and generated $3.2 billion of revenues in 2022.

Customers

Robotics & Discrete Automation serves a wide range of customers. The main customers are active in industries such as automotive, machine building, metalworking, electronics, food and beverage and logistics. They include end-users such as manufacturers, system integrators and machine builders.

Products and Services

The Robotics & Discrete Automation Business Area's products and services are delivered through two operating Divisions.

The Robotics Division offers a wide range of products, solutions and services including robots, autonomous mobile robots, robotics application cells and smart systems, field services, spare parts, digital services, engineering and operations software. This offering provides customers with increased productivity, quality, flexibility and simplicity for operations, e.g. to meet the challenge of making smaller lots of a larger number of specific products in shorter cycles for today's dynamic global markets and coping with increasing uncertainty. Robots are also used in activities or environments which may be hazardous to employee health and safety, such as repetitive or strenuous lifting, dusty, hot or cold rooms, or painting booths and can help customers address labor shortages. Robotics solutions are used in a wide range of segments from automotive OEMs, automotive suppliers, electronics, general industry, consumer goods, food and beverage, and warehouse/logistics center automation. They are increasingly deployed in service applications for life sciences care, restaurants and retail. Typical robotic applications include welding, material handling, machine tending, machining, painting, picking, packing, palletizing and assembly.

The Machine Automation Division offers integrated automation solutions based on programmable logical controllers, industrial PCs, servo motion, industrial transport systems and machine vision. It also provides software for engineering and optimization. The range of solutions are mainly used by machine builders for various types of series machines, e.g. for plastics, metals, printing and packaging.

Sales and Marketing

Sales are made both through direct sales as well as through third-party channel partners, such as system integrators and machine builders. The proportion of direct sales compared to channel partner sales varies among the different industries, product technologies and geographic markets.

Competition

Competitors of the Robotics & Discrete Automation Business Area vary by offering and include companies such as Fanuc, Kuka, Yaskawa, Epson, Dürr, Stäubli, Universal Robots, Rockwell Automation, Siemens, Mitsubishi Electric and Beckhoff.

Capital Expenditures

The Robotics & Discrete Automation Business Area's capital expenditures for property, plant and equipment totaled $86 million in 2022, compared to $96 million in 2021. Principal investments in 2022 were primarily related to a new Robotics factory in Shanghai, China, and selective investments mainly in production facilities in the Robotics Division in Sweden and in the Machine Automation Division in Austria. In 2022, Europe represented 66 percent of capital expenditures, followed by Asia, Middle East and Africa (28 percent) and the Americas (6 percent).

Corporate and Other

Corporate and Other includes core headquarter functions, real estate activities, Corporate Treasury Operations, Global Business Services (GBS), the investment in Hitachi Energy (until December 2022) and other minor business activities. Certain strategic investments managed by ABB Technology Ventures are also included in Corporate. The remaining activities of certain EPC projects which we are completing and are in a wind-down phase are reported as non-core businesses within Corporate and Other. In addition, the historical business activities of certain divested businesses are presented in Corporate and Other. These include the high-voltage cables business, steel structures and certain EPC contracts relating to the oil and gas industry.

Corporate headquarters and stewardship activities include the operations of our corporate headquarters in Zurich, Switzerland, as well as limited corporate-related activities in certain countries. These activities cover staff functions with group-wide responsibilities, such as accounting and financial reporting, corporate finance and corporate treasury, taxes, financial planning and analysis, internal audit, legal and integrity, compliance, risk management and insurance, corporate communications, information systems and investor relations.

GBS operates shared service centers globally through a network of four hubs and consists of both expert and transactional services in the areas of human resources, finance and information services. GBS also staffs and maintains front offices in most countries. The costs in GBS are incurred primarily for the benefit of the Business Areas, which are charged for their use of such services and the related number of employees are allocated to the Business Areas. GBS also provides services to third parties under transitional service agreements in relation to certain divested businesses, the largest of which are Hitachi Energy (the former Power Grids business) and Accelleron (the former Turbocharging Division).

A significant portion of the costs for GBS and other shared corporate overhead costs are charged to the operating businesses. Up to the divestment of the Power Grids business on July 1, 2020, overhead and other management costs, including GBS costs, which would have been allocated or charged to our Power Grids business, and which were not directly attributable to this business, have not been allocated to the discontinued operation and are included in Corporate and Other as "stranded costs".

Corporate and Other had approximately 1,000 employees at December 31, 2022, of which approximately 100 pertain to our non-core businesses.

Discontinued operations

In July 2020, we divested 80.1 percent of our Power Grids business to Hitachi Ltd. As a result, the Power Grids business is reported as discontinued operations in the Consolidated Financial Statements for all years presented. See “Note 3 - Discontinued operations” to our Consolidated Financial Statements.

Power Grids business

The former Power Grids business of ABB delivered products, systems, software and service solutions across the power value chain for utility, industry and transport & infrastructure customers.

The Power Grids business operated worldwide with a globally diversified manufacturing, engineering, and research and development footprint. Direct sales accounted for the majority of total revenues generated by the business while external channel partners such as EPCs, wholesalers, distributors and OEMs accounted for the rest.

Products and Services

The Grid Automation operation supplied substation automation products, systems and services. It also provided Supervisory Control and Data Acquisition (SCADA) systems for transmission and distribution networks as well as a range of wireless, fiber optic and powerline carrier-based telecommunication technologies for mission-critical applications and also offered grid-edge and microgrid solutions. Its enterprise software portfolio provided solutions for managing and optimizing assets, operations, logistics, financials and HR, reducing operating costs and improving productivity for customers.

The Grid Integration operation was a leading provider of integration and transmission solutions such as High Voltage Direct Current (HVDC). Another key part of the portfolio was the Flexible Alternating Current Transmission Systems (FACTS) business, which comprised Static Var Compensation (SVC) and static compensator (STATCOM) technologies to address stability and power quality issues. The Grid Integration operation’s portfolio also included a range of high-power semiconductors, a core technology for power electronics deployed in HVDC, FACTS and rail applications. The Grid Integration operation also provided transmission and distribution substations and associated lifecycle services. These substations are used in utility and non-utility applications including rail, data centers and various industries. Battery energy storage solutions and shore-to-ship power supply were also part of the customer offering.

The High Voltage products operation was a provider of high voltage switchgear up to 1200 kV AC and 1100 kV DC with a portfolio spanning air-insulated, gas-insulated and hybrid technologies. It also manufactured generator circuit breakers, a key product for integrating large power plants into the grid. The portfolio also included a broad range of capacitors and filters that facilitate power quality, instrument transformers and other substation components.

The Transformers operation supplied transformers that are an integral component found across the power value chain, enabling the reliable, efficient and safe conversion of voltage levels. The product range included dry- and liquid-distribution transformers, traction transformers for rail applications and special application transformers plus related components, for example, insulation kits, bushings and other transformer accessories.

The Power Grids business also had an extensive portfolio of service offerings across the value chain. The portfolio included spare parts, condition monitoring and maintenance services, on- and off-site repairs as well as retrofits and upgrades. Advanced software-based monitoring and advisory services further enhanced the portfolio.

Capital expenditures

Total capital expenditures for property, plant and equipment and intangible assets (excluding intangibles acquired through business combinations) amounted to $762 million, $820 million and $694 million in 2022, 2021 and 2020, respectively. In 2022 and 2021, capital expenditures were 6 percent and 8 percent lower, respectively, than depreciation and amortization. Excluding acquisition-related amortization, capital expenditures were 30 percent higher in 2022 and 28 percent higher in 2021, respectively, than depreciation and amortization.

Capital expenditures in 2022 primarily focused in mature markets, reflecting the geographic distribution of our existing production facilities. Capital expenditures in Europe and North America in 2022 were driven primarily by upgrades and maintenance of existing production facilities, mainly in the U.S., Germany, Italy, Finland, Netherlands, and Switzerland. In Asia, Middle East and Africa, capital expenditures were made primarily to increase production capacity by investing in new or expanded facilities, the highest of which were in China and India. The share of emerging markets capital expenditures as a percentage of total capital expenditures in 2022 and 2021 was 24 percent and 33 percent, respectively.

At December 31, 2022, construction in progress for property, plant and equipment was $586 million, mainly in the U.S., Germany, Switzerland, Finland, Austria, China and Sweden, while at December 31, 2021, construction in progress for property, plant and equipment was $522 million, mainly in the U.S., Switzerland, Germany, Sweden, Italy, China and India.

Our capital expenditures relate primarily to property, plant and equipment and are funded primarily through cash flows from operating activities. For 2023, we estimate the expenditures for property, plant and equipment will be higher than our annual depreciation and amortization charge, excluding acquisition-related amortization.

Supplies and raw materials

We purchase a variety of supplies and products which contain raw materials for use in our production and project execution processes. The primary materials used in our products, by weight, are copper, aluminum, steel, mineral oil and various plastics. We also purchase a wide variety of fabricated products, electronic components and systems. We operate a worldwide supply chain management network with employees dedicated to this function in our Business Areas, Divisions and in key countries. Our supply chain operations consists of a number of teams, each focusing on different product categories. These category teams are tasked with taking advantage of opportunities to leverage the scale of ABB on a global, Business Area and/or Division level, as appropriate, to optimize the efficiency of our supply networks in a sustainable manner.

Our supply chain management organization’s activities and objectives include:

- pool and leverage procurement of materials and services,
- provide transparency of ABB’s global spending through a comprehensive performance and reporting system linked to our enterprise resource planning (ERP) systems,
- strengthen ABB’s supply chain network by implementing an effective product category management structure and extensive competency-based training, and
- monitor and develop our supply base to ensure sustainability, both in terms of materials and processes used.

We buy many categories of products which contain steel, copper, aluminum, crude oil and other commodities. Continuing global economic growth in many emerging economies, coupled with the volatility in foreign currency exchange rates, has led to significant fluctuations in these raw material costs over the last few years. While we expect global commodity prices to remain highly volatile, we expect to offset some market volatility through the use of long-term contracts and global sourcing.

We seek to mitigate the majority of our exposure to commodity price risk by entering into derivative contracts. For example, we manage copper, silver and aluminum price risk using principally swap contracts based on prices for these commodities quoted on leading exchanges. ABB's hedging policy is designed to safeguard margins by minimizing price volatility and providing a stable cost base during order execution. In addition to using derivatives to reduce our exposure to fluctuations in raw materials prices, in some cases we can reduce this risk by incorporating changes in raw materials prices into the prices of our end products (through price escalation clauses).

Overall, during 2022, supply chain management personnel in our businesses, and in the countries in which we operate, along with the category teams, continued to focus on value chain optimization efforts in all areas, while maintaining and improving quality and delivery performance. Responding to the challenges of overall global supply chain constraints, each Business Area quickly implemented a task force to mitigate supply chain shortages. The Business Areas experienced some delays in supplier deliveries and product shortages for various categories such as semiconductors and other raw materials as well as constraints in the transportation of inbound supplies. However, we responded to these challenges and took mitigating actions such as building up buffer stocks, approving new suppliers, changing supplier splits, combined with daily, weekly and monthly task force project follow ups. We have, to a large extent, been able to mitigate most disruptions, maintain a competitive service level and support our business growth, while maintaining delivery schedules to our customers.

Through our Sustainable Supply Base Management (SSBM) approach, we assess ESG risks, compliance and the performance of our suppliers in these areas to make sure they meet our expectations. These expectations are detailed in the ABB Supplier Code of Conduct and the ABB Code of Conduct.

We manage our obligations in relation to conflict minerals through our Conflict Minerals policy and processes that we aim to continually improve and tailor to our value chain. We continue to work with our suppliers and customers to enable us to comply with the SEC's rules and disclosure obligations relating to conflict minerals. Further information on ABB's Conflict Minerals policy and supplier requirements can be found under "Material Compliance" at global.abb/group/en/about/supplying/material-compliance.

Patents and trademarks

While we are not materially dependent on any one of our intellectual properties, as a technology-driven company, we believe that intellectual property rights are crucial to protect the assets of our business. We continue to file new patent applications to protect our new inventions. As of December 31, 2022, we have a portfolio of approximately 25,000 pending patent applications and granted patents, of which approximately 5,500 are pending applications. This portfolio includes approximately 3,500 utility models and design rights, of which approximately 200 are pending applications. In 2022, we filed close to 500 priority patents, utility model and design applications, each covering a unique invention or unique angle on an invention. Additionally, we filed approximately 1,850 secondary patents, utility model and design applications, each extending the coverage of a previously filed priority application.

Based on our existing intellectual property strategy, we believe that we have adequate control over our core technologies. The "ABB" trademarks and logo are protected in all of the countries in which we operate. We proactively assert our intellectual property rights to safeguard the reputation associated with the ABB technology and brand. While these intellectual property rights are fundamental to all of our businesses, there is no dependency of the business on any single patent, utility model or design application.

Management overview

In 2022, we managed to navigate high customer activity in a complex macroeconomic environment marked by inflation, a strained value chain, an energy crisis, the war in Ukraine with the related economic sanctions on Russia as well as the lingering impacts of the COVID-19 pandemic. During the year, we also worked to fully implement the ABB Way operating model within our Divisions. Our new and more efficient ways of working combined with a strong market situation led to increased operational results. In the wake of the COVID-19 pandemic, ongoing supply chain, logistics and labor challenges emerged, but we were able to avoid major business disruptions with our more agile organization. Our strong price management processes proved effective as we quickly responded to rising input costs and were able to more than offset the higher costs of inflation through price increases during the year.

Active portfolio management continues to be part of our performance culture. On the back of systematic portfolio reviews we ascertain whether, ultimately, ABB is the best owner of the different businesses. We continued to make strong progress in aligning our business portfolio with our purpose, and fully focus on the areas of electrification and automation. We completed the spin-off of the Turbocharging Division in October 2022 and sold the remaining 19.9 percent interest in Hitachi Energy to Hitachi in December. The net cash received from the sale further strengthened our balance sheet, giving us additional flexibility in our capital allocation decisions. Looking forward, after the end of the year, we also reached an agreement in January 2023 to sell our Power Conversion Division to AcBel Polytech Inc. The transaction is subject to regulatory approvals and is expected to be completed in the second half of 2023.

At the same time, we remain committed to our strategy to separately list our E-mobility business subject to constructive market conditions. In the meantime, we received gross proceeds of approximately CHF 200 million ($216 million) through a private placement of new shares in ABB E-mobility in November 2022. After the end of the year, we obtained an additional amount of funding through the private placement, increasing the total gross proceeds by an additional CHF 325 million ($351 million) in February 2023. We remain a committed partner to ABB E-mobility with a shareholding of 81 percent as of February 2023.

In addition, our active portfolio management process is driving decisions within the Divisions to improve or exit areas of underperformance and support improved performance ambitions. During 2022 we accelerated the pace of strategic partnerships as well as bolt-on acquisitions driven by the Divisions. The Motion Business Area announced their first two acquisitions in more than a decade, with a combined value of approximately $125 million. Both the planned acquisition of the Siemens low voltage NEMA motor business (closing in 2023) and the PowerTech Converter acquisition will help the respective Divisions to further strengthen their leading market positions. We have also made minority investments led by our Divisions. Both the InCharge Energy, Inc (In-Charge) and Numocity Technologies Private Ltd (Numocity) majority acquisitions made earlier this year are good examples that minority investments can later also become acquisition targets. As part of our future strategy, we continue to aim to complete five or more bolt-on acquisitions each year.

Business progress

During 2022, demand for ABB's offering was robust, driven by strong demand across all regions and most customer segments, leading to positive developments in both volumes and pricing, the latter of which was largely driven by our quick response to rising input costs which we were able to pass on to our customers. Orders increased in all Business Areas with higher demand in all regions with the Americas seeing the highest growth, while growth in Asia, Middle East, and Africa was lower, driven mainly by lower growth rates in China versus prior year. Overall demand increased for the short-cycle flow business and the systems-driven offerings as well as in service.

While our orders increased 7 percent (13 percent in local currencies) in 2022, revenue growth was lower at 2 percent (9 percent in local currencies). Supply chain constraints and imbalances in the overall supply chain limited our ability to convert orders into actual deliveries resulting in an increase of our order backlog of 20 percent to $19.9 billion at the end of the year.

Group profitability showed strong improvement during 2022 with segment profit (Operational EBITA) improving in all Business Areas but reflecting approximately 10 percent of negative currency translation impacts compared to 2021. The result was driven by strong pricing execution, increased volumes and improved internal efficiency. Active price management and productivity gains were able to offset increasing raw material costs and general cost inflation emphasized by the tight supply situation over the year.

Cash flows from operating activities was $1.3 billion in 2022, a decrease of 61 percent compared to 2021. The profitability improvement was more than offset by the impact of a buildup of working capital, especially inventories, required to support our record high backlog and the impact of higher pay-out of employee bonuses due to the strong financial performance in 2021, as well as significant cash outflows relating to the exit of a non-core business, the payment for the settlement related to regulatory penalties for the Kusile project as well as ongoing restructuring and business transformation costs.

We continued to make organic growth investments in a disciplined manner, prioritizing research and development while reducing administrative costs. Total non-order related research and development was $1.2 billion in 2022, or 4 percent of revenues.

Capital allocation

Our capital allocation priorities are unchanged:

- funding organic growth, research and development, and capital expenditures at attractive returns,
- paying a rising, sustainable dividend per share over time,
- investing in value-creating acquisitions, and
- returning additional cash to shareholders.

We expect that our strong cash generation, on the back of the ABB Way operating model, will enhance our flexibility to invest in both organic growth and bolt-on acquisitions, while providing attractive returns to shareholders.

At the 2023 Annual General Meeting (AGM), the Board of Directors is proposing a dividend of 0.84 Swiss francs per share. During the year we reached our goal of returning $7.8 billion of the cash proceeds from the Power Grids divestment to shareholders. Under the various share buyback programs we have now purchased in excess of our goal with $2.8 billion of shares purchased in 2022 in addition to the $5.5 billion purchased through the end of 2021.

Sustainability strategy 2030

With our 2030 sustainability strategy, we are actively contributing to a more sustainable world, leading by example in our own operations and partnering with customers and suppliers to enable a low-carbon society, preserve resources and promote social progress. Our sustainability focus is part of ABB's commitment to responsible business practices, which are at the center of our comprehensive governance framework, based on integrity and transparency.

Amongst other focus areas in 2022, we announced a new emissions target for our supply chain. We aim to work with our main tier-one suppliers to achieve a 50 percent reduction in their CO_2e emissions by 2030. The target is focused on suppliers covering 70 percent of ABB's annual procurement expenditure. The new target is expected to make an important contribution to our goal of enabling a low carbon society as, in many cases, our suppliers have a bigger footprint than our company. For a detailed discussion of our sustainability strategy 2030 and our progress in 2022, see "See the Sustainability Report".

Critical accounting policies and estimates

General

We prepare our Consolidated Financial Statements in accordance with U.S. GAAP and present these in U.S. dollars unless otherwise stated.

The preparation of our financial statements requires us to make assumptions and estimates that affect the reported amounts of assets, liabilities, revenues and expenses and the related disclosure of contingent assets and liabilities. We evaluate our estimates on an ongoing basis (see “Note 2 - Significant accounting policies” to our Consolidated Financial Statements for a listing of our most significant accounting estimates). Where appropriate, we base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from our estimates and assumptions.

We deem an accounting policy to be critical if it requires an accounting estimate to be made based on assumptions about matters that are highly uncertain at the time the estimate is made and if different estimates that reasonably could have been used, or if changes in the accounting estimates that are reasonably likely to occur periodically, could materially impact our Consolidated Financial Statements. We also deem an accounting policy to be critical when the application of such policy is essential to our ongoing operations. We believe the following critical accounting policies require us to make subjective judgments, often as a result of the need to make estimates regarding matters that are inherently uncertain and material to our Consolidated Financial Statements. These policies should be considered when reading our Consolidated Financial Statements.

Revenue recognition

A customer contract exists if collectability under the contract is considered probable, the contract has commercial substance, contains payment terms, the rights and commitments of both parties, and has been approved. By analyzing the type, terms and conditions of each contract or arrangement with a customer, we determine which revenue recognition method applies.

We recognize revenues when control of goods or services is transferred to customers in an amount that reflects the consideration we expect to be entitled to in exchange for these goods or services. Control is transferred when the customer has the ability to direct the use and obtain the benefits from the goods or services.

The percentage-of-completion method of accounting is generally used when recognizing revenue on an over time basis and involves the use of assumptions and projections, principally relating to future material, labor, subcontractor and project-related overhead costs as well as estimates of the amount of variable consideration to which we expect to be entitled. As a consequence, there is a risk that total contract costs or the amount of variable consideration will, respectively, either exceed or be lower than those we originally estimated (based on all information reasonably available to us) and the margin will decrease or the contract may become unprofitable. This risk increases if the duration of a contract increases because there is a higher probability that the circumstances upon which we originally developed our estimates will change, resulting in increased costs that we may not recover. Factors that could cause costs to increase include:

- unanticipated technical problems with equipment supplied or developed by us which may require us to incur additional costs to remedy,
- changes in the cost of components, materials or labor,
- difficulties in obtaining required governmental permits or approvals,
- project modifications creating unanticipated costs,
- suppliers’ or subcontractors’ failure to perform, and
- delays caused by unexpected conditions or events.

Changes in our initial assumptions, which we review on a regular basis between balance sheet dates, may result in revisions to estimated costs, current earnings and anticipated earnings. We recognize these changes in the period in which the changes in estimates are determined. By recognizing changes in estimates cumulatively, recorded revenue and costs to date reflect the current estimates of the stage of completion of each project. Additionally, losses on such contracts are recognized in the period when they are identified and are based upon the anticipated excess of contract costs over the related contract revenues.

Pension and other postretirement benefits

As more fully described in “Note 17 - Employee benefits” to our Consolidated Financial Statements, we have a number of defined benefit pension and other postretirement plans and recognize an asset for a plan’s overfunded status or a liability for a plan’s underfunded status in our Consolidated Balance Sheets. We measure such a plan’s assets and obligations that determine its funded status as of the end of the year.

Significant differences between assumptions and actual experience, or significant changes in assumptions, may materially affect the pension obligations. The effects of actual results differing from assumptions and the changing of assumptions are included in net actuarial loss within "Accumulated other comprehensive loss".

We recognize actuarial gains and losses gradually over time. Any cumulative unrecognized actuarial gain or loss that exceeds 10 percent of the greater of the present value of the projected benefit obligation (PBO) and the fair value of plan assets is recognized in earnings over the expected average remaining working lives of the employees participating in the plan, or the expected average remaining lifetime of the inactive plan participants if the plan is comprised of all or almost all inactive participants. Otherwise, the actuarial gain or loss is not recognized in the Consolidated Income Statements.

We use actuarial valuations to determine our pension and postretirement benefit costs and credits. The amounts calculated depend on a variety of key assumptions, including discount rates, mortality rates and expected return on plan assets. Under U.S. GAAP, we are required to consider current market conditions in making these assumptions. In particular, the discount rates are reviewed annually based on changes in long-term, highly-rated corporate bond yields. Decreases in the discount rates result in an increase in the PBO and in pension costs. Conversely, an increase in the discount rates results in a decrease in the PBO and in pension costs. The mortality assumptions are reviewed annually by management. Decreases in mortality rates result in an increase in the PBO and in pension costs. Conversely, an increase in mortality rates results in a decrease in the PBO and in pension costs.

Holding all other assumptions constant, a 0.25 percentage-point decrease in the discount rate would have increased the PBO related to our defined benefit pension plans by $144 million while a 0.25 percentage-point increase in the discount rate would have decreased the PBO related to our defined benefit pension plans by $140 million.

The expected return on plan assets is reviewed regularly and considered for adjustment annually based upon the target asset allocations and represents the long-term return expected to be achieved. Decreases in the expected return on plan assets result in an increase to pension costs. Holding all other assumptions constant, an increase or decrease of 0.25 percentage points in the expected long-term rate of asset return would have decreased or increased, respectively, the net periodic benefit cost in 2022 by $20 million.

The funded status, which can increase or decrease based on the performance of the financial markets or changes in our assumptions, does not represent a mandatory short-term cash obligation. Instead, the funded status of a defined benefit pension plan is the difference between the PBO and the fair value of the plan assets. Our defined benefit pension plans were overfunded by $326 million and $27 million at December 31, 2022 and 2021, respectively. Our other postretirement plans were underfunded by $50 million and $71 million at December 31, 2022 and 2021, respectively.

Income taxes

In preparing our Consolidated Financial Statements, we are required to estimate income taxes in each of the jurisdictions in which we operate. Tax expense from continuing operations is reconciled from the weighted-average global tax rate (rather than from the Swiss domestic statutory tax rate). As the parent company of the ABB Group, ABB Ltd, is domiciled in Switzerland, income which has been generated in jurisdictions outside of Switzerland (hereafter "foreign jurisdictions") and has already been subject to corporate income tax in those foreign jurisdictions is, to a large extent, tax exempt in Switzerland. Therefore, generally no or only limited Swiss income tax has to be provided for on the repatriated earnings of foreign subsidiaries. There is no requirement in Switzerland for a parent company of a group to file a tax return of the group determining domestic and foreign pre-tax income and as our consolidated income from continuing operations is predominantly earned outside of Switzerland, corporate income tax in foreign jurisdictions largely determines our global weighted-average tax rate.

We account for deferred taxes by using the asset and liability method. Under this method, we determine deferred tax assets and liabilities based on temporary differences between the financial reporting and the tax bases of assets and liabilities. Deferred tax assets and liabilities are measured using the enacted tax rates and laws that are expected to be in effect when the differences are expected to reverse. We recognize a deferred tax asset when it is more likely than not that the asset will be realized. We regularly review our deferred tax assets for recoverability and establish a valuation allowance based upon historical losses, projected future taxable income and the expected timing of the reversals of existing temporary differences. To the extent we increase or decrease this allowance in a period, we recognize the change in the allowance within “Income tax expense” in the Consolidated Income Statements unless the change relates to discontinued operations, in which case the change is recorded in “Income from discontinued operations, net of tax”. Unforeseen changes in tax rates and tax laws, as well as differences in the projected taxable income as compared to the actual taxable income, may affect these estimates.

Certain countries levy withholding taxes, dividend distribution taxes or additional corporate income taxes (hereafter “withholding taxes”) on dividend distributions. Such taxes cannot always be fully reclaimed by the shareholder, although they have to be declared and withheld by the subsidiary. Switzerland has concluded double taxation treaties with many countries in which we operate. These treaties either eliminate or reduce such withholding taxes on dividend distributions. It is our policy to distribute retained earnings of subsidiaries, insofar as such earnings are not permanently reinvested or no other reasons exist that would prevent the subsidiary from distributing them. No deferred tax liability is set up if retained earnings are considered as indefinitely reinvested and used for financing current operations as well as business growth through working capital and capital expenditure in those countries.

We operate in numerous tax jurisdictions and, as a result, are regularly subject to audit by tax authorities, including for transfer pricing. We provide for tax contingencies whenever it is deemed more likely than not that a tax asset has been impaired or a tax liability has been incurred for events such as tax claims or changes in tax laws. Contingency provisions are recorded based on the technical merits of our filing position, considering the applicable tax laws and OECD guidelines and are based on our evaluations of the facts and circumstances as of the end of each reporting period. Changes in the facts and circumstances could result in a material change to the tax accruals. Although we believe that our tax estimates are reasonable and that appropriate tax reserves have been made, the final determination of tax audits and any related litigation could be different than that which is reflected in our income tax provisions and accruals.

An estimated loss from a tax contingency must be accrued as a charge to income if it is more likely than not that a tax asset has been impaired or a tax liability has been incurred and the amount of the loss can be reasonably estimated. We apply a two-step approach to recognize and measure uncertainty in income taxes. The first step is to evaluate the tax position for recognition by determining if the weight of available evidence indicates that it is more likely than not that the position will be sustained on audit, including resolution of related appeals or litigation processes, if any. The second step is to measure the tax benefit as the largest amount which is more than 50 percent likely of being realized upon ultimate settlement. The required amount of provisions for contingencies of any type may change in the future due to new developments.

Goodwill and intangible assets

We review goodwill for impairment annually as of October 1, or more frequently if events or circumstances indicate the carrying value may not be recoverable. We use either a qualitative or quantitative assessment method for each reporting unit.

As each of our Divisions have full ownership and accountability for their respective strategies, performance and resources, we have determined our reporting units to be at the Division level, which is one level below our operating segments of Electrification, Motion, Process Automation and Robotics & Discrete Automation.

When performing the qualitative assessment, we first determine, for a reporting unit, factors which would affect the fair value of the reporting unit including: (i) macroeconomic conditions related to the business, (ii) industry and market trends, and (iii) the overall future financial performance and future opportunities in the markets in which the business operates. We then consider how these factors would impact the most recent quantitative analysis of the reporting unit’s fair value. Key assumptions in determining the fair value of the reporting unit include the projected level of business operations, the reporting unit’s weighted-average cost of capital, the income tax rate and the terminal growth rate.

During 2022, we added one new Division by creating a standalone Division from components of two existing Divisions resulting in twenty-one reporting units in total for the Group at October 1, 2022. Subsequently ABB completed the spin-off of the Turbocharging Division in October 2022. For each change in reporting unit which arose during 2022, an interim quantitative impairment test was conducted before and after the change. In both the “before” and “after” tests, it was concluded that the fair value of the reporting units exceeded the carrying value by a significant amount.

During 2021, we added three new Divisions by splitting two existing ones into multiple standalone Divisions and announced (in July 2021) the divestment of the Mechanical Power Transmission Division, resulting in twenty reporting units in total for the Group at October 1, 2021. For each change in reporting unit which arose during 2021, an interim quantitative impairment test was conducted before and after the change. In both the “before” and “after” tests, it was concluded that the fair value of the reporting units exceeded the carrying value by a significant amount.

In 2020, prior to the adoption of the new “ABB Way” operating model on July 1, 2020, goodwill was generally assessed at the level of ABB’s operating segments (one level above the Division, with the exception of Process Automation where the reporting units were the same as the Divisions) while after the change, goodwill impairment was assessed at the Division level. Although the new operating model resulted only in an allocation of goodwill within the operating segments and did not change the segment level goodwill, an interim quantitative impairment test was conducted before and after the July 1 change. As a result of the interim quantitative impairment test, a goodwill impairment charge of $290 million was recorded in 2020 to reduce the carrying value of the Machine Automation reporting unit to its implied fair value. For more information, please refer to “Note 11 – Goodwill and intangible assets” to ABB’s Consolidated Financial Statements.

At October 1, 2022 and 2021, we performed qualitative assessments and determined that it was not more likely than not that the fair value for each of these reporting units was below the carrying value. As a result, we concluded that it was not necessary to perform the quantitative impairment test.

Intangible assets are reviewed for recoverability upon the occurrence of certain triggering events (such as a decision to divest a business or projected losses of an entity) or whenever events or changes in circumstances indicate that the carrying amount may not be recoverable. We record impairment charges other than impairments of goodwill in “Other income (expense), net” in our Consolidated Income Statements, unless they relate to a discontinued operation, in which case the charges are recorded in “Income from discontinued operations, net of tax”.

New accounting pronouncements

For a description of accounting changes and recent accounting pronouncements, including the expected dates of adoption and estimated effects, if any, on our Consolidated Financial Statements, see “Note 2 - Significant accounting policies” to our Consolidated Financial Statements.

Research and development

Each year, we invest significantly in research and development. Our research and development focuses on developing and commercializing the technologies, products and solutions of our businesses that are of strategic importance to our future growth. In 2022, we invested $1,166 million, or approximately 4 percent of our 2022 consolidated revenues, on research and development activities in our continuing operations. We also had expenditures of approximately $48 million on order-related development activities. These are customer- and project-specific development efforts that we undertake to develop or adapt equipment and systems to the unique needs of our customers in connection with specific orders or projects.

In addition to continuous product development, and order-related engineering work, we develop platforms for technology applications in our businesses in our research and development laboratories, which operate on a global basis. Through active management of our investment in research and development, we seek to maintain a balance between short-term and long-term research and development programs and optimize our return on investment. We protect these results by holding patents, copyrights and other appropriate intellectual property protection.

To complement our business-focused product development, our businesses invest together in collaborative research activities covering topics such as artificial intelligence, software, sensors, control and optimization, mechatronics and robotics, power electronics, communication technologies, material and manufacturing, electrodynamics and electrical switching technologies. This results in advancing the state-of-the-art technologies used in our products and in common technology platforms that can be applied across multiple product lines.

Universities are incubators of future technology, and one task of our research and development teams is to transform university research into industry-ready technology platforms. We collaborate with multiple universities and research institutions to build research networks and foster new technologies. We believe these collaborations shorten the amount of time required to turn basic ideas into viable products, and they additionally help us to recruit and train new personnel. We have built numerous university strategic relationships with a number of leading institutions in various countries around the world.

We are also leveraging our ecosystem to enhance our innovation efforts and gain speed with strategic partners with complementary competencies. In addition, we invest and collaborate with start-ups worldwide via our corporate venture arm ABB Technology Ventures and our start-up collaboration arm SynerLeap.

The result of our investment in research and development is that ABB is widely recognized for its world-class technology.

Acquisitions and divestments

Acquisitions

During 2022 and 2021, ABB paid $195 million and $212 million to purchase five and two businesses, respectively.

The principal acquisition in 2022 was InCharge Energy, Inc. (In-Charge), where we increased our ownership to a 60 percent controlling interest, expanding the market presence of the E-mobility Division within our Electrification operating segment, particularly in the North American market. In-Charge is headquartered in Santa Monica, United States, and is a provider of turn-key commercial electric vehicle charging hardware and software solutions. See “Note 4 - Acquisitions, divestments and equity-accounted companies” to our Consolidated Financial Statements.

The principal acquisition in 2021 was ASTI Mobile Robotics Group SL (ASTI). ASTI is headquartered in Burgos, Spain.

There were no significant acquisitions in 2020.

Divestments and spin-offs

Spin-off of the Turbocharging Division

In September 2022, the shareholders approved the spin-off of the Company's Turbocharging Division into an independent, publicly traded company, Accelleron Industries AG (Accelleron), which was completed through the distribution of common stock of Accelleron to the stockholders of ABB on October 3, 2022. As a result of the spin-off of this Division, the Company distributed net assets of $272 million, net of amounts attributable to noncontrolling interests of $12 million, which was reflected as a reduction in Retained earnings. In addition, total accumulated comprehensive income of $95 million, including the cumulative translation adjustment, was reclassified to Retained earnings. Cash and cash equivalents distributed with Accelleron was $172 million. Prior to being spun-off, the Turbocharging Division was part of our Process Automation Business Area. See "Note 4 - Acquisitions, divestments and equity-accounted companies" to our Consolidated Financial Statements.

Divestment of Mechanical Power Transmission Division

In November 2021, we completed the sale of our Mechanical Power Transmission Division (Dodge) to RBC Bearings Inc. for cash proceeds of $2,862 million, net of transaction costs and cash disposed and recognizing a net gain on sale of $2,195 million. Prior to its disposal, the Dodge business was part of our Motion Business Area. See "Note 4 - Acquisitions, divestments and equity-accounted companies" to our Consolidated Financial Statements.

Divestment of Power Grids

On July 1, 2020, we completed the divestment of 80.1 percent of our former Power Grids business (Hitachi Energy) to Hitachi. As this divestment represented a strategic shift that would have a major effect on our operations and financial results, the results of operations for this business are presented as discontinued operations and the assets and liabilities are reflected as held for sale for all periods presented. For more information on the divestment of the Power Grids business see "Note 3 - Discontinued operations" to our Consolidated Financial Statements.

Hitachi held a call option which required ABB to sell the remaining 19.9 percent interest in Hitachi Energy at a price consistent with what was paid by Hitachi to acquire the initial 80.1 percent or at fair value, if higher. In September 2022, we agreed with Hitachi that we would sell our remaining investment in Hitachi Energy and concurrently settle certain outstanding contractual obligations relating to the initial sale of the business, including certain indemnification guarantees (see Note 15 - Commitments and contingencies). The transaction was completed in December 2022, and we received proceeds of $1,552 million. See "Note 4 - Acquisitions, divestments and equity-accounted companies" to our Consolidated Financial Statements.

Exchange rates

We report our financial results in U.S. dollars. Due to our global operations, a significant amount of our revenues, expenses, assets and liabilities are denominated in other currencies. As a consequence, movements in exchange rates between currencies may affect: (i) our profitability, (ii) the comparability of our results between periods and (iii) the reported carrying value of our assets and liabilities.

We translate non-USD denominated results of operations, assets and liabilities to USD in our Consolidated Financial Statements. Balance sheet items are translated to USD using year-end currency exchange rates. Income statement and cash flow items are translated to USD using the relevant monthly average currency exchange rate.

Increases and decreases in the value of the USD against other currencies will affect the reported results of operations in our Consolidated Income Statements and the value of certain of our assets and liabilities in our Consolidated Balance Sheets, even if our results of operations or the value of those assets and liabilities have not changed in their original currency. As foreign exchange rates impact our reported results of operations and the reported value of our assets and liabilities, changes in foreign exchange rates could significantly affect the comparability of our reported results of operations between periods and result in significant changes to the reported value of our assets, liabilities and stockholders' equity.

While we operate globally and report our financial results in USD, exchange rate movements between the USD and the EUR, the CNY and the CHF are of particular importance to us due to (i) the location of our significant operations and (ii) our corporate headquarters being in Switzerland.

The exchange rates between the USD and the EUR, the USD and the CHF and the USD and the CNY at December 31, 2022, 2021 and 2020, were as follows:

Exchange rates into $	2022	2021	2020
EUR 1.00	1.07	1.13	1.23
CHF 1.00	1.08	1.10	1.14
CNY 1.00	0.14	0.16	0.15

The average exchange rates between the USD and the EUR, the USD and the CHF and the USD and the CNY for the years ended December 31, 2022, 2021 and 2020, were as follows:

Exchange rates into $	2022	2021	2020
EUR 1.00	1.05	1.18	1.14
CHF 1.00	1.05	1.09	1.07
CNY 1.00	0.15	0.16	0.14

When we incur expenses that are not denominated in the same currency as the related revenues, foreign exchange rate fluctuations could affect our profitability. To mitigate the impact of exchange rate movements on our profitability, it is our policy to enter into forward foreign exchange contracts to manage the foreign exchange transaction risk of our operations.

In 2022, approximately 75 percent of our consolidated revenues were reported in currencies other than the USD. The following percentages of consolidated revenues were reported in the following currencies:

- Euro, approximately 22 percent, and
- Chinese renminbi, approximately 16 percent.

In 2022, approximately 72 percent of our cost of sales and selling, general and administrative expenses were reported in currencies other than the USD. The following percentages of consolidated cost of sales and selling, general and administrative expenses were reported in the following currencies:

- Euro, approximately 19 percent, and
- Chinese renminbi, approximately 13 percent.

We also incur expenses other than cost of sales and selling, general and administrative expenses in various currencies.

The results of operations and financial position of our subsidiaries outside of the U.S. are generally accounted for in the currencies of the countries in which those subsidiaries are located. We refer to these currencies as “local currencies”. Local currency financial information is then translated into USD at applicable exchange rates for inclusion in our Consolidated Financial Statements.

The discussion of our results of operations below provides certain information with respect to orders, revenues, income from operations and other measures as reported in USD (as well as in local currencies). We measure period-to-period variations in local currency results by using a constant foreign exchange rate for all periods under comparison. Differences in our results of operations in local currencies as compared to our results of operations in USD are caused exclusively by changes in currency exchange rates.

While we consider our results of operations as measured in local currencies to be a significant indicator of business performance, local currency information should not be relied upon to the exclusion of U.S. GAAP financial measures. Instead, local currencies reflect an additional measure of comparability and provide a means of viewing aspects of our operations that, when viewed together with the U.S. GAAP results, provide a more complete understanding of factors and trends affecting the business. As local currency information is not standardized, it may not be possible to compare our local currency information to other companies’ financial measures that have the same or a similar title. We encourage investors to review our financial statements and publicly filed reports in their entirety and not to rely on any single financial measure.

Orders

Our policy is to book and report an order when a binding contractual agreement has been concluded with a customer covering, at a minimum, the price and scope of products or services to be supplied, the delivery schedule and the payment terms. The reported value of an order corresponds to the undiscounted value of revenues that we expect to recognize following delivery of the goods or services subject to the order, less any trade discounts and excluding any value added or sales tax. The value of orders received during a given period of time represents the sum of the value of all orders received during the period, adjusted to reflect the aggregate value of any changes to the value of orders received during the period and orders existing at the beginning of the period. These adjustments, which may in the aggregate increase or decrease the orders reported during the period, may include changes in the estimated order price up to the date of contractual performance, changes in the scope of products or services ordered and cancellations of orders. The undiscounted value of future revenues we expect to generate from our orders at any point in time is represented by our order backlog.

The level of orders fluctuates from year to year. Portions of our business involve orders for long-term projects that can take months or years to complete and many larger orders result in revenues in periods after the order is booked. Consequently, the level of orders generally cannot be used to accurately predict future revenues or operating performance. Orders that have been placed can often be cancelled, delayed or modified by the customer. These actions can reduce or delay any future revenues from the order or may result in the elimination of the order.

Performance measures

We evaluate the performance of our operating segments based on orders received, revenues and Operational EBITA.

Operational EBITA represents income from operations excluding:

- amortization expense on intangibles arising upon acquisitions (acquisition-related amortization),
- restructuring, related and implementation costs,
- changes in the amount recorded for obligations related to divested businesses occurring after the divestment date (changes in obligations related to divested businesses),
- changes in estimates relating to opening balance sheets of acquired businesses (changes in pre-acquisition estimates),
- gains and losses from sale of businesses (including fair value adjustment on assets and liabilities held for sale),
- acquisition- and divestment-related expenses and integration costs,
- other income/expense relating to the Power Grids joint venture,
- certain other non-operational items, as well as
- foreign exchange/commodity timing differences in income from operations consisting of: (a) unrealized gains and losses on derivatives (foreign exchange, commodities, embedded derivatives), (b) realized gains and losses on derivatives where the underlying hedged transaction has not yet been realized, and (c) unrealized foreign exchange movements on receivables/payables (and related assets/liabilities).

Certain other non-operational items generally includes: certain regulatory, compliance and legal costs, certain asset write downs/impairments (including impairment of goodwill) and certain other fair value changes, as well as other items which are determined by management on a case-by-case basis.

See “Note 23 - Operating segment and geographic data” to our Consolidated Financial Statements for a reconciliation of the total Operational EBITA to income from continuing operations before taxes.

Transactions with affiliates and associates

In the normal course of our business, we purchase products from, sell products to and engage in other transactions with entities in which we hold an equity interest. The amounts involved in these transactions are not material to ABB Ltd. Prior to its sale in December 2022 our most significant equity method investment was in Hitachi Energy Ltd (see “Note 4 - Acquisitions, divestments and equity-accounted companies” for details). Also, in the normal course of our business, we engage in transactions with businesses that we have divested. We believe that the terms of the transactions we conduct with these companies are negotiated on an arm’s length basis.

Analysis of results of operations

The discussion in the following sections below provides a comparative analysis between 2022 and 2021. See the sections under “Operating and Financial Review and Prospects” in our 2021 Annual Report for a comparative discussion and analysis between 2021 and 2020.

Our consolidated results from operations were as follows:

Income Statement Data:

($ in millions, except per share data in $)	2022	2021	2020
Revenues	29,446	28,945	26,134
Cost of sales	(19,736)	(19,478)	(18,256)
Gross profit	**9,710**	**9,467**	**7,878**
Selling, general and administrative expenses	(5,132)	(5,162)	(4,895)
Non-order related research and development expenses	(1,166)	(1,219)	(1,127)
Impairment of goodwill	—	—	(311)
Other income (expense), net	(75)	2,632	48
Income from operations	**3,337**	**5,718**	**1,593**
Interest and dividend income	72	51	51
Interest and other finance expense	(130)	(148)	(240)
Losses from extinguishment of debt	—	—	(162)
Non-operational pension (cost) credit	115	166	(401)
Income tax expense	(757)	(1,057)	(496)
Income from continuing operations, net of tax	**2,637**	**4,730**	**345**
Income (loss) from discontinued operations, net of tax	(43)	(80)	4,860
Net income	**2,594**	**4,650**	**5,205**
Net income attributable to noncontrolling interests and redeemable noncontrolling interests	(119)	(104)	(59)
Net income attributable to ABB	**2,475**	**4,546**	**5,146**
Amounts attributable to ABB shareholders:			
Income from continuing operations, net of tax	2,517	4,625	294
Income (loss) from discontinued operations, net of tax	(42)	(79)	4,852
Net income	2,475	4,546	5,146
Basic earnings per share attributable to ABB shareholders:			
Income from continuing operations, net of tax	1.33	2.31	0.14
Income (loss) from discontinued operations, net of tax	(0.02)	(0.04)	2.30
Net income	1.30	2.27	2.44
Diluted earnings per share attributable to ABB shareholders:			
Income from continuing operations, net of tax	1.32	2.29	0.14
Income (loss) from discontinued operations, net of tax	(0.02)	(0.04)	2.29
Net income	1.30	2.25	2.43

A more detailed discussion of the orders, revenues, income from operations and Operational EBITA for our Business Areas follows in the sections of “Business analysis” below for Electrification, Motion, Process Automation, Robotics & Discrete Automation and Corporate and Other. Orders and revenues of our businesses include intersegment transactions which are eliminated in the “Corporate and Other” line in the tables below.

Orders

($ in millions)	2022	2021	2020	% Change 2022	% Change 2021
Electrification	15,901	14,381	11,884	11%	21%
Motion	7,896	7,616	6,574	4%	16%
Process Automation	6,825	6,779	6,144	1%	10%
Robotics & Discrete Automation	4,116	3,844	2,868	7%	34%
Total Business Areas	**34,738**	**32,620**	**27,470**	**6%**	**19%**
Corporate and Other					
Non-core and divested businesses	46	(10)	(31)	n.a.	n.a.
Intersegment eliminations and other	(796)	(742)	(927)	n.a.	n.a.
Total	**33,988**	**31,868**	**26,512**	**7%**	**20%**

In 2022, total orders increased 7 percent compared to 2021 (13 percent in local currencies). All Business Areas contributed to the order growth driven by both higher business volumes and price increases, reflecting strong demand across most regions and most customer segments, as well as the impact of successfully passing on rising input costs to end customers. Orders were higher for product and project businesses as well as for service businesses. In addition to strong underlying market demand, orders were also supported by customers placing orders early to secure deliveries in an environment with a generally tight supply chain, especially earlier in the year. As supply chain constraints eased over the year, customer order patterns tended to normalize. Growth rates were highest in the Electrification and Robotics & Discrete Automation Business Areas. Both the Process Automation and Motion Business Areas contributed modest growth, with the former impacted by the spin-off of the Turbocharging Division in October 2022 and the latter impacted by the divestment of the Mechanical Power Transmission business sold in November 2021 which together had a combined negative impact on consolidated order growth of approximately 3 percent. For additional information about individual Business Area order performance, refer to the relevant sections of “Business analysis” below.

We determine the geographic distribution of our orders based on the location of the ultimate destination of the products’ end use, if known, or the location of the customer. The geographic distribution of our consolidated orders was as follows:

($ in millions)	2022	2021	2020	% Change 2022	% Change 2021
Europe	11,778	11,857	9,618	(1)%	23%
The Americas	11,825	9,940	7,956	19%	25%
of which: United States	8,920	7,453	5,971	20%	25%
Asia, Middle East and Africa	10,385	10,071	8,938	3%	13%
of which: China	5,087	5,036	4,121	1%	22%
Total	**33,988**	**31,868**	**26,512**	**7%**	**20%**

In 2022, orders increased 19 percent in the Americas (20 percent in local currencies), with orders growing in the U.S., Canada, Brazil and Mexico. In Europe, orders decreased 1 percent (increased 13 percent in local currencies) with the Motion and Robotics & Discrete Automation Business Areas reporting order growth. Orders were higher in France, Switzerland, Italy and the United Kingdom while they declined in Germany, Sweden and Finland. In Asia, Middle East and Africa, orders increased 3 percent (9 percent in local currencies) with orders increasing in China, India, Singapore, South Korea and Saudi Arabia while they decreased in Australia.

Order backlog

December 31, ($ in millions)	2022	2021	2020	% Change 2022	% Change 2021
Electrification	6,933	5,458	4,358	27%	25%
Motion	4,726	3,749	3,320	26%	13%
Process Automation	6,229	6,079	5,805	2%	5%
Robotics & Discrete Automation	2,679	1,919	1,403	40%	37%
Total Business Areas	**20,567**	**17,205**	**14,886**	**20%**	**16%**
Corporate and Other					
Non-core and divested businesses	23	114	139	(80)%	(18)%
Intersegment eliminations	(723)	(712)	(722)	n.a.	n.a.
Total	**19,867**	**16,607**	**14,303**	**20%**	**16%**

At December 31, 2022, consolidated order backlog was 20 percent higher (26 percent in local currencies) compared to December 31, 2021. Order backlog increased significantly in most Business Areas with the Process Automation Business Area having only modest growth. The order backlog in the Motion Business Area was driven by order growth in both the short- and long-cycle businesses in most Divisions. Order backlog increased across all Divisions in the Electrification Business Area reflecting the very high order levels with the strongest growth in the E-mobility and Distribution Solutions Divisions. The order backlog in the Process Automation Business Area was supported by a strong order increase in most Divisions except the Marine & Ports Division, which was negatively impacted by an order reversal due to a customer bankruptcy in Germany. The low order backlog growth in the Process Automation Business Area also reflects the spin-off of the Turbocharging Division. The increase in the order backlog in the Robotics & Discrete Automation Business Area was driven by strong growth in both Divisions (Machine Automation and Robotics).

Revenues

($ in millions)	2022	2021	2020	% Change 2022	% Change 2021
Electrification	14,105	13,187	11,924	7%	11%
Motion	6,745	6,925	6,409	(3)%	8%
Process Automation	6,044	6,259	5,792	(3)%	8%
Robotics & Discrete Automation	3,181	3,297	2,907	(4)%	13%
Total Business Areas	**30,075**	**29,668**	**27,032**	**1%**	**10%**
Corporate and Other					
Non-core and divested businesses	135	11	(6)	n.a.	n.a.
Intersegment eliminations and other	(764)	(734)	(892)	n.a.	n.a.
Total	**29,446**	**28,945**	**26,134**	**2%**	**11%**

In 2022, revenues increased by 2 percent (9 percent in local currencies). During the first half of the year, revenues were hampered as component constraints slowed production and hindered customer deliveries. However, the supply chain challenges progressively eased, triggering higher revenue growth rates in the latter part of the year. All Business Areas benefited from increased volumes and price increases as we were able to pass on the impacts of higher cost inputs to the end customers. Growth rates were highest in the Electrification Business Area. In local currencies, the Motion Business Area achieved a single-digit growth rate despite the adverse impact from the divestment of the Mechanical Power Transmission Division in November 2021. The Process Automation Business Area saw moderate growth in local currencies despite the spin-off of the Turbocharging Division in October 2022. Revenues in the Robotics & Discrete Automation Business Area increased in local currencies, with revenues benefiting in the second half of the year from an easing of component constraints. For additional analysis of revenues for each of the Business Areas, refer to the relevant sections of “Business analysis” below.

We determine the geographic distribution of our revenues based on the location of the ultimate destination of the products' end use, if known, or the location of the customer. The geographic distribution of our consolidated revenues was as follows:

				% Change	
($ in millions)	**2022**	**2021**	**2020**	**2022**	**2021**
Europe	10,286	10,529	9,764	(2)%	8%
The Americas	9,572	8,686	7,949	10%	9%
of which: United States	7,021	6,397	6,027	10%	6%
Asia, Middle East and Africa	9,588	9,730	8,421	(1)%	16%
of which: China	4,696	4,932	4,098	(5)%	20%
Total	**29,446**	**28,945**	**26,134**	**2%**	**11%**

In 2022, the increase in revenues was driven by the Americas region, where revenues increased 10 percent (11 percent in local currencies) and were higher across all Business Areas except the Motion Business Area. Revenues increased in the U.S., Canada, Brazil, Mexico, Argentina and Peru. In Europe, revenues decreased 2 percent (increased 12 percent in local currencies) and were higher across all Business Areas except the Motion Business Area, which was flat. Sales were higher in Finland, the United Kingdom and France while revenues were lower in Sweden, Switzerland and Norway. Germany and Italy reported stable sales. In Asia, Middle East and Africa revenues decreased 1 percent (increased 5 percent in local currencies) and revenues grew in the Electrification Business Area while the Process Automation and Robotics & Discrete Automation Business Areas reported a decrease with the Motion Business Area being stable. Revenues increased in India and Singapore while they decreased in China, Saudi Arabia, Australia, Japan and South Korea.

Cost of sales

Cost of sales consists primarily of labor, raw materials and component costs but also includes indirect production costs, expenses for warranties, contract and project charges, as well as order-related development expenses incurred in connection with projects for which corresponding revenues have been recognized.

In 2022, costs of sales increased 1 percent (8 percent in local currencies) to $19,736 million. Cost of sales as a percentage of revenues decreased to 67.0 percent from 67.3 percent in 2021, increasing the gross margin, primarily driven by price increases and certain cost savings actions taken to mitigate higher inflation in labor, commodity prices and freight costs. It is partly offset by a negative impact due to portfolio changes. In 2022, gross margin percentages were higher in the Electrification, Process Automation and Motion Business Areas. The gross margin percentages in the Robotics & Discrete Automation Business Areas were lower in 2022 compared to 2021 due to the impact of higher inflation and lower volume due to general supply chain constraints.

Selling, general and administrative expenses

The components of selling, general and administrative expenses were as follows:

($ in millions)	2022	2021	2020
Selling expenses	3,248	3,281	3,087
General and administrative expenses	1,884	1,881	1,808
Total	**5,132**	**5,162**	**4,895**

In 2022, general and administrative expenses were flat (increased 8 percent in local currencies) compared to 2021. The local currency increase principally represents an impact from inflation. As a percentage of revenues, general and administrative expenses slightly decreased to 6.4 percent from 6.5 percent in 2021 mainly due to strong revenue growth compared to more modest cost increases. General and administrative expenses in 2022 continue to include the ongoing costs required to deliver services to Hitachi Energy Ltd and Accelleron (commencing in October 2022) under transition service agreements for which we are compensated and have recorded $162 million in Other income (expense), net, during 2022 compared to $173 million in 2021.

In 2022, selling expenses decreased 1 percent (increased 6 percent in local currencies) compared to 2021 and was higher in local currencies across all Business Areas. Spending levels increased as pandemic-related restrictions were gradually relaxed and sales activities increased to keep pace with the strong growth in underlying demand. Selling expenses as a percentage of orders received decreased from 10.3 percent in 2021 to 9.6 percent in 2022 mainly due to strong order growth.

Non-order related research and development expenses

In 2022, non-order related research and development expenses decreased 4 percent (increase 4 percent in local currencies) compared to 2021. In 2022, non-order related research and development expenses as a percentage of revenues remained similar to prior year levels (4.0 percent in 2022 compared to 4.2 percent in 2021) as we continued investing in research and development in line with revenues growth.

Other income (expense), net

($ in millions)	2022	2021	2020
Income from provision of services under transition services agreements	221	173	91
Net gain from sale of property, plant and equipment	84	38	37
Gain (loss) from change in fair value of investments in equity securities	52	108	73
Brand income from Hitachi Energy	57	89	60
Favorable resolution of an uncertain purchase price adjustment	15	6	36
Fair value adjustment on assets and liabilities held for sale	—	—	(33)
Net gain (loss) from sale of businesses & equity-accounted investments[(1)]	36	2,193	(2)
Asset impairments	(55)	(33)	(35)
Income (loss) from equity-accounted companies	(102)	(100)	(66)
Restructuring and restructuring-related expenses[(2)]	(227)	(48)	(87)
Regulatory penalties in connection with Kusile project	(313)	—	—
Other income (expense)	157	206	(26)
Total	**(75)**	**2,632**	**48**

(1) Includes gain on sale of the remaining 19.9 percent investment in Hitachi Energy Ltd.
(2) Excluding asset impairments

In 2022, Other income (expense), net, was a loss of $75 million compared to a gain of $2,632 million in 2021. In 2022, we recorded costs of $313 million associated with regulatory penalties assessed in connection with the Kusile project and higher restructuring and restructuring-related expenses which included $195 million in connection with the exit of the full train retrofit business primarily for contract settlement costs. In 2022, we recorded a gain of $43 million relating to the sale of the remaining 19.9 percent of Hitachi Energy to Hitachi. In 2021, we recorded gains of $2,193 million in Other income (expense), net for net gains from sales of businesses. This was primarily due to the divestment of the Dodge business. In 2022 compared to 2021, we recorded lower gains for net fair value increases in various equity investments, the most significant of which in 2022 related to InCharge Energy, Inc and in 2021 related to CMR Surgical Ltd.

Income from operations

				% Change	
($ in millions)	2022	2021	2020	2022	2021
Electrification	2,159	1,841	1,335	17%	38%
Motion	1,092	3,276	989	(67)%	231%
Process Automation	663	713	344	(7)%	107%
Robotics & Discrete Automation	247	269	(163)	(8)%	n.a.
Total Business Areas	**4,161**	**6,099**	**2,505**	**(32)%**	**143%**
Corporate and Other	(823)	(385)	(927)	n.a.	n.a.
Intersegment elimination	(1)	4	15	n.a.	n.a.
Total	**3,337**	**5,718**	**1,593**	**(42)%**	**259%**

In 2022 and 2021, changes in income from operations were a result of the factors discussed above and in “Business analysis” below.

Financial income and expenses

Financial income and expenses include “Interest and dividend income”, “Interest and other finance expense” and “Losses from extinguishment of debt”.

“Interest and other finance expense” includes interest expense on our debt, the amortization of upfront transaction costs associated with long-term debt and committed credit facilities, commitment fees on credit facilities, foreign exchange gains and losses on financial items and gains and losses on marketable securities. In addition, interest accrued relating to uncertain tax positions is included within interest expense. “Interest and other finance expense” excludes interest expense which has been allocated to discontinued operations.

($ in millions)	2022	2021	2020
Interest and dividend income	72	51	51
Interest and other finance expense	(130)	(148)	(240)
Losses from extinguishment of debt	—	—	(162)

In 2022, increases in market interest rates resulted in both higher interest income on cash deposits and higher interest expense on floating rate debt. Interest expense was lower primarily due to net reversals of interest expense in connection with income tax related contingencies. This was partially offset by the effect of higher rates of interest on floating rate debt as well as higher amounts of outstanding commercial paper.

Non-operational pension (cost) credit

A non-operational pension credit of $115 million was recorded in 2022 compared to a $166 million credit in 2021. Compared to 2021, the 2022 non-operational pension credit has decreased due to lower expected returns on plan assets and higher interest costs on the benefit obligations (see “Note 17 - Employee benefits” to our Consolidated Financial Statements).

Income tax expense

($ in millions)	2022	2021	2020
Income from continuing operations before taxes	3,394	5,787	841
Income tax expense	(757)	(1,057)	(496)
Effective tax rate for the year	22.3%	18.3%	59.0%

In 2022, the effective tax rate increased to 22.3 percent from 18.3 percent in 2021. The effective tax rate in 2022 was approximately 2 percentage points higher due to the non-deductible regulatory penalties in connection with the Kusile project and 3 percentage points due to not benefiting losses in entities having a participation exemption. The effective tax rate in 2022 also reflects a benefit of approximately 6 percentage points due to changes in assessment of recoverability of deferred tax assets. In 2021, the tax impacts related to the sale of the Dodge business reduced the effective tax rate by approximately 5 percentage points. We also realized certain benefits from internal reorganizations in anticipation of this divestment which reduced the effective tax rate by a further 4 percentage points.

See “Note 16 - Income taxes” to our Consolidated Financial Statements for additional information.

Income from continuing operations, net of tax

As a result of the factors discussed above, compared to 2021, Income from continuing operations, net of tax, decreased by $2,093 million to $2,637 million in 2022.

Income from discontinued operations, net of tax

Income (loss) from discontinued operations, net of tax, in 2022, 2021 and 2020 was as follows:

($ in millions)	2022	2021	2020
Total revenues	—	—	4,008
Total cost of sales	—	—	(3,058)
Gross profit	**—**	**—**	**950**
Expenses	(38)	(18)	(808)
Change to net gain recognized on sale of the Power Grids business	(10)	(65)	5,141
Income (loss) from operations	**(48)**	**(83)**	**5,282**
Net interest income (expense) and other finance expense	—	2	(5)
Non-operational pension (cost) credit	—	—	(94)
Income (loss) from discontinued operations before taxes	**(48)**	**(81)**	**5,182**
Income tax	5	1	(322)
Income (loss) from discontinued operations, net of tax	**(43)**	**(80)**	**4,860**

On July 1, 2020, we completed the divestment of 80.1 percent of our former Power Grids business to Hitachi. As a result of the sale, substantially all Power Grids related assets and liabilities have been sold. As this divestment represented a strategic shift that would have a major effect on our operations and financial results, the results of operations for this business have been presented as discontinued operations for all periods presented. In addition, we also have retained obligations (primarily for environmental and taxes) related to other businesses disposed or otherwise exited that qualified as discontinued operations. Changes to these retained obligations are also included in Income (loss) from discontinued operations, net of tax.

In 2020, as a result of the sale of the Power Grids business, we recognized a net gain for the sale of the entire Power Grids business which is included in Income from discontinued operations, net of tax. Certain amounts included in the net gain are estimated or otherwise subject to change in value and, as a result, we have recorded additional adjustments in 2022 and 2021, primarily due to the impacts of the final purchase price settlement agreed with Hitachi and net foreign currency losses on certain obligations. We may record additional adjustments in future periods to the gain which are not expected to have a material impact on the Consolidated Financial Statements.

For additional information on the divestment and discontinued operations, see “Note 3 - Discontinued operations” to our Consolidated Financial Statements.

Net income attributable to ABB

As a result of the factors discussed above, compared to 2021, Net income attributable to ABB decreased by $2,071 million to $2,475 million in 2022.

Earnings per share attributable to ABB shareholders

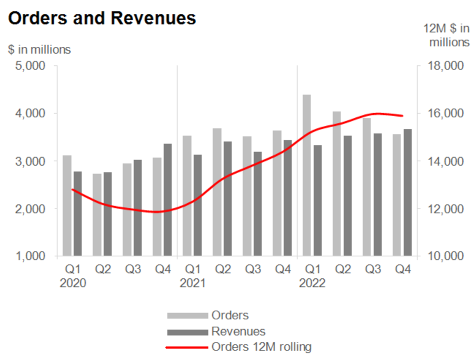
(in $)	2022	2021	2020
Basic earnings per share attributable to ABB shareholders:			
Income from continuing operations, net of tax	1.33	2.31	0.14
Income (loss) from discontinued operations, net of tax	(0.02)	(0.04)	2.30
Net income	1.30	2.27	2.44
Diluted earnings per share attributable to ABB shareholders:			
Income from continuing operations, net of tax	1.32	2.29	0.14
Income (loss) from discontinued operations, net of tax	(0.02)	(0.04)	2.29
Net income	1.30	2.25	2.43

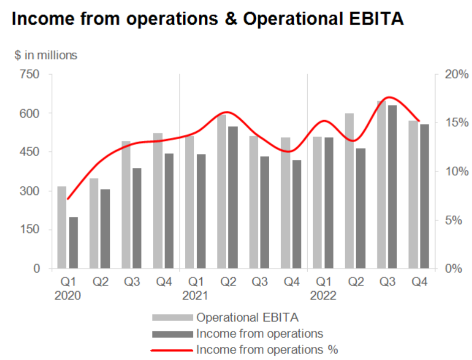
Basic earnings per share is calculated by dividing income by the weighted-average number of shares outstanding during the year. Diluted earnings per share is calculated by dividing income by the weighted-average number of shares outstanding during the year, assuming that all potentially dilutive securities were exercised, if dilutive. Potentially dilutive securities comprise: outstanding written call options and outstanding options and shares granted subject to certain conditions under our share-based payment arrangements. See “Note 20 - Earnings per share” to our Consolidated Financial Statements.

Business analysis

Electrification Business Area

The financial results of our Electrification Business Area were as follows:





				% Change	
($ in millions)	2022	2021	2020	2022	2021
Orders	15,901	14,381	11,884	11%	21%
Order backlog at December 31,	6,933	5,458	4,358	27%	25%
Revenues	14,105	13,187	11,924	7%	11%
Income from operations	2,159	1,841	1,335	17%	38%
Operational EBITA	2,328	2,121	1,681	10%	26%

Orders

Approximately two-thirds of the Business Area’s orders are for products with short delivery times; these orders are usually recorded and delivered within a three-month period and thus are generally considered as short-cycle. The remainder is comprised of smaller project orders that require longer lead times, as well as larger solutions requiring engineering and installation. Approximately half of the Business Area’s orders are received via third-party distributors. As a consequence, end-customer market data is based partially on management estimates.

In 2022, orders increased 11 percent (17 percent in local currencies) as demand improved across all key end-user segments. Demand in the buildings segment, the Electrification Business Area’s largest end-user segment, was robust, with strong growth particularly in the non-residential building sector. Solid growth in the residential building sector in the first half of the year was partly offset by a slowdown in the second half of 2022, particularly in certain European markets. Substantial growth continues in the e-mobility segment along with strong growth in data centers, food and beverage, infrastructure and renewables. Demand from the oil and gas segment increased significantly during the year, while growth in the utilities and rail segments was solid even if geographically uneven.

The geographic distribution of orders for our Electrification Business Area was as follows:

($ in millions)	2022	2021	2020
Europe	4,973	5,022	4,149
The Americas	6,776	5,199	4,033
of which: United States	5,273	3,891	3,065
Asia, Middle East and Africa	4,152	4,160	3,702
of which: China	2,028	2,141	1,819
Total	**15,901**	**14,381**	**11,884**

In 2022, orders in local currencies increased in all regions. The pandemic-related challenges improved compared to 2021 in most geographies. Orders in the Americas increased 30 percent (31 percent in local currencies), with demand strengthening across all key markets, led by increases in the U.S. and Brazil. Orders in Europe decreased 1 percent, reflecting the weakening of many European currencies against the U.S. dollar, but increased 13 percent in local currencies, with growth across the region including in key markets such as Italy and Germany. Orders in Asia, Middle East and Africa were on the same level as in 2021, but increased 6 percent in local currencies, with strong order growth in India throughout the year offsetting a slowdown in China. Orders in China were lower in most end-user segments mainly as business activity was hampered by pandemic-related measures, but also reflected a challenging comparable due to strong order performance in 2021.

Order backlog

In 2022, order backlog increased 27 percent (33 percent in local currencies). Order backlog benefited from strong order intake, but was also impacted by execution challenges caused by material shortages, transportation constraints as well as pandemic-related production pressures in some local markets.

Revenues

In 2022, revenues increased 7 percent (14 percent in local currencies). Revenues in local currencies increased in all Divisions reflecting the strong demand across regions and end-user segments, however growth was still hampered by component shortages, logistics challenges and a tight labor market. Pricing actions taken to mitigate increasing material, labor and transportation costs contributed strongly to the higher revenue level and accounted for around three quarters of the revenue growth in 2022. The revenue growth was led by the E-mobility Division, mirroring the very high demand in this segment. There was also strong double-digit revenue growth in local currencies in the Power Conversion Division as well as in the Installation Products and Smart Power Divisions.

The geographic distribution of revenues for our Electrification Business Area was as follows:

($ in millions)	2022	2021	2020
Europe	4,544	4,628	4,190
The Americas	5,372	4,503	4,093
of which: United States	3,940	3,322	3,115
Asia, Middle East and Africa	4,189	4,056	3,641
of which: China	2,004	2,110	1,858
Total	**14,105**	**13,187**	**11,924**

In 2022, revenues in the Americas increased 19 percent (20 percent in local currencies) with widespread regional growth. Revenues increased 3 percent (10 percent in local currencies) in Asia, Middle East and Africa, supported by strong growth in India, while revenues in China were lower than the previous year. Revenues in Europe decreased 2 percent, impacted by weakening currencies in many European countries versus the U.S. dollar, while revenues in the region grew 13 percent in local currencies.

Income from operations

In 2022, income from operations increased 17 percent (28 percent in local currencies), supported by higher volumes as well as strong price management, which helped offset the adverse impact from cost inflation in raw materials, freight and labor. Benefits of savings realized from ongoing restructuring and cost savings programs also positively influenced income from operations. Restructuring-related expenses and implementation costs in our operating Divisions were lower in 2022 than in 2021, mainly due to the substantial completion of the integration of GEIS, which we acquired in 2018. Also contributing to the higher income from operations in 2022 compared to 2021 were higher gains from net fair value increases in various equity investments, the most significant being InCharge Energy, Inc., as well as lower GEIS integration costs. These positive effects were partially dampened by widespread inflationary cost pressures in 2022, as well as higher personnel expenses driven by a ramp-up of manufacturing capacity to meet higher demand. Changes in foreign currencies, including the impacts from FX/commodity timing differences summarized in the table below, negatively impacted income from operations by approximately 6 percent.

Operational EBITA

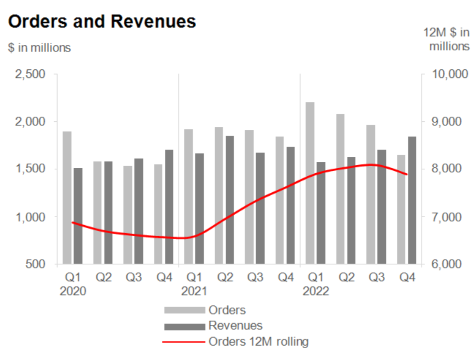
The reconciliation of Income from operations to Operational EBITA for the Electrification Business Area was as follows:

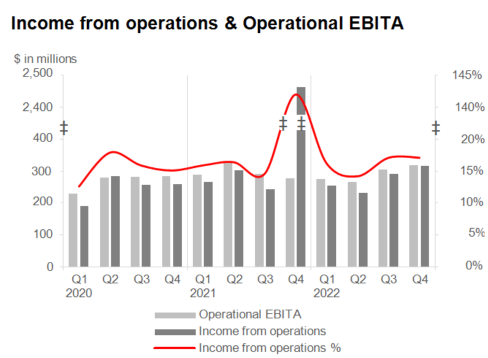
($ in millions)	2022	2021	2020
Income from operations	**2,159**	**1,841**	**1,335**
Acquisition-related amortization	116	117	115
Restructuring, related and implementation costs	28	66	145
Changes in obligations related to divested businesses	1	—	15
Changes in pre-acquisition estimates	11	(6)	11
Gains and losses from sale of businesses	(1)	13	4
Fair value adjustment on assets and liabilities held for sale	—	—	33
Favorable resolution of an uncertain purchase price adjustment	—	(5)	(36)
Acquisition- and divestment-related expenses and integration costs	40	70	71
Changes in fair value of investments in equity securities	(57)	(15)	—
Certain other non-operational items	33	15	9
FX/commodity timing differences in income from operations	(2)	25	(21)
Operational EBITA	**2,328**	**2,121**	**1,681**

In 2022, Operational EBITA increased 10 percent (20 percent excluding the impact from changes in foreign currency exchange rates) compared to 2021, primarily due to the reasons described under "Income from operations", excluding the explanations related to the reconciling items in the table above.

Motion Business Area

The financial results of our Motion Business Area were as follows:





				% Change	
($ in millions)	**2022**	**2021**	**2020**	**2022**	**2021**
Orders	7,896	7,616	6,574	4%	16%
Order backlog at December 31,	4,726	3,749	3,320	26%	13%
Revenues	6,745	6,925	6,409	(3)%	8%
Income from operations	1,092	3,276	989	(67)%	231%
Operational EBITA	1,163	1,183	1,075	(2)%	10%

Orders

In 2022, orders increased 4 percent (11 percent in local currencies) compared to 2021. Strong market activity as well as effective price management offset negative impacts from both exchange rates and the divestment in November 2021 of the Mechanical Power Transmission Division which negatively impacted the growth rate by approximately 9 percent. The Business Area recorded strong double-digit order growth in local currencies across all Divisions and in key customer segments and benefited from strong order growth in the buildings segment (heating, ventilation, air conditioning and refrigeration) as well as in rail, with solid demand recovery and high year-on-year growth in the chemical, and oil and gas segments. Other segments supporting strong order development include metals, pulp and paper, marine and other segments such as power generation (including wind), food and beverage, and mining. The market shift towards carbon reduction, energy efficiency and digitalization continued to support business growth.

The geographic distribution of orders for our Motion Business Area was as follows:

($ in millions)	2022	2021	2020
Europe	2,710	2,617	2,219
The Americas	2,583	2,677	2,276
of which: United States	2,128	2,200	1,897
Asia, Middle East and Africa	2,603	2,322	2,079
of which: China	1,314	1,232	1,077
Total	**7,896**	**7,616**	**6,574**

In 2022, orders increased 4 percent (18 percent in local currencies) in Europe as orders increased across the region particularly in Turkiye, Italy, Sweden, Germany, France and Poland. In Asia, Middle East and Africa, orders increased 12 percent (18 percent in local currencies) driven by growth in India, China and Australia. In the Americas, orders decreased 4 percent (2 percent in local currencies) reflecting the impact of the divestment of the Mechanical Power Transmission Division, which operated principally in the United States.

Order backlog

Order backlog in 2022 increased 26 percent (33 percent in local currencies) compared to 2021 reaching $4.7 billion. Order backlog increased across all Divisions and was driven mainly by the large orders received in the long-cycle business. Additionally, supply chain constraints impacted customer deliveries, particularly in the short-cycle business, further adding to the order backlog.

Revenues

In 2022, revenues declined 3 percent (up 5 percent in local currencies) compared to 2021, negatively impacted by approximately 9 percent by the divestment of the Mechanical Power Transmission Division in November 2021. The growth in the other Divisions was supported by strong demand and solid price management particularly in the products business.

The geographic distribution of revenues for our Motion Business Area was as follows:

($ in millions)	2022	2021	2020
Europe	2,271	2,258	2,196
The Americas	2,208	2,396	2,225
of which: United States	1,823	1,974	1,867
Asia, Middle East and Africa	2,266	2,271	1,988
of which: China	1,245	1,256	1,040
Total	**6,745**	**6,925**	**6,409**

In 2022, revenues in Europe increased 1 percent (16 percent in local currencies) compared to 2021. Revenue increases in local currencies were driven by Turkiye, Germany, the United Kingdom, Finland and Italy while sales volumes declined in Poland, Switzerland and Austria. In Asia, Middle East and Africa revenues were flat (up 6 percent in local currencies) as revenue growth in India and China was partly offset by declines in Australia and Japan. In the Americas, revenues decreased 8 percent (7 percent in local currencies) impacted by the divestment of the Mechanical Power Transmission Division, which was partially offset by growth in the U.S., particularly in the book-and-bill business in the NEMA Motors Division.

Income from operations

In 2022, income from operations declined 67 percent compared to 2021 as the previous year included a gain of $2,195 million on the sale of the Mechanical Power Transmission Division. Excluding this gain, income from operations increased 1 percent as higher volume in 2022 offset the impact of the divestment. The higher revenues reflected strong demand and active price management during 2022 which more than offset increasing commodities and freight expenses and other cost inflation. Profitability was also supported by continued cost discipline, focus on operational performance and a positive divisional mix. Changes in foreign currencies, including the impacts from FX/commodity timing differences summarized in the table below, negatively impacted income from operations by approximately 4 percent.

Operational EBITA

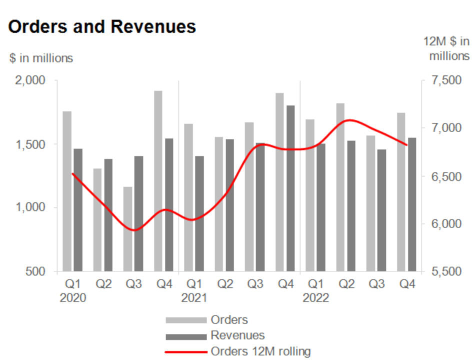
The reconciliation of Income from operations to Operational EBITA for the Motion Business Area was as follows:

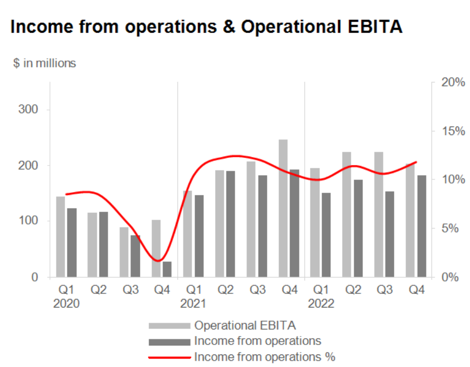
($ in millions)	2022	2021	2020
Income from operations	**1,092**	**3,276**	**989**
Acquisition-related amortization	31	43	52
Restructuring, related and implementation costs	16	22	44
Gains and losses from sale of businesses	8	(2,196)	—
Acquisition- and divestment-related expenses and integration costs	15	26	—
Certain other non-operational items	—	1	17
FX/commodity timing differences in income from operations	1	11	(27)
Operational EBITA	**1,163**	**1,183**	**1,075**

In 2022, Operational EBITA decreased 2 percent (increased 6 percent excluding the impact from changes in foreign currency exchange rates) compared to 2021, primarily due to the reasons described under “Income from operations”, excluding the explanations related to the reconciling items in the table above.

Process Automation Business Area

The financial results of our Process Automation Business Area were as follows:





				% Change	
($ in millions)	2022	2021	2020	2022	2021
Orders	6,825	6,779	6,144	1%	10%
Order backlog at December 31,	6,229	6,079	5,805	2%	5%
Revenues	6,044	6,259	5,792	(3)%	8%
Income from operations	663	713	344	(7)%	107%
Operational EBITA	848	801	451	6%	78%

Orders

In 2022, orders increased 1 percent (8 percent in local currencies) compared to 2021. Order growth was impacted approximately 3 percent due to the spin-off of the Turbocharging Division. Orders grew in all Divisions and were especially strong in the Measurement & Analytics and Process Industries Divisions. Strong demand was seen for the product, systems and service businesses and supported by most customer segments. Demand was particularly strong in sectors such as chemicals and refining, with positive developments also recorded in the areas of mining, metals, and oil and gas, including the liquefied natural gas sector. Customer activities increased in power generation, pulp and paper, and ports segments, whereas demand in marine was lower. Customer interest was high in the hydrogen segment, which remains a small but growing part of the business.

The geographic distribution of orders for our Process Automation Business Area was as follows:

($ in millions)	2022	2021	2020
Europe	2,361	2,614	2,365
The Americas	1,994	1,645	1,360
of which: United States	1,201	1,047	770
Asia, Middle East and Africa	2,470	2,520	2,419
of which: China	748	821	590
Total	**6,825**	**6,779**	**6,144**

Orders in Europe decreased 10 percent (increased 2 percent in local currencies). In local currencies and excluding the impact of the spin-off of the Turbocharging Division, orders increased in Poland, Norway, the Netherlands and the United Kingdom while orders decreased in Russia where the ABB Group is winding down remaining business activities and Germany where a customer bankruptcy resulted in an order reversal of approximately $170 million. Orders in Asia, Middle East and Africa decreased 2 percent (increased 5 percent in local currencies). Higher orders in India, South Korea, Singapore and Saudi Arabia were partly offset by lower order volumes in China and Australia both of which had a higher order intake in 2021. In the Americas, orders increased 21 percent (23 percent in local currencies) supported by strong demand in the U.S., Canada, Argentina and Brazil.

Order backlog

In 2022, order backlog increased 2 percent (8 percent in local currencies) compared to 2021. Order backlog increased in all Divisions due to strong order intake during 2022.

Revenues

In 2022, revenues decreased 3 percent (increased 4 percent in local currencies) compared to 2021 due to foreign currency translation and the impact from the spin-off of the Turbocharging Division business. Revenues increased in all Divisions, reflecting strong execution of the order backlog in the long-cycle businesses and strong underlying demand that was partially held back by challenges from supply chain constraints which hampered customer deliveries.

The geographic distribution of revenues for our Process Automation Business Area was as follows:

($ in millions)	2022	2021	2020
Europe	2,266	2,439	2,395
The Americas	1,569	1,439	1,329
of which: United States	943	836	808
Asia, Middle East and Africa	2,209	2,381	2,068
of which: China	668	742	629
Total	**6,044**	**6,259**	**5,792**

In 2022, revenues were 7 percent lower (1 percent in local currencies) in Asia, Middle East and Africa, 9 percent higher (11 percent in local currencies) in the Americas and 7 percent lower (5 percent higher in local currencies) in Europe compared to 2021. In Asia, Middle East and Africa, revenues were higher in India and Australia but declined in China, Singapore and South Korea. In the Americas, revenue growth was driven by the U.S. and Argentina while revenues in Brazil were steady. Growth in Europe was reported in key markets including Italy, Germany, France, Norway and the United Kingdom.

Income from operations

In 2022, income from operations decreased 7 percent compared to 2021 driven largely by unfavorable foreign currency exchange changes and the impact of the spin-off of the Turbocharging Division. Excluding these impacts, all Divisions reported higher operating income. In local currencies, income growth was driven by higher revenue volumes, operational improvements in project execution, a favorable business mix and discipline in cost controls. The impact from inflation on costs was offset by pricing actions taken to secure gross margin levels, mainly in the short-cycle business. Changes in foreign currencies, including the effect from changes in the FX/commodity timing differences summarized in the table below, negatively impacted income from operations by approximately 10 percent.

Operational EBITA

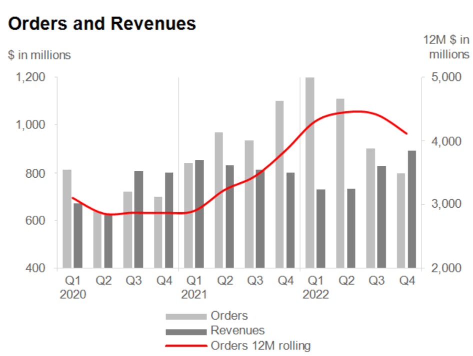
The reconciliation of Income from operations to Operational EBITA for the Process Automation Business Area was as follows:

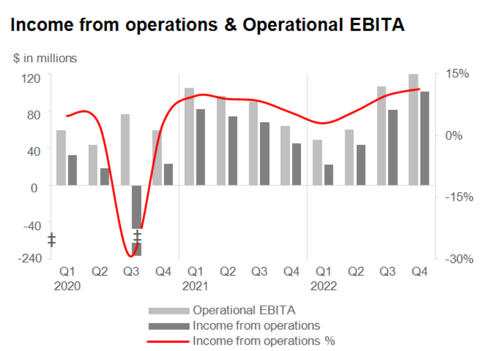
($ in millions)	2022	2021	2020
Income from operations	**663**	**713**	**344**
Acquisition-related amortization	4	5	4
Restructuring, related and implementation costs	29	48	125
Gains and losses from sale of businesses	—	(13)	—
Acquisition- and divestment-related expenses and integration costs	134	35	2
Certain other non-operational items	—	1	1
FX/commodity timing differences in income from operations	18	12	(25)
Operational EBITA	**848**	**801**	**451**

In 2022, Operational EBITA increased 6 percent (15 percent excluding the impact from changes in foreign currency exchange rates) compared to 2021, primarily due to the reasons described under “Income from operations”, excluding the explanations related to the reconciling items in the table above.

Robotics & Discrete Automation Business Area

The financial results of our Robotics & Discrete Automation Business Area were as follows:





($ in millions)	2022	2021	2020	% Change 2022	% Change 2021
Orders	4,116	3,844	2,868	7%	34%
Order backlog at December 31,	2,679	1,919	1,403	40%	37%
Revenues	3,181	3,297	2,907	(4)%	13%
Income (loss) from operations	247	269	(163)	(8)%	n.a.
Operational EBITA	340	355	237	(4)%	50%

Orders

In 2022, orders increased 7 percent (16 percent in local currencies). Both the Robotics and the Machine Automation Divisions contributed to the robust order growth driven by positive developments in both volumes and pricing, reflecting strong demand across all regions and most of the customer segments. In the automotive sector, demand was particularly driven by EV investments. Strength was also noted in the automotive-related sectors, general industry, machine builders and electronics market sectors. In addition to strong underlying market demand, the order intake was also supported by customers placing orders early in an effort to secure deliveries in an environment with a generally tight supply chain, especially earlier in the year. As supply chain constraints progressively eased over the year, customer order patterns tended to normalize.

The geographic distribution of orders for our Robotics & Discrete Automation Business Area was as follows:

($ in millions)	2022	2021	2020
Europe	2,043	1,978	1,424
The Americas	609	530	388
of which: United States	404	371	277
Asia, Middle East and Africa	1,464	1,336	1,056
of which: China	1,151	976	781
Total	**4,116**	**3,844**	**2,868**

In 2022, orders increased in all regions. Orders in Europe increased 3 percent (16 percent in local currencies) driven by increased demand, mainly in Germany. Orders in the Americas increased 15 percent (15 percent in local currencies) compared to 2021, driven by strong order intake in the U.S. in the Robotics Division. Orders in Asia, Middle East and Africa increased 10 percent (15 percent in local currencies) with strong demand in the Robotics Division in China.

Order backlog

In 2022, order backlog increased 40 percent (49 percent in local currencies) compared to 2021. Order backlog increased in both Divisions. The order backlog benefited from strong order intake, despite our selectivity of orders in the automotive EV segment and also reflected customer deliveries being hampered by material shortages, transportation constraints as well as pandemic-related production pressures in some local markets.

Revenues

In 2022, revenues decreased 4 percent (increased 5 percent in local currencies) compared to 2021. Revenues increased in both Divisions due to higher volumes from book-and-bill business and price increases to compensate for higher input expenses. However, growth in the first half of the year was hindered by component shortages (primarily related to semiconductors) and logistic challenges. Additionally, the COVID-19 related shutdown of the robotics factory in Shanghai, China, in April, with the subsequent gradual ramp up of production during May, had a significant impact on customer deliveries in the second quarter. Service revenues also increased, driven by strong demand from all industry segments.

The geographic distribution of revenues for our Robotics & Discrete Automation Business Area was as follows:

($ in millions)	2022	2021	2020
Europe	1,498	1,582	1,481
The Americas	525	441	389
of which: United States	374	309	273
Asia, Middle East and Africa	1,158	1,274	1,037
of which: China	898	950	719
Total	**3,181**	**3,297**	**2,907**

Revenues from Asia, Middle East and Africa decreased 9 percent (decreased 4 percent in local currencies) compared to 2021 due to the impact from the factory shutdown in Shanghai, China, described above. Revenues in Europe decreased 5 percent (increased 8 percent in local currencies) with Austria, Italy and the Czech Republic performing strongly while revenues declined in the United Kingdom. In the Americas, revenues increased 19 percent (increased 19 percent in local currencies) due to strong demand in both Divisions in the U.S. and in the Robotics Division in Brazil, following the recovery from the lower levels in 2021.

Income (loss) from operations

In 2022, the Business Area recorded income from operations of $247 million compared to $269 million in 2021, with both Divisions contributing to the higher income level. The operational performance in 2022 reflected improved sales volumes, price increases, a favorable change in the revenue mix, and the benefit of cost reduction measures taken in the second half of 2022. These positive drivers were partially offset by widespread inflationary cost pressures in 2022 as well as under absorption of fixed costs due to volumes being hampered by component shortages, particularly in the first half of the year. Changes in foreign currencies, including the impacts from FX/commodity timing differences summarized in the table below, negatively impacted income from operations by approximately 14 percent.

Operational EBITA

The reconciliation of Income (loss) from operations to Operational EBITA for the Robotics & Discrete Automation Business Area was as follows:

($ in millions)	2022	2021	2020
Income (loss) from operations	**247**	**269**	**(163)**
Acquisition-related amortization	78	83	78
Restructuring, related and implementation costs	11	7	26
Changes in pre-acquisition estimates	(1)	—	—
Favorable resolution of an uncertain purchase price adjustment	(15)	—	—
Acquisition- and divestment-related expenses and integration costs	6	1	—
Impairment of goodwill	—	—	290
Certain other non-operational items	8	—	5
FX/commodity timing differences in income from operations	6	(5)	1
Operational EBITA	**340**	**355**	**237**

In 2022, Operational EBITA decreased 4 percent (increased 8 percent excluding the impact from changes in foreign currency exchange rates) compared to 2021, primarily due to the reasons described under “Income (loss) from operations”, excluding the explanations related to the reconciling items in the table above.

Corporate and Other

Net loss from operations for Corporate and Other was as follows:

($ in millions)	2022	2021	2020
Corporate headquarters and stewardship	(430)	(399)	(334)
Regulatory penalty in connection with Kusile project	(313)	—	—
Loss from equity-accounted companies	(101)	(102)	(68)
Other corporate costs	(25)	(29)	(65)
Corporate brand income from Hitachi Energy	57	89	60
Net gain (loss) from sale of businesses(1)	43	(3)	2
Corporate real estate	66	41	54
Restructuring costs in Corporate	—	(5)	(46)
Fair value adjustment on equity securities	(4)	94	71
OS implementation costs	—	—	(24)
Digital program costs	—	—	(45)
Corporate research and development	—	—	(49)
Costs for divestment of Power Grids	—	—	(86)
Stranded corporate costs	—	—	(40)
Divested businesses and other non-core activities	(117)	(67)	(342)
Total Corporate and Other	**(824)**	**(381)**	**(912)**

(1) Includes gain on sale of the remaining 19.9 percent investment in Hitachi Energy Ltd.

In 2022, the net loss from operations within Corporate and Other increased by $443 million to $824 million compared to 2021. This increase was driven by costs associated with regulatory penalties assessed in connection with the Kusile project, restructuring expenses in connection with the exit of the full train retrofit business and lower gains for fair value adjustments on equity investments. Partly offsetting these negative impacts was the reversal of a provision that we had previously recorded related to one of our divested businesses and the gain in December 2022 from the sale of the remaining 19.9 percent of Hitachi Energy to Hitachi.

Corporate

In 2022, Corporate headquarters and stewardship costs increased by $31 million, mainly due to higher external consulting costs as part of the implementation of the ABB Way operating model. Excluding this, Corporate headquarters and stewardship costs were lower, supported by lower costs especially in the corporate legal function.

During 2022, we did not have any significant revaluations of equity investments while in 2021 we recognized gains of $94 million for investments in our corporate equity ventures portfolio.

Corporate brand income results from the granting of use of the ABB Brand to Hitachi Energy, the fair value of which was initially determined on the date of the divestment of the former Power Grids business in 2020. A portion of the proceeds received for the sale was allocated to the fair value of the granting of the use of the brand and is being amortized over the expected period of benefit received by Hitachi Energy.

Corporate real estate primarily includes income and expenses from property rentals and gains from the sale of real estate properties. In 2022, income from operations in corporate real estate included gains from the sale of real estate properties of approximately $73 million compared to $22 million in 2021.

Other corporate costs consists of operational costs of our Corporate Treasury Operations and other minor items including changes of the elimination related to internal profit of inventory.

Other - Divested businesses and other non-core activities

The results of operations for certain divested businesses and other non-core activities are presented in Corporate and Other. Divested businesses include the high-voltage cables business, steel structures business and the oil & gas EPC business. Other continuing non-core activities include the execution and wind-down of certain legacy EPC and other contracts.

In 2022 and 2021, the amounts represent charges and losses relating to divested businesses and the winding down of the remaining EPC projects. In 2022, we recorded a restructuring expense of $195 million in connection with the exit of the full train retrofit business primarily for contract settlement costs. This was offset in part by the reversal of a provision of $61 million that we had previously recorded related to one of our divested businesses based on a settlement proposal issued by the ruling court. In 2021, we recorded losses of $67 million which were mostly related to the full train retrofit business but also related to legacy EPC projects and the divested oil & gas EPC business.

At December 31, 2022, our remaining non-core activities primarily include the completion of the remaining EPC contracts for substations and oil & gas.

Liquidity and capital resources

Principal sources of funding

We meet our liquidity needs principally using cash from operations, proceeds from the issuance of debt instruments (bonds and commercial paper), and short-term bank borrowings. In 2022, we also received significant funds from the sale of our remaining investment in Hitachi Energy which was sold in December 2022.

Our net debt/cash is shown in the table below:

December 31, ($ in millions)	2022	2021
Short-term debt and current maturities of long-term debt	2,535	1,384
Long-term debt	5,143	4,177
Cash and equivalents	(4,156)	(4,159)
Restricted cash - current	(18)	(30)
Marketable securities and short-term investments	(725)	(1,170)
Restricted cash - non-current	—	(300)
Net debt (cash) (defined as the sum of the above lines)	**2,779**	**(98)**

During 2022, cash generation from operating activities was lower than in 2021 while we increased our total cash payments to shareholders in the form of dividends and purchases of treasury stock. These factors were the primary contributors to the change in net debt as presented in the table above.

During 2022, we changed from a net cash position of $98 million at December 31, 2021, to a net debt position of $2,779 million at December 31, 2022. The effect of the exchange rate movements reduced net debt by approximately $30 million. In 2022, we received net proceeds of $1,552 million for the sale of our remaining investment in Hitachi Energy. We generated cash flows from operating activities during 2022 of $1,287 million and sold treasury stock in relation to our employee share plans for $394 million. We also issued shares in our subsidiary ABB E-Mobility to third parties in private placements for $216 million. These items were more than offset by amounts for purchases of treasury shares of $3,553 million, including $2,891 million relating to the announced buybacks of our shares, as well as $1,698 million for the payment of the dividend to our shareholders. We made net purchases of property, plant and equipment and intangible assets of $635 million and made payments of dividends to noncontrolling shareholders totaling $99 million. See “Financial position”, “Investing activities” and “Financing activities” for further details.

Our Corporate Treasury Operations is responsible for providing a range of treasury management services to our group companies, including investing cash in excess of current business requirements. At December 31, 2022 and 2021, the proportion of our aggregate “Cash and equivalents” (including restricted cash) and “Marketable securities and short-term investments” managed by our Corporate Treasury Operations amounted to approximately 51 percent and 44 percent, respectively.

Our investment strategy for cash (in excess of current business requirements) has generally been to invest in short-term time deposits with maturities of less than 3 months, supplemented at times by investments in money market funds, and in some cases, government securities. We actively monitor credit risk in our investment and derivative portfolios. Credit risk exposures are controlled in accordance with policies approved by our senior management to identify, measure, monitor and control credit risks. We have minimum rating requirements for our counterparts and closely monitor developments in the credit markets making appropriate changes to our investment policy as deemed necessary. In addition to minimum rating criteria, we have strict investment parameters and specific approved instruments as well as restrictions on the types of investments we make. These parameters are closely monitored on an ongoing basis and amended as we consider necessary.

Our cash is held in various currencies around the world. Approximately 41 percent of our cash and equivalents held at December 31, 2022, was in U.S. dollars, while the most significant foreign currencies in which cash and equivalents was held was euros (21 percent) and Indian rupees (10 percent).

We believe the ongoing cash flows generated from our business, supplemented, when necessary, through access to the capital markets (including short-term commercial paper) and our credit facilities are sufficient to support business operations, capital expenditures, business acquisitions, the payment of dividends to shareholders and contributions to pension plans. Consequently, we believe that our ability to obtain funding from these sources will continue to provide the cash flows necessary to satisfy our working capital and capital expenditure requirements, as well as meet our debt repayments and other financial commitments for the next 12 months. See “Contractual obligations and commitments”.

Due to the nature of our operations, including the timing of annual incentive payments to employees, our cash flow from operations generally tends to be weaker in the first half of the year than in the second half of the year.

Debt and interest rates

Total outstanding debt was as follows:

December 31, ($ in millions)	2022	2021
Short-term debt and current maturities of long-term debt	2,535	1,384
Long-term debt:		
Bonds	4,944	3,984
Other long-term debt	199	193
Total debt	**7,678**	**5,561**

The increase in short-term debt in 2022 was due primarily to the increase in commercial paper outstanding offset partially by a reduction in Current maturities of long-term debt.

At December 31, 2022, Long-term debt was $966 million higher compared to the end of 2021 due to the issuance of five new instruments which remain classified as Long-term debt at December 31, 2022 (EUR 700 million 0.625% Instruments due 2024, EUR 500 million floating rate Instruments due 2024, CHF 150 million 2.1% Bonds due 2025, CHF 425 million 0.75% Bonds due 2027 and CHF 150 million 2.375% Bonds due 2030) offset partially by the reclassification to current of the EUR 700 million 0.625% Instruments, due 2023. The increase in interest rates also resulted in a reduction in our long-term debt of approximately $200 million due to the application of fair value hedge accounting on certain outstanding instruments.

Our debt has been obtained in a range of currencies and maturities and with various interest rate terms. For certain of our debt obligations, we use derivatives to manage the fixed interest rate exposure. For example, we use interest rate swaps and cross-currency interest rate swaps to effectively convert fixed rate debt into floating rate liabilities. After considering the effects of interest rate swaps and cross-currency interest rate swaps, at December 31, 2022, the effective average interest rate on our floating rate long-term debt (including current maturities) of $3,459 million and our fixed rate long-term debt (including current maturities) of $2,771 million was 2.8 percent and 2.2 percent, respectively. This compares with an effective rate of 0.3 percent for floating rate long-term debt of $3,598 million and 3.1 percent for fixed rate long-term debt of $1,885 million at December 31, 2021.

For a discussion of our use of derivatives to modify the interest characteristics of certain of our individual bond issuances, see “Note 12 - Debt” to our Consolidated Financial Statements.

Credit facility

In December 2019, we replaced our previous multicurrency revolving credit facility with a new $2 billion multicurrency revolving credit facility, maturing in 2024. In 2021 we exercised our option to further extend the maturity to 2026. No amount was drawn under the facility at December 31, 2022 and 2021. The facility is available for general corporate purposes and contains cross-default clauses whereby an event of default would occur if we were to default on indebtedness, as defined in the facility, at or above a specified threshold.

The credit facility does not contain financial covenants that would restrict our ability to pay dividends or raise additional funds in the capital markets. For further details of the credit facility, see “Note 12 - Debt” to our Consolidated Financial Statements.

Commercial paper

At December 31, 2022, we had two commercial paper programs in place:

- a $2 billion commercial paper program for the private placement of U.S. dollar denominated commercial paper in the United States, and
- a $2 billion Euro-commercial paper program for the issuance of commercial paper in a variety of currencies.

At December 31, 2022 and 2021, there was no amount outstanding under the $2 billion program in the United States.

At December 31, 2022, $1,383 million was outstanding under the $2 billion Euro-commercial paper program. There was no amount outstanding at December 31, 2021.

European program for the issuance of debt

The European program for the issuance of debt allows the issuance of up to the equivalent of $8 billion in certain debt instruments. The terms of the program do not obligate any third party to extend credit to us and the terms and possibility of issuing any debt under the program are determined with respect to, and as of the date of issuance of, each debt instrument. At December 31, 2022, five bonds (principal amount of EUR 700 million, due in 2023, principal amount of EUR 700 million, due in 2024, principal amount of EUR 500 million, due in 2024, principal amount of EUR 750 million, due in 2024, and principal amount of EUR 800 million, due in 2030) having a combined carrying amount of $3,444 million were outstanding under the program. The carrying amount of the three bonds outstanding under the program at December 31, 2021, was $2,522 million.

Credit ratings

Credit ratings are assessments by the rating agencies of the credit risk associated with ABB and are based on information provided by us or other sources that the rating agencies consider reliable. Higher ratings generally result in lower borrowing costs and increased access to capital markets. Our ratings are of “investment grade” which is defined as Baa3 (or above) from Moody’s and BBB– (or above) from Standard & Poor’s.

At December 31, 2022 and 2021, our long-term debt was rated A3 by Moody’s and currently with a Stable outlook. At December 31, 2022 and 2021, our long-term debt was rated A- by Standard & Poor’s and currently with a Stable outlook.

Limitations on transfers of funds

Currency and other local regulatory limitations related to the transfer of funds exist in a number of countries where we operate or otherwise have bank deposits, including: China, Egypt, India, Malaysia, the Russian Federation, South Africa, South Korea, Taiwan (Chinese Taipei), Thailand, Turkiye and Vietnam. Funds, other than regular dividends, fees or loan repayments, cannot be readily transferred offshore from these countries and are therefore deposited and used for working capital needs in those countries. In addition, there are certain countries where, for tax reasons, it is not considered optimal to transfer the cash offshore. As a consequence, these funds are not available within our Corporate Treasury Operations to meet short-term cash obligations outside the relevant country. The above described funds are reported as cash in our Consolidated Balance Sheets, but we do not consider these funds immediately available for the repayment of debt outside the respective countries where the cash is situated, including those described above. At December 31, 2022 and 2021, the balance of “Cash and equivalents” and “Marketable securities and other short-term investments” under such limitations (either regulatory or sub-optimal from a tax perspective) totaled approximately $1,381 million and $2,074 million, respectively.

During 2022, we continued to direct our subsidiaries in countries with restrictions to place such cash with our core banks or investment grade banks, in order to minimize credit risk on such cash positions. We continue to closely monitor the situation to ensure bank counterparty risks are minimized.

Financial position

Balance sheets

December 31, ($ in millions)	2022	2021	% Change
Current assets			
Cash and equivalents	4,156	4,159	0%
Restricted cash	18	30	(40)%
Marketable securities and short-term investments	725	1,170	(38)%
Receivables, net	6,858	6,551	5%
Contract assets	954	990	(4)%
Inventories, net	6,028	4,880	24%
Prepaid expenses	230	206	12%
Other current assets	505	573	(12)%
Current assets held for sale and in discontinued operations	96	136	(29)%
Total current assets	**19,570**	**18,695**	**5%**

For a discussion on Cash and equivalents, see sections “Liquidity and Capital Resources—Principal sources of funding” and “Cash flows” for further details.

Marketable securities and short-term investments decreased in 2022. The change primarily reflects lower amounts placed in bank time deposits and a reduction in amounts placed in money market funds classified as equity securities (see “Note 5 - Cash and equivalents, marketable securities and short-term investments” to our Consolidated Financial Statements).

Receivables, net, increased 5 percent (12 percent in local currencies) reflecting the higher revenues (due to both higher business volumes and higher prices) at the end of 2022 compared to 2021. Receivables also decreased 3 percent due to the spin-off of the Turbocharging Division.

Contract assets decreased 4 percent (increased 2 percent in local currencies). Contract assets decreased 2 percent due to the spin-off of the Turbocharging Division with the remaining local currency increase of 4 percent reflecting higher levels of business activity at the end of 2022 compared to 2021.

Inventories, net, increased 24 percent (32 percent in local currencies) and were significantly higher in all inventory categories. A portion of this increase reflects higher business activities at the end of 2022 compared to 2021 as well as higher inventories in order to fulfil the higher order backlog. We also had a significant build-up in the amount of raw materials as well as cost increases for materials. Supply chain challenges and shortages in the availability of some items have created the need for our businesses to stockpile certain key components. These challenges have also resulted in some delays in completing and delivering finished goods. The impact of the spin-off of the Turbocharging Division was a reduction of Inventories, net, of 3 percent.

Current assets held for sale and in discontinued operations decreased to $96 million from $136 million. These amounts primarily relate to working capital for certain contracts relating to the former Power Grids business which remain with ABB and are being executed over time for the direct benefit of Hitachi Energy. For the details of the assets of the Power Grids business see “Note 3 - Discontinued operations” to our Consolidated Financial Statements.

December 31, ($ in millions)	2022	2021	% Change
Current liabilities			
Accounts payable, trade	4,904	4,921	0%
Contract liabilities	2,216	1,894	17%
Short-term debt and current maturities of long-term debt	2,535	1,384	83%
Current operating leases	220	230	(4)%
Provisions for warranties	1,028	1,005	2%
Other provisions	1,171	1,386	(16)%
Other current liabilities	4,323	4,367	(1)%
Current liabilities held for sale and in discontinued operations	132	381	(65)%
Total current liabilities	**16,529**	**15,568**	**6%**

Accounts payable, trade, remained flat (increase 6 percent in local currencies) while the spin-off of the Turbocharging Division reduced the balance by 2 percent. The local currency increase reflects higher inventory purchases but the increase was muted as payment terms with suppliers have become somewhat less favorable in a constrained supply chain environment.

Contract liabilities increased 17 percent (increased 24 percent in local currency) reflecting higher levels of business activity at the end of 2022 compared to 2021. The spin-off of the Turbocharging Division reduced the amount by 1 percent.

The increase in short-term debt and current maturities of long-term debt in 2022 was due to an increase of commercial paper borrowings under the Euro-commercial paper program and the reclassification to current of the EUR 700 million 0.625% Instruments, due 2023, offset partially by the repayment at maturity of the USD 1,250 million 2.875% Notes, due 2022.

Current operating leases includes the portion of the operating lease liabilities that are due to be paid in the next 12 months. For a summary of operating lease liabilities, see “Note 14 - Leases” to our Consolidated Financial Statements.

Provisions for warranties increased 2 percent (7 percent in local currencies). The spin-off of the Turbocharging Division reduced the amount by 2 percent. The local currency increase reflects the higher provisioning in 2022 on increased revenues as well as increases in expected costs for certain newer product lines. For details on the change in the Provisions for warranties, see “Note 15 - Commitments and contingencies” to our Consolidated Financial Statements.

Current liabilities held for sale and in discontinued operations decreased to $132 million from $381 million. The decrease included the settlement of $136 million for certain indemnification guarantees which were provided in connection with the original sale of the Power Grids business to Hitachi. The remaining amounts primarily relate to certain working capital balances of the former Power Grids business as described above.

December 31, ($ in millions)	**2022**	**2021**	**% Change**
Non-current assets			
Restricted cash, non-current	—	300	(100)%
Property, plant and equipment, net	3,911	4,045	(3)%
Operating lease right-of-use assets	841	895	(6)%
Investments in equity-accounted companies	130	1,670	(92)%
Prepaid pension and other employee benefits	916	892	3%
Intangible assets, net	1,406	1,561	(10)%
Goodwill	10,511	10,482	0%
Deferred taxes	1,396	1,177	19%
Other non-current assets	467	543	(14)%
Total non-current assets	**19,578**	**21,565**	**(9)%**

The non-current Restricted cash at December 31, 2021, related to certain amounts received on the initial sale of the Power Grids business in 2020 which were placed in escrow, pending resolution of certain of our contractual obligations to Hitachi. See “Note 3 - Discontinued operations” to our Consolidated Financial Statements. In connection with the sale of the remaining ownership in Hitachi Energy to Hitachi in December 2022, the restrictions on the bank account where this cash was deposited were removed.

In 2022, Property, plant and equipment, net, decreased 3 percent (increased 2 percent in local currencies). The spin-off of the Turbocharging Division reduced this balance by 4 percent.

In 2022, Goodwill remained flat (increased 2 percent in local currencies). The local currency increase primarily reflects the purchase of In-Charge.

Intangible assets, net, decreased 10 percent (8 percent in local currencies). Acquisitions of businesses, primarily In-Charge, increased Intangible assets, net, by 5 percent. For additional information on goodwill and intangible assets see “Note 11 - Goodwill and intangible assets” to our Consolidated Financial Statements.

The balance for Investment in equity-accounted companies at December 31, 2021, primarily represented our remaining 19.9 percent interest in the Hitachi Energy joint venture. We sold this remaining interest in December 2022. For additional information on investments in equity-accounted companies see “Note 4 - Acquisitions, divestments and equity-accounted companies” to our Consolidated Financial Statements.

Prepaid pension and other employee benefits increased 3 percent (6 percent in local currencies). The spin-off of the Turbocharging Division reduced this balance by 10 percent. For additional information on Pension and employee benefits see “Note 17 - Employee benefits” to our Consolidated Financial Statements.

In 2022, Deferred taxes increased 19 percent (26 percent in local currencies). For details on deferred tax assets see “Note 16 - Income taxes” to our Consolidated Financial Statements.

December 31, ($ in millions)	2022	2021	% Change
Non-current liabilities			
Long-term debt	5,143	4,177	23%
Non-current operating leases	651	689	(6)%
Pension and other employee benefits	719	1,025	(30)%
Deferred taxes	729	685	6%
Other non-current liabilities	2,085	2,116	(1)%
Non-current liabilities held for sale and in discontinued operations	20	43	(53)%
Total non-current liabilities	**9,347**	**8,735**	**7%**

Long-term debt increased 23 percent. The balance at December 31, 2022, includes five instruments newly issued in 2022: i) EUR 700 million 0.625% Instruments due 2024, ii) EUR 500 million floating rate Instruments due 2024, iii) CHF 150 million 2.1% Bonds due 2025, iv) CHF 425 million 0.75% Bonds due 2027 and v) CHF 150 million 2.375% Bonds due 2030. This was partially offset by the reclassification to current of the EUR 700 million 0.625% Instruments, due 2023, as well as a reduction of 5 percent in reported amounts due to fair value hedge accounting adjustments. Foreign currency movements also reduced the balance by 3 percent over the year. For additional information on Long-term debt, see “Liquidity and Capital Resources—Debt and interest rates” as well as “Note 12 - Debt” to our Consolidated Financial Statements.

Non-current operating leases includes the portion of the operating lease liabilities that are due to be paid in more than 12 months.

Pension and employee benefits decreased 30 percent (26 percent in local currencies). For additional information on Pension and employee benefits see “Note 17 - Employee benefits” to our Consolidated Financial Statements.

For a breakdown of Other non-current liabilities, see “Note 13 - Other provisions, other current liabilities and other non-current liabilities” to our Consolidated Financial Statements.

Non-current liabilities held for sale and in discontinued operations relate to the sale in 2020 of the Power Grids business. For the details of the liabilities of the Power Grids business see “Note 3 - Discontinued operations” to our Consolidated Financial Statements.

Cash flows

The Consolidated Statements of Cash Flows are shown on a continuing operations basis, with the effects of discontinued operations shown in aggregate for each major cash flow activity and also include the impact from changes in restricted cash.

The Consolidated Statements of Cash Flows can be summarized as follows:

($ in millions)	2022	2021	2020
Net cash provided by operating activities	1,287	3,330	1,693
Net cash provided by investing activities	981	2,307	6,760
Net cash used in financing activities	(2,394)	(4,968)	(8,175)
Effects of exchange rate changes on cash and equivalents	(189)	(81)	79
Net change in cash and equivalents and restricted cash	**(315)**	**588**	**357**

Operating activities

($ in millions)	2022	2021	2020
Net income	2,594	4,650	5,205
Loss (income) from discontinued operations, net of tax	43	80	(4,860)
Depreciation and amortization	814	893	915
Total adjustments to reconcile net income to net cash provided by operating activities (excluding depreciation and amortization)	(434)	(2,593)	263
Total changes in operating assets and liabilities	(1,683)	308	352
Net cash provided by operating activities — continuing operations	**1,334**	**3,338**	**1,875**
Net cash used in operating activities — discontinued operations	**(47)**	**(8)**	**(182)**

Cash flows from operating activities in continuing operations in 2022 provided net cash of $1,334 million, a decrease of 60 percent compared to 2021 of which 7 percent was due to movements in exchange rates. In addition, in 2022, we had lower cash effective net income (i.e. net income from continuing operations adjusted for depreciation, amortization and other non-cash items) partially due to costs associated with business transformation activities, higher costs relating to business restructuring and costs for the spin-off of the Turbocharging Division and other business portfolio transactions. In 2022, this reduction was also impacted by payments of approximately $315 million in relation to regulatory penalties for the Kusile project.

In 2022, an increase in both business volumes and inflation-driven cost and price changes resulted in growth in our working capital. Changes in operating assets and liabilities reflected a high buildup of inventory with a less favorable timing of inventory payments, an increase in amounts receivable from customers as well as the timing of payments for accrued liabilities, including higher employee bonuses paid in 2022 compared to 2021. Cash paid for income taxes decreased to $1,188 million from $1,292 million, reflecting the higher current income taxes in 2021, including tax impacts from the sales of businesses. In 2022 and 2021, there were no significant cash flows from operating activities of discontinued operations.

Investing activities

($ in millions)	2022	2021	2020
Purchases of investments	(321)	(1,528)	(5,933)
Purchases of property, plant and equipment and intangible assets	(762)	(820)	(694)
Acquisition of businesses (net of cash acquired) and increases in cost- and equity-accounted companies	(288)	(241)	(121)
Proceeds from sales of investments	697	2,272	4,341
Proceeds from maturity of investments	73	81	11
Proceeds from sales of property, plant and equipment	127	93	114
Proceeds from sales of businesses (net of transaction costs and cash disposed) and cost- and equity-accounted companies	1,541	2,958	(136)
Net cash from settlement of foreign currency derivatives	(166)	(121)	138
Changes in loans receivable, net	320	(19)	(3)
Other investing activities	(14)	(4)	11
Net cash provided by (used in) investing activities — continuing operations	**1,207**	**2,671**	**(2,272)**
Net cash provided by (used in) investing activities — discontinued operations	**(226)**	**(364)**	**9,032**

Net cash provided by investing activities for continuing operations in 2022 was $1,207 million compared to $2,671 million during 2021, a decrease of $1,464 million. In 2022, we received net proceeds in connection with the sale of our remaining equity-method investment in Hitachi Energy of $1,552 million. In addition, included in Changes in loans receivable, net, are funds collected from a subsidiary of Accelleron in October 2022, related to a short-term intercompany loan granted in anticipation of the Turbocharging Division spin off. In 2021, we received proceeds of $2,958 million in connection with sales of businesses, primarily from the sale of the Dodge business.

The following presents purchases of property, plant and equipment and intangible assets by significant asset category:

($ in millions)	2022	2021	2020
Construction in progress	540	479	493
Purchase of machinery and equipment	127	150	134
Purchase of land and buildings	26	158	17
Purchase of intangible assets	69	33	50
Purchases of property, plant and equipment and intangible assets	**762**	**820**	**694**

Cash expenditures for acquisitions of businesses in 2022 primarily reflects the amount paid to acquire In-Charge while the amount in 2021 primarily reflects the acquisition of ASTI.

Cash flows used in investing activities for discontinued operations includes amounts relating to the original sale of the Power Grids business to Hitachi. We sold this business in 2020 and reported net cash proceeds of $9,168 million in that year. Certain amounts related to the purchase price were subject to adjustment, including the final settlement for working capital balances as well as other payments which were contractually due to be transferred to Hitachi in periods after the initial sale. In 2022 and 2021, these uncertain elements of the purchase price, including the original indemnification guarantees, were finalized and we made payments related to the purchase price and certain other obligations totaling $227 million and $364 million, respectively.

Financing activities

($ in millions)	2022	2021	2020
Net changes in debt with maturities of 90 days or less	1,366	(83)	(587)
Increase in debt	3,849	1,400	343
Repayment of debt	(2,703)	(1,538)	(3,459)
Delivery of shares	394	826	412
Purchase of treasury stock	(3,553)	(3,708)	(3,048)
Dividends paid	(1,698)	(1,726)	(1,736)
Cash associated with the spin-off of the Turbocharging Division	(172)	—	—
Dividends paid to noncontrolling shareholders	(99)	(98)	(82)
Proceeds from issuance of subsidiary shares	216	—	—
Other financing activities	6	(41)	(49)
Net cash used in financing activities — continuing operations	**(2,394)**	**(4,968)**	**(8,206)**
Net cash provided by financing activities — discontinued operations	**—**	**—**	**31**

Our financing cash flow activities primarily include debt transactions (both from the issuance of debt securities and borrowings directly from banks), share transactions (including share transactions in consolidated subsidiaries) and payments of distributions to controlling and noncontrolling shareholders. In 2022, we also distributed cash as part of the spin-off of the Turbocharging Division.

In 2022, the net inflow for debt with maturities of 90 days or less related to net borrowings of amounts outstanding under the Euro-commercial paper program and various local country borrowings.

In 2022, "Increase in debt" primarily represents initial borrowings for terms longer than 90 days under the Euro-commercial paper program of $1,425 million and borrowings under the following six long-term debt transactions (total cashflow amount at date of borrowings of $2,390 million):

- CHF 275 million 0% Bonds due 2023
- EUR 700 million 0.625% Instruments due 2024
- EUR 500 million floating rate Instruments due 2024
- CHF 150 million 2.1% Bonds due 2025
- CHF 425 million 0.75% Bonds due 2027
- CHF 150 million 2.375% Bonds due 2030

In 2022, "Repayment of debt" includes the repayment at maturity of the USD 1,250 million Notes and repayments of $1,345 million under the Euro-commercial paper program for borrowings having terms longer than 90 days.

"Delivery of shares" in 2022 primarily reflects cash received from the exercise of options in connection with our Management Incentive Plan (resulting in a delivery of 16 million shares). All shares were delivered out of Treasury stock.

“Proceeds from issuance of subsidiary shares” in 2022 relates to the sale of shares by ABB E-mobility Holdings Ltd through a private placement of $216 million.

In 2022, “Purchase of treasury stock” reflects $2,891 million of cash payments to purchase 91 million of our own shares in connection with the announced share buyback programs. It also reflects $662 million paid to purchase 20 million shares on the open market during the year.

“Cash associated with the spin-off of the Turbocharging Division” represents the amount of cash and cash equivalents which were directly owned by the entities in the spin-off of the Turbocharging Division at the date of the spin-off.

Contractual obligations and commitments

The contractual obligations presented in the table below represent our estimates of future payments under fixed contractual obligations and commitments. These amounts may differ from those reported in our Consolidated Balance Sheet at December 31, 2022. Changes in our business needs, cancellation provisions and changes in interest rates, as well as actions by third parties and other factors, may cause these estimates to change. Therefore, our actual payments in future periods may vary from those presented below. The table below summarizes certain of our cash requirements for known contractual obligations and principal and interest payments under our debt instruments and purchase obligations at December 31, 2022, and the timing thereof. For details of future operating and finance lease payments, see “Note 14 - Leases” to our Consolidated Financial Statements.

At December 31, 2022 ($ in millions)	Current	Non-current	Total
Long-term debt obligations	1,058	5,235	6,293
Interest payments related to long-term debt obligations	70	629	699
Purchase obligations	3,519	949	4,468
Total	**4,647**	**6,813**	**11,460**

In the table above, the “Long-term debt obligations” reflect the cash amounts to be repaid upon maturity of those debt obligations. The cash obligations above will differ from Long-term debt due to the impacts of fair value hedge accounting adjustments and premiums or discounts on certain debt.

We have determined the interest payments related to long-term debt obligations by reference to the payments due under the terms of our debt obligations at the time such obligations were incurred. However, we use interest rate swaps to modify the interest characteristics of certain of our debt obligations. The net effect of these swaps may increase or decrease the actual amount of our cash interest payment obligations, which may differ from those stated in the above table. For further details on our debt obligations and the related hedges, see “Note 12 - Debt” to our Consolidated Financial Statements.

Purchase obligations are defined as agreements to purchase goods and services that are enforceable and legally binding, that specify all significant terms, including the quantities to be purchased, price provisions and the approximate timing of the transactions. Purchase obligations includes procurement contracts for raw materials, sub-contracted work, supplies and services. Purchase obligations include amounts recorded as well as amounts that are not recorded in the Consolidated Balance Sheets.

Off-balance sheet arrangements

Commercial commitments

We disclose the maximum potential exposure of certain guarantees, as well as possible recourse provisions that may allow us to recover from third parties amounts paid out under such guarantees. The maximum potential exposure does not allow any discounting of our assessment of actual exposure under the guarantees. The information below reflects our maximum potential exposure under the guarantees, which is higher than our assessment of the expected exposure.

Guarantees

The following table provides quantitative data regarding our third-party guarantees. The maximum potential payments represent a worst-case scenario, and do not reflect our expected outcomes.

	Maximum potential payments(1)	
December 31, ($ in millions)	**2022**	**2021**
Performance guarantees	4,300	4,540
Financial guarantees	96	52
Indemnification guarantees(2)	—	136
Total	**4,396**	**4,728**

(1) Maximum potential payments include amounts in both continuing and discontinued operations.
(2) Certain indemnifications provided to Hitachi in connection with the divestment of Power Grids were without limit.

The carrying amount of liabilities recorded in the Consolidated Balance Sheets reflects our best estimate of future payments, which we may incur as part of fulfilling our guarantee obligations. In respect of the above guarantees, the carrying amounts of liabilities at December 31, 2022 and 2021, amounted to $1 million and $156 million, respectively, the majority of which in 2021 is included in discontinued operations.

In addition, in the normal course of bidding for and executing certain projects, we have entered into standby letters of credit, bid/performance bonds and surety bonds (collectively “performance bonds”) with various financial institutions. Customers can draw on such performance bonds in the event that we do not fulfill our contractual obligations. We would then have an obligation to reimburse the financial institution for amounts paid under the performance bonds. At December 31, 2022 and 2021, the total outstanding performance bonds aggregated to $2.9 billion and $3.6 billion, respectively; of each of these amounts, $0.1 billion relates to discontinued operations. There have been no significant amounts reimbursed to financial institutions under these types of arrangements in 2022 and 2021.

For additional descriptions of our performance, financial and indemnification guarantees see “Note 15 - Commitments and contingencies” to our Consolidated Financial Statements.