

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

Form 10-K

- ☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2021
OR
☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from ____ to ____
Commission file number: 1-3247

CORNING INCORPORATED

(Exact name of registrant as specified in its charter)

New York
(State or other jurisdiction of incorporation or organization)

16-0393470
(I.R.S. Employer Identification No.)

One Riverfront Plaza, Corning, New York
(Address of principal executive offices)

14831
(Zip Code)

607-974-9000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock	GLW	New York Stock Exchange (NYSE)

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ☒ No ☐

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act.

Yes ☐ No ☒

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days.

Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files.)

Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Emerging growth company	<input type="checkbox"/>
Smaller reporting company	<input type="checkbox"/>		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes ☐ No ☒

As of June 30, 2021, the aggregate market value of the registrant's common stock held by non-affiliates of the registrant was \$35 billion based on the \$40.90 closing price as reported on the New York Stock Exchange.

There were 845,849,498 shares of Corning's common stock issued and outstanding as of January 31, 2022.

DOCUMENTS INCORPORATED BY REFERENCE

Part III of this Annual Report on Form 10-K will be incorporated by reference from certain portions of the definitive Proxy Statement for the Registrant's 2022 Annual Meeting of Stockholders, which definitive Proxy Statement will be filed with the Securities and Exchange Commission pursuant to Regulation 14A or will be included in an amendment to this Report.

PART I

Corning Incorporated and its consolidated subsidiaries are hereinafter sometimes referred to as the “Company,” the “Registrant,” “Corning,” “we,” “our,” or “us.”

This report contains forward-looking statements that involve a number of risks and uncertainties. These statements relate to plans, objectives, expectations and estimates and may contain words such as “believes,” “expects,” “anticipates,” “estimates,” “forecasts,” or similar expressions. Actual results could differ materially from what is expressed or forecasted in forward-looking statements. Some of the factors that could contribute to these differences include those discussed under “Forward-Looking Statements,” “Risk Factors,” “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” and elsewhere in this report.

Item 1. Business

General

Corning traces its origins to a glass business established in 1851. The present corporation was incorporated in the State of New York in December 1936. The Company’s name was changed from Corning Glass Works to Corning Incorporated on April 28, 1989.

Corning Incorporated is a leading innovator in materials science. For 170 years, Corning has combined its unparalleled expertise in glass science, ceramic science, and optical physics with deep manufacturing and engineering capabilities to develop category-defining products that transform industries and enhance people’s lives. We succeed through sustained investment in research and development, a unique combination of material and process innovation, and deep, trust-based relationships with customers who are global leaders in their industries.

Corning’s capabilities are versatile and synergistic, allowing the Company to evolve to meet changing market needs, while also helping customers capture new opportunities in dynamic industries. Today, Corning’s markets include optical communications, mobile consumer electronics, display technology, automotive emissions control, laboratory products and other glass products. Corning’s industry-leading products include damage-resistant cover glass for mobile devices; precision glass for advanced displays; optical fiber and cable, wireless technologies, and connectivity solutions for state-of-the-art communications networks; trusted products to accelerate drug discovery and delivery; and clean-air technologies for cars and trucks.

Corning operates in five reportable segments: Display Technologies, Optical Communications, Specialty Materials, Environmental Technologies and Life Sciences, and manufactures products at 119 plants in 15 countries.

Display Technologies Segment

Corning’s Display Technologies segment manufactures glass substrates for flat panel displays, including liquid crystal displays (“LCDs”) and organic light-emitting diodes (“OLEDs”) that are used primarily in televisions, notebook computers, desktop monitors, tablets and handheld devices. This segment develops, manufactures, and supplies high quality glass substrates using technology expertise and a proprietary fusion manufacturing process, which Corning invented and is the cornerstone of the Company’s technology leadership in the display glass industry. Our highly automated process yields glass substrates with a pristine surface and excellent thermal stability and dimensional uniformity – essential attributes in the production of large, high-performance display panels. Corning’s fusion process is scalable and we believe it is the most cost-effective process in producing large size substrates.

We are recognized as a world leader in precision glass innovations that enable our customers to produce larger, thinner, more flexible, and higher-resolution displays. Some of the product innovations we have launched over the past ten years utilizing our world-class processes and capabilities include the following:

- Corning® EAGLE XG® Slim Glass, Corning's flagship glass product enabling thinner televisions and monitors with larger-sized screens; it is trusted by the world's leading panel makers for LCD displays with more than 35 billion square feet sold;
- Corning Astra® Glass, an innovative glass solution designed to meet the emerging needs for high-resolution displays. This glass is designed for oxide backplanes, but enables a range of applications made using traditional aluminosilicate to specific low temperature polysilicon processes;
- Corning Lotus™ NXT Glass, a high-performance display glass designed to withstand high-temperature processing requirements enabling highest-resolution displays in smaller and flexible devices; and
- The world's first Gen 10 and Gen 10.5 glass substrate sizes in support of improved efficiency in manufacturing large-sized displays.

Corning has display glass manufacturing operations in China, South Korea, Japan and Taiwan, and services its glass customers in all regions, utilizing its manufacturing facilities throughout Asia.

Patent protection and proprietary trade secrets are important to the Display Technologies segment's operations. Refer to the material under the heading "Patents and Trademarks" for information relating to patents and trademarks.

The Display Technologies segment represented 26% of Corning's consolidated net sales in 2021.

Optical Communications Segment

Corning invented the world's first low-loss optical fiber in 1970. Since that milestone, we have continued to pioneer optical fiber, cable and connectivity solutions. As global demand driven by video usage grows exponentially, telecommunications networks continue to migrate from copper to optical-based systems that can deliver the required cost-effective capacity. Our experience puts us in a unique position to design and deliver optical solutions that reach every edge of the communications network.

This segment is divided into two main product groupings – carrier network and enterprise network. The carrier network group consists primarily of products and solutions for optical-based communications infrastructure for services such as video, data and voice communications. The enterprise network group consists primarily of optical-based communication networks sold to businesses, governments and individuals for their own use.

Our carrier network product portfolio encompasses an array of optical fiber products, including Vascade® optical fibers for use in submarine networks; LEAF® optical fiber for long-haul, regional and metropolitan networks; SMF-28® ULL and TFX® fiber for more scalable long-haul and regional networks; SMF-28e+™ single-mode optical fiber providing additional transmission wavelengths in metropolitan and access networks, and ClearCurve® ultra-bendable single-mode fiber for use in multiple-dwelling units and fiber-to-the-home applications. For high performance across the range of long-haul, metro, access, and fiber-to-the-home network applications, SMF-28® Ultra and SMF-28® Contour fibers deliver industry-leading attenuation, compatibility, and improved macrobend performance in one fiber. A portion of our optical fiber is sold directly to end users and third-party cabling globally. Corning's remaining fiber production is cabled internally and sold to end users as either bulk cable or as part of an integrated optical solution. Corning's cable products, including the RocketRibbon® and miniXtend® portfolios, support various outdoor, indoor/outdoor and indoor applications and include a broad range of loose tube, ribbon and drop cable designs with flame-retardant versions available for indoor and indoor/outdoor use including 5G networks.

In addition to optical fiber and cable, our carrier network product portfolio also includes hardware and equipment products, including cable assemblies, fiber-optic hardware, fiber-optic connectors, optical components and couplers, closures, network interface devices, and other accessories. These products may be sold as individual components or as part of integrated optical connectivity solutions designed for various carrier network applications. Examples of these solutions include our Evolv™ platform, which provides pre-connectorized solutions for cost-effectively deploying fiber-to-the-home and 5G networks; and the Centrix platform, which provides a fiber management system with industry-leading density and innovative jumper routing that can be deployed in a wide variety of carrier switching centers.

In addition to our optical-based portfolio, Corning's carrier network portfolio also contains select copper-based products including subscriber demarcation, connection and protection devices, xDSL (different variations of digital subscriber lines) passive solutions and outside plant enclosures.

Our enterprise network portfolio leverages optical fiber products, including ClearCurve® ultra-bendable multimode fiber for private and hyperscale data centers and other enterprise network applications.

Corning's hardware and equipment for enterprise network applications include cable assemblies, fiber-optic hardware, fiber-optic connectors, optical components and couplers, closures and other accessories. These products may be sold as individual components or as part of integrated optical connectivity solutions designed for various network applications, including hyperscale data centers. Examples of enterprise network solutions include the EDGE® platform, which provides high-density pre-connectorized cabling solutions for data center applications, supporting a path to speeds of 400G and beyond, and Everon™ Network Solutions, which provide next-generation cellular connectivity products for interior spaces of all sizes.

Our optical fiber manufacturing facilities are in North Carolina, China and India, with a new facility in Poland coming online in 2022. Cabling operations are in North Carolina, Poland and smaller regional locations. Our manufacturing operations for hardware and equipment products are in Texas, Mexico, Brazil, Germany, Poland, and China.

Patent protection is important to the segment's operations. The segment has an extensive portfolio of patents relating to its products, technologies and manufacturing processes. The segment licenses certain of its patents to third parties and generates revenue from these licenses, although the royalty income is not currently material to this segment's operating results. Corning is licensed to use certain patents owned by others, which are considered important to the segment's operations. Refer to the material under the heading "Patents and Trademarks" for information relating to the Company's patents and trademarks.

The Optical Communications segment represented 31% of Corning's consolidated net sales in 2021.

Specialty Materials Segment

The Specialty Materials segment manufactures products that provide more than 150 material formulations for glass, glass ceramics, and crystals, as well as precision metrology instruments and software to meet requirements for unique customer needs. Consequently, this segment operates in a wide variety of commercial and industrial markets including materials optimized for mobile consumer electronics, semiconductor equipment optics and consumables, aerospace and defense optics, radiation shielding products, sunglasses, and telecommunications components.

Our highly durable glass, known as Corning® Gorilla® Glass, is a chemically strengthened thin glass designed specifically to function as a cover, or back-enclosure glass, for mobile consumer electronic devices such as mobile phones, tablets, laptops and smartwatches. Elegant and lightweight, Corning® Gorilla® Glass is durable enough to resist many real-world events that commonly cause wear or scratch damage and glass failure, while providing optical clarity, touch sensitivity, and RF transparency, thus enabling exciting new applications in technology and design. In 2020, Corning unveiled its toughest Gorilla Glass yet, Corning® Gorilla® Glass Victus®, which significantly improves both drop and scratch performance, addressing consumer demand for improved durability. Corning® Gorilla® Glass is manufactured in the United States ("U.S."), South Korea and Taiwan.

In 2020, Corning invented the world's first transparent, color-free glass-ceramic suitable for smartphone applications, which is featured as "Ceramic Shield" on the front cover of the latest iPhone models. Apple and Corning partnered to develop and scale the manufacturing of Ceramic Shield, which offers unparalleled durability and toughness.

Corning's semiconductor optics include high-performance optical materials including Corning® HPFS® Fused Silica and Corning® ULE® Ultra-Low Expansion Glass, optical-based metrology instruments, and custom optical assemblies for applications in the global semiconductor industry. Corning's semiconductor optics products are manufactured in New York.

Corning also manufactures ultra-flat, ultra-thin glass wafers and substrates for a variety of applications including augmented reality, advanced semiconductor packaging, 3D sensing, and more. These products are manufactured in New York, France, and China.

Other specialty glass products include tinted sunglasses and radiation shielding products that are made in France.

Patent protection is important to the segment's operations. The segment has a growing portfolio of patents relating to its products, technologies and manufacturing processes. Brand recognition and loyalty, through well-known trademarks, are important to the segment. Refer to the material under the heading "Patents and Trademarks" for information relating to the Company's patents and trademarks.

The Specialty Materials segment represented 14% of Corning's consolidated net sales in 2021.

Environmental Technologies Segment

Corning's Environmental Technologies segment manufactures ceramic substrates and filter products for emissions control in mobile applications around the world. In the early 1970s, Corning developed an economical, high-performance cellular ceramic substrate that is now the standard for catalytic converters in vehicles worldwide. As global emissions control regulations tighten, Corning has continued to develop more effective and durable ceramic substrate and filter products for gasoline and diesel applications, most recently launching low-mass Corning® FLORA® substrates and Corning® DuraTrap® GC gasoline particulate filters. Corning manufactures substrate and filter products in New York, Virginia, China, Germany and South Africa. Corning sells its ceramic substrate and filter products worldwide to catalyzers and manufacturers of emission control systems who then sell to automotive and diesel vehicle or engine manufacturers. Although most sales are made to the emission control systems manufacturers, the use of Corning substrates and filters is generally required by the specifications of the automotive and diesel vehicle or engine manufacturers.

Patent protection is important to the segment's operations. The segment has an extensive portfolio of patents relating to its products, technologies and manufacturing processes. Corning is licensed to use certain patents owned by others, which are also considered important to the segment's operations. Refer to the material under the heading "Patents and Trademarks" for information relating to the Company's patents and trademarks.

The Environmental Technologies segment represented 11% of Corning's consolidated net sales in 2021.

Life Sciences Segment

As a leading developer, manufacturer and global supplier of laboratory products for over 105 years, Corning's Life Sciences segment works with researchers and drug manufacturers seeking to drive innovation, increase efficiencies, reduce costs and compress timelines. Using unique expertise in the fields of materials science, polymer surface science, cell culture and cell biology, the segment provides innovative solutions that improve productivity and enable breakthrough research for traditional small molecule, or chemical, drugs, biologics, vaccines, and emerging cell and gene therapies.

Life Sciences products include consumables, such as plastic vessels, liquid handling plastics, specialty surfaces, cell culture media and serum, as well as general labware and equipment. These products are used for drug discovery research and development, compound screening and toxicology testing, advanced cell culture research, genomics applications and mass production of cells for clinical trials and bioproduction.

Corning sells life sciences products under these primary brands: Corning, Falcon, PYREX and Axygen. The products are marketed globally, primarily through distributors, to pharmaceutical and biotechnology companies, contract manufacturing organizations, central testing labs, academic institutions, hospitals, government entities, and other facilities. Corning manufactures these products in California, Illinois, Maine, Massachusetts, New York, North Carolina, Utah, Virginia, China, France, Mexico and Poland.

Patent protection is important to the segment's operations. The segment has a growing portfolio of patents relating to its products, technologies and manufacturing processes. Brand recognition and loyalty, through well-known trademarks, are important to the segment. Refer to the material under the heading "Patents and Trademarks" for more information.

The Life Sciences segment represented 9% of Corning's consolidated net sales in 2021.

All Other

All other businesses that do not meet the quantitative threshold for separate reporting have been grouped as “All Other.” The Company obtained a controlling interest in Hemlock Semiconductor Group (“HSG”) during the third quarter of 2020 and has consolidated results in “All Other” beginning on September 9, 2020. This group is comprised of the results of HSG, the pharmaceutical technologies business, auto glass, new product lines and development projects, as well as other businesses and certain corporate investments.

Refer to Note 3 (Investments) and Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for additional information on this transaction.

“All Other” represented 9% of Corning’s consolidated net sales in 2021.

Additional explanation regarding Corning and its five reportable segments, as well as financial information about geographic areas, is presented in Management’s Discussion and Analysis of Financial Condition and Results of Operations and Note 20 (Reportable Segments) to the consolidated financial statements.

Competition

Corning competes with many large and varied manufacturers, both domestic and foreign. Some of these competitors are larger than Corning, and some have broader product lines. Corning strives to maintain and improve its market position through technology and product innovation. For the foreseeable future, Corning believes its competitive advantage lies in its commitment to research and development, deep customer relationships, reliability of supply, product quality, superior customer service and technical specification of its products. There is no assurance that Corning will be able to maintain or improve its market position or competitive advantage.

Display Technologies Segment

Corning is the largest worldwide producer of glass substrates for flat panel display glass. The environment for high-performance display glass substrate products is very competitive and Corning believes it has maintained its competitive advantages by investing in new products, continually improving its proprietary fusion manufacturing process and providing a consistent and reliable supply of high quality products. Our process allows us to deliver glass that is larger, thinner and lighter, with exceptional surface quality and without heavy metals. AGC Inc. and Nippon Electric Glass Co., Ltd. are Corning’s principal competitors in display glass substrates.

Optical Communications Segment

Corning believes it maintains a leadership position in the segment’s principal product groups, which include carrier and enterprise networks. The competitive landscape includes industry consolidation, pricing pressure and competition for the innovation of new products. These competitive conditions are likely to persist. Corning believes its large-scale manufacturing experience, fiber process, technology leadership and intellectual property provide cost advantages relative to several of its competitors. The primary competitors of the Optical Communications segment are CommScope Inc. and Prysmian Group S.p.A.

Specialty Materials Segment

Corning has deep capabilities in materials science, optical design, shaping, coating, finishing, metrology, and optical system assembly. Our products and capabilities in this segment position the Company to meet the needs of a broad array of markets, including semiconductor, aerospace, defense, industrial, commercial, and telecommunications. Schott AG, AGC Inc., Nippon Electric Glass Co., Ltd. and Heraeus are the main competitors for this segment.

Environmental Technologies Segment

Corning believes it maintains a strong position in the worldwide market for automotive ceramic substrate and filter products, as well as in the heavy-duty and light-duty diesel vehicle markets. The Company believes its competitive advantage in automotive ceramic substrate products for catalytic converters and filter products for particulate emissions in exhaust systems is based on an advantaged product portfolio, collaborative engineering design services, customer service and support, strategic global presence and continued product innovation. Corning’s Environmental Technologies products face principal competition from NGK Insulators, Ltd. and Ibiden Co., Ltd.

Life Sciences Segment

Corning seeks to maintain a competitive advantage by emphasizing product quality, global distribution, supply chain efficiency, a broad product line and superior product attributes. Our principal competitors include Thermo Fisher Scientific, Inc., Greiner AG, Eppendorf AG, Sarstedt AG and Danaher Corporation. Corning also faces competition from large distributors that have pursued backward integration or introduced private label products.

Raw Materials

Corning's manufacturing processes and products require access to uninterrupted power sources, significant quantities of industrial water, certain precious metals and various batch materials. Availability of resources (ores, minerals, polymers, helium and processed chemicals) required in manufacturing operations, appear to be adequate. From time to time, Corning's suppliers may experience capacity limitations in their own operations or may eliminate certain product lines. Corning believes it has adequate programs to ensure a reliable supply of raw and batch materials, as well as precious metals. For many of its materials, Corning has alternate suppliers that would allow operations to continue without interruption in the event of specific materials shortages.

Certain key materials and proprietary equipment used in the manufacturing of products are currently sole-sourced or available only from a limited number of suppliers. To minimize this risk, Corning closely monitors raw materials and equipment with limited availability or sole-sourced suppliers. However, any future difficulty in obtaining sufficient and timely delivery, or inflationary pricing, of components and/or raw materials could result in lost sales due to delays or reductions in product shipments, or reductions in Corning's gross margins.

Patents and Trademarks

Inventions by members of Corning's research and engineering staff continue to be important to the Company's growth. Patents have been granted on many of these inventions in the U.S. and other countries. Some of these patents have been licensed to other manufacturers. Many of our earlier patents have now expired, but Corning continues to seek and obtain patents protecting its innovations. In 2021, Corning was granted about 420 patents in the U.S. and over 1,600 patents in countries outside the U.S.

Each business segment possesses a patent portfolio that provides certain competitive advantages in protecting Corning's innovations. Corning has historically enforced, and will continue to enforce, its intellectual property rights. At the end of 2021, Corning and its wholly owned subsidiaries owned about 12,150 unexpired patents in various countries of which about 4,350 were U.S. patents. Between 2022 and 2024, approximately 625 (5%) of these worldwide patents will expire, while at the same time Corning intends to seek patents protecting its newer innovations. Worldwide, Corning has about 9,050 patent applications in process, with about 2,150 in process in the U.S. Corning believes that its patent portfolio will continue to provide a competitive advantage in protecting the Company's innovation, although Corning's competitors in each of its businesses are actively seeking patent protection as well.

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While each of our reportable segments has numerous patents in various countries, no one patent is considered material to any of these segments. Important U.S.-issued patents in our reportable segments include the following:

- Display Technologies: patents relating to glass compositions and methods for the use and manufacture of glass substrates for display applications.
- Optical Communications: patents relating to (i) multimode and single mode optical fiber products including low-loss optical fiber, large effective area optical fiber, and other high data rate optical fiber, and processes and equipment for manufacturing optical fiber, including methods for making optical fiber preforms and methods for drawing, cooling and winding optical fiber; (ii) optical fiber ribbons and methods for making such ribbon, indoor and outdoor fiber optic cable products and methods for making and installing optical fiber cable; (iii) optical fiber connectors and factory-terminated assemblies, hardware, termination and storage and associated methods of manufacture; and (iv) optical fiber and hybrid fiber-coax wireless communication systems.
- Specialty Materials: patents relating to protective cover glass materials and coatings, ophthalmic glasses and polarizing dyes, and semiconductor/microlithography optics and blanks, metrology instrumentation and laser/precision optics, glass polarizers, specialty fiber, and refractories.
- Environmental Technologies: patents relating to cellular ceramic honeycomb products, together with ceramic batch and binder system compositions, honeycomb extrusion and firing processes, and honeycomb extrusion dies and equipment for the high-volume, low-cost manufacture of such products.
- Life Sciences: patents relating to methods and apparatus for the manufacture and use of scientific laboratory equipment including multiwell plates and cell culture products, as well as equipment and processes for cell and gene therapy research.

Approximate number of patents granted to our reportable segments are as follows:

	Number of patents worldwide	U.S. patents	Important U.S. patents expiring between 2022 and 2024
Display Technologies	1,176	165	3
Optical Communications	4,562	2,110	33
Specialty Materials	2,399	743	5
Environmental Technologies	1,050	362	10
Life Sciences	567	173	1

Many of the Company's patents are used in operations or are licensed for use by others, and Corning is licensed to use patents owned by others. Corning has entered into cross-licensing arrangements with some major competitors, but the scope of such licenses has been limited to specific product areas or technologies.

Corning's principle trademarks include the following: Axygen, Celcor, ClearCurve, Corning, DuraTrap, Eagle XG, Edge8, Falcon, Gorilla, Guardiant, HPFS, Leaf, PYREX, RocketRibbon, SMF-28e, Steuben, UniCam, Valor, Velocity, and Victus.

Protection of the Environment

Corning has an extensive program to ensure that its facilities comply with state, federal and foreign pollution-control regulations. This program has resulted in capital and operating expenditures each year. To maintain compliance with such regulations, capital expenditures for pollution control in operations were approximately \$18.4 million in 2021 and are estimated to be \$23.3 million in 2022.

Corning's 2021 consolidated operating results were charged with approximately \$54.9 million for depreciation, maintenance, waste disposal and other operating expenses associated with pollution control.

Human Capital Management Overview

At Corning, we are proud of the life-changing innovations we bring to the world. Our unparalleled expertise in our core technologies along with deep manufacturing and engineering capabilities require a talent strategy focused on attracting and retaining exceptional people, fostering a culture that enables innovation and collaboration and supporting long and successful careers.

Each of our 61,200 full- and part-time employees in 44 countries make an important contribution, whether in one of our manufacturing or processing facilities, research labs, sales offices or other facilities. Approximately 68% of our employees are production and maintenance and an estimated 66% are represented by a union or works council. Our global workforce is concentrated in North America, the Asia Pacific region and EMEA.

Values

Corning is guided by an enduring set of Values that defines our relationship with employees, customers, and our communities: Quality, Integrity, Performance, Leadership, Innovation, Independence and the Individual. Our Values are the key to our business success, a source of pride and excitement for our employees, and the factor that ultimately sets us apart from our competitors. In short, we believe that how we do things is as important as what we do. We measure how we live our Values through the annual Corporate Values Survey. We use the results to see what actions can be taken toward better achievement of the Values. Corning employees all contribute to the success of the Company by living our Values—all seven, all the time, all around the world.

Diversity, Equity and Inclusion

We are focused on leveraging globally diverse teams and creating an inclusive environment for all employees. Our global workforce is comprised of 61% men and 39% women. In all regions of the world, we are continuing to invest in building our pipeline of female and underrepresented talent through targeted recruitment efforts, mentoring and coaching programs, networking opportunities, personalized development plans and proactive career management. As a result of these efforts, we have made significant diversity gains within our leadership teams. Since 2010, gender and ethnic diversity among members of the Corporate Management Group, which includes about 230 of the Company's top global leaders, increased from 28% to 50%; corporate officer diverse representation has increased from 21% to 38%.

In 2021, as planned, we achieved 100% pay equity for all salaried men and women in our worldwide operations and we continued to maintain pay equity across minority groups compared with white salaried employees in the U.S. We furthered our longstanding commitment to diversity, equity and inclusion in 2020 by creating the Office of Racial Equality and Social Unity (ORESU) to further our goal of a more equitable and inclusive culture at Corning and beyond. The efforts of this office have not only impacted policies, practices, communications, and our corporate culture, but have championed diversity and inclusion in the communities in which our employees live and work. Since its creation, in addition to launching enterprise-wide Unconscious Bias training and entering a \$5.5 million strategic partnership with North Carolina A&T University, ORESU is also engaging with local communities to enhance public safety and create places where students of color can thrive.

Corning proudly sponsors 16 different Employee Resource Groups ("ERGs") with 59 chapters worldwide. They represent employees who are women, Black, Asian, Latino, Native American, people with disabilities, members of the LGBTQ+ community, and veterans, among others. The ERGs are vital in raising awareness, recruiting and retaining diverse talent, and inspiring corporate leadership to adopt new policies, practices, and services.

Talent Management

Each year we formally evaluate the talent implications of our strategic business plans and align our actions and objectives accordingly. As businesses grow organically or through acquisition, we create human capital objectives to ensure we have the right people with the right skills in place to deliver that growth. In 2021, as a result of these objectives, our talent processes supported the net addition of approximately 11,100 employees worldwide, with significant growth in all regions.

Corning strives to attract and recruit diverse qualified candidates to maintain our culture of innovation and to foster creativity. We have created a strategic talent pipeline through internships, co-operatives, rotational leadership programs, and partnerships with various universities, including Historically Black Colleges & Universities (HBCUs). In addition, we collaborate with organizations such as the Society of Women Engineers, The Association of Latino Professionals for America, National Society of Black Engineers, National Association of Black Accountants, Out for Undergrad, and military veterans' groups to introduce us to qualified, diverse candidates.

Businesses conduct climate surveys at least every two years, and ad hoc pulse surveys as needed, to measure engagement, satisfaction and alignment with our Values. It is important to Corning that employees develop, grow and are inspired to continue their careers at the Company over the long-term. We offer rich simulations, assessments, and experiences that are digital, classroom, and a blend of both, targeted to all levels in the organization. We provide on-the-job learning experience, mentoring, and career planning to ensure immediate application and lasting impact. Talent retention is an ongoing important focus area which aligns with our strategy of encouraging and supporting longer-term careers with Corning. Historically, our talent retention has been consistently higher than the markets in which we compete for talent. Although 2021 yielded some recruitment and retention challenges primarily in specific locations within our US operations, our talent management approach enabled our HR teams to mobilize quickly with plans in place to address those issues. Salaried talent retention in 2021 was 94%.

At Corning, the health and safety of our workforce is always of paramount consideration. Our safety standards always meet, and often exceed, local regulatory standards. We continue to rank within the top quartile of our ORCHSE Strategies, LLC. (a National Safety Council membership-based workplace safety group) peer group in terms of total recordable incident rate (TRIR) performance with a Company-wide TRIR of just 0.50 in 2021. We promote employee wellbeing through wellness programs which vary by region such as nutrition, mental health, and fitness-related offerings, smoking cessation programs, and smoke free campuses. With the continuation of the pandemic in 2021, we continued our Responsible Corning program with enhanced cleaning, screening, testing and other measures initiated in 2020. In addition, we encouraged COVID vaccinations and boosters among our employees and in the communities in which we operate, supplying more than 100,000 vaccines to employees, families and community members in locations such as Reynosa Mexico, Asan Korea and Pune India.

Executive Officers of the Registrant

John P. Bayne, Jr. Senior Vice President & General manager, Mobile Consumer Electronics

Mr. Bayne joined Corning in 1995 as the Fallbrook plant controller, and in 1997 became an international business controller in the Optical Fiber division. From 1999 to 2003 he held a variety of management positions in Photonic Technologies. In 2003 he joined Display Technologies and in 2006, he was named president, Display Technologies, China. In 2009 he became director of strategy, Display Technologies. Beginning in 2012 he was vice president and general manager for High Performance Displays and in 2014 he assumed responsibility for the Advanced Glass Innovations group. In 2015 he was named vice president and general manager of the Gorilla Glass business. He was appointed senior vice president and general manager of Mobile Consumer Electronics in April 2020. Age 56.

Stefan Becker Senior Vice President & Operations Controller

Mr. Becker joined Corning in 2000 through Corning's acquisition of Siemens Communication Cable Division. From 2001, he held positions as manager, Planning and Analysis and later director of Finance, Corning Cable Systems. He joined the Display Technologies division in 2005 as U.S. Controller. In 2007 he was appointed CFO, Corning Display Technologies Taiwan. In 2009 he was named director of Finance, Corning Display Technologies ("CDT") and in 2010 was appointed division controller, CDT. Between 2012 and 2015, he served as international division vice president, Finance, Corning Glass Technologies. He was appointed as Corning's Operations Controller in 2015 and senior vice president in 2019. Age 50.

Michael A. Bell Senior Vice President & General Manager, Optical Communications

Mr. Bell joined Corning in 1991 as a process engineer for the Telecommunications Cable Plant in Hickory, North Carolina. He has held a variety of positions in manufacturing and engineering. He was appointed to CCS Americas Cable Manufacturing Manager in 2004, which expanded to include hardware manufacturing in 2009. In 2012 he was appointed senior vice president and general manager, Optical Connectivity Solutions for Corning Optical Communications. He was appointed senior vice president and general manager, Optical Communications in April 2020. Age 57.

Cheryl C. Capps Senior Vice President and Chief Supply Chain Officer, Global Supply Chain

Ms. Capps joined Corning in 2011 as vice president, procurement and transportation and in 2018 she was appointed as senior vice president, global supply chain. Since joining Corning, Ms. Capps has worked to develop the capabilities within the global supply management function and across the corporation to transform supply chain into a competitive advantage for enabling innovation, growth, and financial success. She has many years of diverse leadership experience in business management, strategic planning, manufacturing, supply chain, quality, research, and development. Ms. Capps was appointed as senior vice president and chief supply chain officer in 2020. Age 60.

Martin J. Curran Executive Vice President and Innovation Officer

Mr. Curran joined Corning in 1984 and has held a variety of roles in finance, manufacturing, and marketing. He has served as senior vice president, general manager for Corning Cable Systems Hardware and Equipment Operations in the Americas, responsible for operations in Hickory, North Carolina; Keller, Texas; Reynosa, Mexico; Shanghai, China; and the Dominican Republic. In 2007, he was appointed as senior vice president and general manager of Corning Optical Fiber. Mr. Curran was appointed as executive vice president and innovation officer in August 2012. Age 63.

Jeffrey W. Evenson Executive Vice President and Chief Strategy Officer

Dr. Evenson joined Corning in 2011 as senior vice president and operations chief of staff. In 2015, he was named chief strategy officer. He was appointed executive vice president in 2018. He oversees corporate strategy, corporate communications, and advanced analytics. Prior to joining Corning, Dr. Evenson was a senior vice president with Sanford C. Bernstein & Co., LLC, where he served as a senior analyst. Before that, Dr. Evenson was a partner at McKinsey & Company, where he led technology and market assessment for early-stage technologies. Age 56.

Li Fang President & General Manager, Corning Greater China

Mr. Fang joined Corning International in 1997 as business development manager, China. In 1999 he transferred to the Environmental Products Division and became production manager of CET's China Plant - Corning (Shanghai) Company Ltd. In July 2004, he was appointed operations manager and in October 2004 he was appointed director of operations and plant manager of Corning (Shanghai) Company Ltd. In 2007, he was appointed vice president, Corning Display Technologies China, and director of commercial operations, government affairs and supply chain. In 2009 he was named president, Corning Display Technologies China. He was appointed president and general manager of Corning Greater China in 2012. Age 59.

Robert P. France Senior Vice President, Human Resources

Mr. France joined Corning in 2000 as a commercial Human Resources manager for Optical Fiber. He moved to Display Technologies in 2004 as the division Human Resources manager. He was Human Resources director for Corning Glass Technologies and Asia from 2004 to 2016. From 2016 to 2018, Mr. France was Human Resources senior vice president for Corning Optical Communications, responsible for leading all aspects of the Human Resources function across several businesses and had HR Generalist responsibility for the Corning China organization. In 2018 he was appointed as vice president, Human Resources and was appointed senior vice president, Human Resources in 2019. Age 56.

Lawrence D. McRae Vice Chairman and Corporate Development Officer

Mr. McRae joined Corning in 1985 and has held a broad range of leadership positions in various finance, sales, marketing, and general management across Corning's businesses. In 1995 he was appointed vice president of Corning Consumer Products Company and president of Revere Ware Corporation. He then moved to Telecommunications Products, where he served as vice president, Global Development, from 1996 to 2000. He was appointed vice president Corporate Development in 2000 and progressed through a series of senior leadership positions. He has led strategy and corporate development since 2010. He was named vice chairman in 2015 and first vice chairman and corporate development officer in April 2020. Age 63.

David L. Morse Executive Vice President and Chief Technology Officer

Dr. Morse joined Corning in 1976 as a composition scientist in glass research. In 1985, he was named senior research associate, manager of consumer products development in 1987 and director of materials research in 1990. He served in a variety of technology leadership positions in organic materials and telecommunications before joining Corporate Research in 2001. From 2006 to 2012, he served as senior vice president and director, Corporate Research. Dr. Morse was appointed to his current position in 2012. Age 69.

Anne Mullins Senior Vice President & Chief Digital & Information Officer

Ms. Mullins joined Corning as senior vice president & chief digital & information officer in August 2019. In this role, she is responsible for leading the strategic direction of Corning's global information technology function and evolving the Company's digital footprint. Prior to joining Corning, Ms. Mullins served as chief information officer for Lockheed Martin and previously served as Lockheed Martin's chief information security officer. Age 59.

Eric S. Musser President & Chief Operating Officer

Mr. Musser joined Corning in 1986 and served in a variety of manufacturing and general management roles in Corning's Optical Communications businesses. In 2005, he was named vice president and general manager of Optical Fiber. Mr. Musser served as general manager, Corning Greater China from 2007 to 2012 and president of Corning International from 2012 to 2014. In 2014, he was appointed executive vice president, Corning Technologies and International. In April 2020, he was appointed as president & chief operating officer. Age 62.

Avery H. Nelson III Senior Vice President & General Manager, Automotive

Mr. Nelson joined Corning in 1991 as shift supervisor at the Harrodsburg, Kentucky plant and subsequently served in progressive roles in Corning Display Technologies. In 2007, he joined CET as general manager, Corning (Shanghai) Company Limited. In 2009, he became general manager and regional director of China and India, CET. In 2010 he returned to the U.S. as program director, CET. In 2011, he assumed the role of business director, AAA Corning® Gorilla® Glass, New Business Development. Later that year, he was appointed division vice president, Heavy Duty Diesel (HDD). In 2013, he was appointed division vice president and business director. In 2014, he was appointed vice president and general manager for Environmental Technologies. He was appointed to his current position in April 2020. Age 53.

Edward A. Schlesinger Senior Vice President and Corporate Controller

Mr. Schlesinger joined Corning in 2013 as senior vice president and chief financial officer of Corning Optical Communications. He was elected vice president and corporate controller in September 2015 and principal accounting officer in December 2015. He was named senior vice president in February 2019. Prior to joining Corning, Mr. Schlesinger served as Vice President, Finance and Sector Chief Financial Officer for the Climate Solutions Sector for Ingersoll Rand. Mr. Schlesinger has a financial career that spans more than 20 years garnering extensive expertise in accounting, technical financial management and reporting. Age 54.

On December 7, 2021, Corning's Board of Directors appointed Mr. Schlesinger as executive vice president and chief financial officer, effective February 18, 2022.

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Lewis A. Steverson *Executive Vice President and Chief Legal & Administrative Officer*

Mr. Steverson joined Corning in 2013 as senior vice president and general counsel. In 2018 he was named executive vice president and general counsel. Prior to joining Corning, Mr. Steverson served as senior vice president, general counsel, and corporate secretary of Motorola Solutions, Inc. During his 18 years with Motorola, he held a variety of law leadership roles across the company's numerous business units. Prior to Motorola, Mr. Steverson was in private practice at the law firm of Arnold & Porter. He was appointed Executive Vice President and Chief Legal & Administrative Officer in April 2020. Age 58.

R. Tony Tripeny *Executive Vice President and Chief Financial Officer*

Mr. Tripeny joined Corning Cable Systems in 1985 as the corporate accounting manager and became the Keller, Texas facility's plant controller in 1989. In 1993, he was appointed equipment division controller and, in 1996, corporate controller. Mr. Tripeny was appointed chief financial officer of Corning Cable Systems in July 2000 and, in 2003, he took on the additional role of group controller, Telecommunications. He was appointed division vice president, Operations Controller in August 2004, vice president, corporate controller in October 2005, and senior vice president and principal accounting officer in April 2009. Mr. Tripeny was then appointed as Corning's senior vice president and chief financial officer in September 2015. He was appointed executive vice president in 2018. Age 62.

On December 9, 2021, the Company announced that Mr. Tripeny will relinquish the chief financial officer title effective February 18, 2022, as part of his plan to retire in March 2022 after a successful 36-year tenure with Corning.

Ronald L. Verkleeren *Senior Vice President & General Manager, Life Sciences Technologies*

Mr. Verkleeren joined Corning in 2001 in the Optical Communications segment. He joined the Life Sciences segment in 2004 and has held a variety of progressive roles in that segment. In 2010, he was named division vice president and director of Advanced Life Sciences. In 2012 he was named division vice president and program director for Corning Pharmaceutical Technologies. In 2015, he became vice president and general manager of the Pharmaceutical Technologies division. He was elected as senior vice president & general manager, Life Sciences in April 2020. Age 51.

Wendell P. Weeks *Chairman and Chief Executive Officer*

Mr. Weeks joined Corning in 1983 in the finance group. He has held a variety of financial, business development, commercial, and general management roles. He was named vice president and general manager of the Optical Fiber business in 1996 and president of Corning's Optical Communications division in 2001. He became Corning's president and chief operation officer in April 2002. Mr. Weeks has been a member of Corning's Board of Directors since December 2000. He was named chief executive officer in April 2005 and chairman of the board in April 2007. Mr. Weeks is a director of Amazon.com, Inc. Age 62.

John Z. Zhang *Senior Vice President & General Manager, Display Technologies*

Mr. Zhang joined Corning in 2008 as director, corporate development. In 2009, he was appointed director, corporate development Asia Pacific. In 2010, he further expanded his role to lead the strategy & corporate development organization of Corning International. In 2014, he was named deputy general manager, Corning Display Technologies. In 2015, he was elected as senior vice president and general manager, Corning Display Technologies. Age 49.

Document Availability

A copy of Corning's 2021 Annual Report on Form 10-K filed with the Securities and Exchange Commission is available upon written request to Corporate Secretary, Corning Incorporated, One Riverfront Plaza, Corning, NY 14831. The Annual Report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments pursuant to Section 13(a) or 15(d) of the Exchange Act of 1934 and other filings are available as soon as reasonably practicable after such material is electronically filed or furnished to the SEC, and can be accessed electronically free of charge at www.SEC.gov, or through the Investor Relations page on Corning's website at www.corning.com. The information contained on the Company's website is not included in, or incorporated by reference into, this Annual Report on Form 10-K.

Other

Additional information in response to Item 1 is found in Note 20 (Reportable Segments) to the consolidated financial statements.

Item 1A. Risk Factors

We operate in rapidly changing economic, political, and technological environments that present numerous risks. Our operations and financial results are subject to risks and uncertainties, including those described below, that could adversely affect our business, financial condition, results of operations, cash flows, our ability to successfully execute our strategy and the trading price of our common stock or debt. The following discussion identifies the most significant factors that may adversely affect the Company. This information should be read in conjunction with Management's Discussion and Analysis of Financial Conditions and Results of Operations ("MD&A") and the consolidated financial statements and related notes incorporated by reference into this report. The following discussion of risks is not all inclusive but is designed to highlight what we believe are important factors to consider, as these factors could cause our future results to differ from those in our forward-looking statements and from historical trends.

Risks Related to Our Business

The ongoing COVID-19 pandemic has, and may continue to, adversely impact the global economy and disrupt our operations and supply chains, which may have an adverse effect on our results of operations

COVID-19 has impacted and may further impact the global economy and could have additional impacts on economic growth, the proper functioning of financial and capital markets, foreign currency exchange rates, and interest rates. The pandemic has resulted in authorities around the world implementing numerous unprecedented measures such as travel restrictions, quarantines, shelter in place orders, vaccine mandates and facility shutdowns. These measures have impacted, and may continue to impact our workforce, operations and supply chains, and those of our customers, contract manufacturers and suppliers, particularly in the event of a significant global resurgence of the illness. There is considerable uncertainty regarding the duration, scope and severity of the pandemic and the impacts on our business and the global economy from the effects of the ongoing pandemic and response measures.

Inflationary price pressures and uncertain availability of commodities, raw materials, utilities, labor or other inputs used by us and our suppliers, or instability in logistics and related costs, could negatively impact our profitability.

Increases in the price of commodities, raw materials, utilities, labor or other inputs that we or our suppliers use in manufacturing and supplying products, components and parts, along with logistics and other related costs, may lead to higher production and shipping costs for our products, parts, and components. Further, increasing global demand for, and uncertain supply of, such materials could disrupt our or our suppliers' ability to obtain such materials in a timely manner to meet our supply needs and/or could lead to increased costs. Any increase in the cost of inputs to our production could lead to higher costs for our products and could negatively impact our operating results, future profitability and ability to successfully deliver on our strategy. Increasing prices to our customers to offset the impact of higher costs, may cause certain of our customers to push out, cancel or refrain from purchasing our products, which could materially adversely impact demand for our products, and therefore also negatively impact our operating results, future profitability and ability to successfully deliver on our strategy.

Supply chain disruptions, manufacturing interruptions or delays, or the failure to accurately forecast customer demand, could affect our ability to meet customer demand, lead to higher costs, or result in excess or obsolete inventory; if we are unable to obtain the necessary equipment, raw and batch materials, natural resources or utilities required in our products or processes, our business will be negatively impacted

Corning's business relies on its timely supply of materials, equipment, services and related products to meet the changing technical and volume requirements of its customers, which depends in part on the timely delivery of materials, equipment and services, from suppliers and contract manufacturers. Significant and sudden increases in demand for such materials, equipment and services, as well as delays in and unpredictability of shipments due to transportation interruptions, have resulted in, and may continue to result in, a shortage of materials, equipment and services needed to manufacture Corning's products. Such shortages have adversely impacted, and may continue to adversely impact, our suppliers' ability to meet our demand requirements and Corning's manufacturing operations and its ability to meet customer demand. Some key materials, equipment and services are subject to long lead-times or available only from a single supplier or limited group of suppliers. Volatility of demand for manufacturing equipment can increase capital, technical, operational and other risks for Corning and for companies throughout our supply chain, and may cause some suppliers to exit businesses, or scale back or cease operations, which could impact our ability to meet customer demand.

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Our ability to meet customer demand depends, in part, on our ability to obtain timely and adequate delivery of equipment, raw and batch materials, natural resources or utilities, equipment, parts, components and raw materials from our suppliers. We may experience shortages that could adversely affect our operations. Certain manufacturing equipment, components and raw materials are available only from single or limited sources, and we may not be able to find alternate sources in a timely manner. A reduction, interruption or delay of supply, or a significant increase in the price for supplies, such as manufacturing equipment, precious metals, raw materials, utilities including energy and industrial water, could have a material adverse effect on our business.

Corning may also experience significant interruptions of its manufacturing operations, delays in its ability to deliver products or services, increased costs or customer order cancellations as a result of:

- The failure or inability to accurately forecast demand and obtain sufficient quantities of materials, equipment and services on a cost-effective basis;
- Volatility in the availability and cost of materials, equipment and services, including rising prices due to inflation or scarcity of availability;
- Difficulties or delays in obtaining required import or export approvals;
- Shipment delays due to transportation interruptions or capacity constraints;
- A worldwide shortage of semiconductor components as a result of sharp increases in demand for semiconductor products in general;
- Information technology or infrastructure failures, including those of a third-party supplier or service provider; and
- Natural disasters, the impacts of climate change, or other events beyond Corning's control (such as earthquakes, utility interruptions, tsunamis, hurricanes, typhoons, floods, storms or extreme weather conditions, fires, regional economic downturns, regional or global health epidemics, including the ongoing COVID-19 pandemic, geopolitical turmoil, increased trade restrictions between the U.S. and China and other countries, social unrest, political instability, terrorism, or acts of war) in locations where it or its customers or suppliers have manufacturing, research, engineering or other operations.

Corning's Display Technologies segment generates a significant amount of the Company's profits and cash flow; any significant decrease in display glass pricing or market share could have a material and negative impact on our financial results

Corning's ability to generate profits and operating cash flow depends largely on the profitability of our display glass business, which is subject to continuous pricing pressure due to industry competition, potential over-capacity, and development of new technologies. If we are not able to achieve proportionate reductions in costs and/or increases in volume to offset ongoing pricing pressure, it could have a material adverse impact on our financial results.

Because we have a concentrated customer base, future sales and cash flows could be negatively impacted by the actions or loss of one or more key customers

A relatively small number of end customers accounted for a high percentage of our net sales. This concentration subjects us to a variety of risks including:

- The loss or insolvency of one or more of our key customers, could result in a substantial loss of sales and reduction in anticipated cash flows;
- Customers may possess substantial leverage in negotiating contractual obligations, including liability provisions; and
- Mergers and consolidations between customers could result in further concentration of the customer base.

The following table details the number of combined customers of our segments that accounted for a large percentage of segment net sales:

	Number of combined end customers	% of total segment net sales in 2021
Display Technologies	3	55%
Optical Communications	2	27%
Specialty Materials	2	43%
Environmental Technologies	3	77%
Life Sciences	2	40%

Events outside of Corning's control, or those of our contract manufacturers, could cause a disruption to our manufacturing operations and adversely impact our customers, resulting in a negative impact to Corning's net sales, net income, asset values and liquidity

Disruption to our manufacturing operations, or those of our contract manufacturers, could significantly impact Corning's ability to supply its customers and could produce a near-term severe impact on our individual business units and the Company. Given the geographical concentration of certain of the Company's and our contract manufacturers' plants, the highly engineered nature of the facilities and the globally dispersed talent required to run these facilities, any event that adversely affects or restricts movement into or out of a specific geographic area where we, our contract manufacturers, our suppliers, or our customers have a presence, could adversely impact our results. Due to the specialized nature of our products and single-site manufacturing locations, in the event such a location experiences disruption, it we may not be possible to find replacement capacity or substitute production from other facilities.

We may experience difficulties in enforcing our intellectual property rights, which could result in loss of market share, and we may be subject to claims of infringement of the intellectual property rights of others

We rely on patent and trade secret laws, copyright, trademark, confidentiality procedures, controls and contractual commitments to protect our intellectual property rights. Despite our efforts, these protections may be limited and we may encounter difficulties in protecting our intellectual property rights or obtaining rights to additional intellectual property necessary to permit us to continue or expand our businesses. We cannot provide assurance that the patents that we hold or may obtain will provide meaningful protection against our competitors. Changes in or enforcement of laws concerning intellectual property may affect our ability to prevent or address the misappropriation of, or the unauthorized use of, our intellectual property, potentially resulting in loss of market share. Litigation may be necessary to enforce our intellectual property rights. Litigation is inherently uncertain and outcomes are unpredictable. If we cannot protect our intellectual property rights against unauthorized copying or use, or other misappropriation, we may not remain competitive.

The intellectual property rights of others could inhibit our ability to introduce new products. Other companies hold patents on technologies used in our industries and are aggressively seeking to expand, enforce and license their patent portfolios. We periodically receive notices from, or have lawsuits filed against us by third parties claiming infringement, misappropriation or other misuse of their intellectual property rights and/or breach of our agreements with them. These third parties often include entities that do not have the capabilities to design, manufacture, or distribute products or that acquire intellectual property like patents for the sole purpose of monetizing their acquired intellectual property through asserting claims of infringement and misuse. Such claims of infringement or misappropriation may result in loss of revenue, substantial costs, or lead to monetary damages or injunctive relief against us.

Information technology dependency and cybersecurity vulnerabilities could lead to reduced revenue, liability claims, competitive or reputational harm, and result in material adverse effects on our operations and financial results

The Company is dependent on information technology systems and infrastructure ("IT systems") owned and operated by the Company or managed by third-party service providers, suppliers and contract manufacturers. IT systems enable us to conduct, monitor and/or protect our business, operations, systems, data and other assets. In the ordinary course of our business, we and our providers collect, process, transmit and store sensitive data, including intellectual property, our proprietary information and that of our customers, suppliers and business partners, as well as personally identifiable information. Intrusion into a supplier or contract manufacturer system not integrated with a Corning IT system could result in service disruption and/or loss of financial control.

Our IT systems, and those of our providers, may be vulnerable to compromise or disruption due to human error or malfeasance, outdated applications, computer viruses or malware (e.g., ransomware), natural disasters, unauthorized access, cyber-attacks and other similar incidents and disruptions. Increased work-from-home, at both the Company and our providers, presents additional operational risk. Companies that provide utilities, water, transportation, natural gas, and other resources and services across our supply chain, are critical to our manufacturing operations and are vulnerable to cyber-attacks. From time to time, both we and certain of our providers, have been subject to cyberattacks and security incidents. We may be unable to anticipate, detect, prevent or remediate future attacks, particularly as attackers are becoming more sophisticated in their ability to circumvent controls and remove forensic evidence.

Any significant disruption, breakdown, intrusion, interruption or corruption, data breach, or compromise to the accessibility, security or integrity of our or our providers' IT systems, or the misappropriation or disclosure of any confidential, proprietary or personally identifiable information, could result in the loss of data or intellectual property, equipment or systems damage, downtime, safety related issues and could have a material adverse effect on our business, including by harming our competitive position and reputation, disrupting our manufacturing, reducing the value of our investment in research and development and other strategic initiatives, impairing our ability to access suppliers, contract manufacturers, customers, and cloud-based services, subjecting us to litigation or regulatory investigations or fines, increasing the costs of compliance and remediation, or otherwise adversely affecting our business. We may be required to invest significant additional resources to comply with evolving cybersecurity regulations and to modify and enhance our IT systems, information security and controls, and to investigate and remediate any security vulnerabilities. Any losses, costs or liabilities may not be covered by, or may exceed the coverage limits of, any, or all, of our applicable insurance policies.

We may not earn a positive return from our research, development and engineering investments

Developing our products through our innovation model of research and development is costly and often involves a long investment cycle. We make significant investments in research, development and engineering that may not earn an economic return. If our investments do not provide a pipeline of products or technologies that our customers demand or lower our manufacturing costs, it could negatively impact our revenue and operating margins for both near- and long-term.

Our innovation model depends on our ability to attract and retain specialized experts in our core technologies

Our innovation model requires us to employ highly specialized experts in glass science, ceramic science, and optical physics to conduct our research and development and engineer our products and design our manufacturing facilities. The loss of the services of any member of our key research and development or engineering team without adequate replacement, or the inability to attract new qualified personnel, could have a material adverse effect on our operations and financial performance.

We are subject to strict environmental regulations and regulatory changes that could result in fines or restrictions that interrupt our operations

Some of our manufacturing processes generate chemical waste, wastewater, other industrial waste or greenhouse gases, and we are subject to numerous laws and regulations relating to the use, storage, discharge and disposal of such substances. We have installed anti-pollution equipment for the treatment of chemical waste and wastewater at our facilities. We have taken steps to control the amount of greenhouse gases created by our manufacturing operations. However, we cannot provide assurance that environmental claims will not be brought against us or that government regulators will not take steps to adopt more stringent environmental standards.

Any failure on our part to comply with any present or future environmental regulations could result in the assessment of damages or imposition of fines against us, or the suspension/cessation of production or operations. In addition, environmental regulations could require us to acquire costly equipment, incur other significant compliance expenses or limit or restrict production or operations and thus materially and negatively affect our financial condition and results of operations.

Changes in regulations and the regulatory environment in the U.S. and other countries, such as those resulting from the regulation and impact of global warming and CO₂ abatement, may affect our businesses and their results in adverse ways by, among other things, substantially increasing manufacturing costs, limiting availability of scarce resources, especially energy, or requiring limitations on production and sale of our products or those of our customers.

General Risk Factors

We may have additional tax liabilities

We are subject to income taxes in the U.S. and many foreign jurisdictions, and are commonly audited by various tax authorities. There are many transactions and calculations where the ultimate tax treatment is uncertain. Judgment is required in determining our worldwide provision for income taxes. Although we believe our tax estimates are reasonable, the final determination of tax, assessments, audits and any related litigation could be materially different from our historical income tax provisions and accruals, or result in the forfeiture of funds deposited with the relevant government authorities. The results of an audit or litigation could have a material effect on our financial statements in the period or periods for which such a determination is made.

The U.S., other countries and international organizations, such as Organisation for Economic Co-operation and Development (“OECD”), may change their laws or issue new international tax standards that may also impact our taxes.

As a global company, we face many risks which could adversely impact our operations and financial results

We are a global company and derive a substantial portion of our revenue from, and have significant operations, outside of the U.S. Our international operations include manufacturing, assembly, sales, research and development, customer support, and shared administrative service centers. Additionally, we rely on a global supply chain for key components and capabilities that are central to our ability to invent, make and sell products.

Compliance with laws and regulations increases our costs. We are subject to both U.S. laws and the local laws where we operate which, among other things, include data privacy requirements, employment and labor laws, tax laws, anti-competition regulations, prohibitions on payments to governmental officials, import and trade restrictions and export requirements. Non-compliance or violations could result in fines, criminal sanctions against us, our officers or employees, and prohibitions on the conduct of our business. Such violations could result in prohibitions on our ability to offer our products and services in one or more countries and could also materially damage our reputation, our brand, our international expansion efforts, our ability to attract and retain employees, our businesses and operating results. Our success depends, in part, on our ability to anticipate and manage these risks.

Corning is exposed to risks associated with an uncertain and inflationary global economy

Uncertain or adverse economic and business conditions, including uncertainties and volatility in the financial markets, national debt, fiscal or monetary concerns, inflation and rising interest rates in various regions, could materially adversely impact Corning’s operating results. Markets for our products depend largely on business and consumer spending and demand for network capacity, electronics and automotive products. Uncertain or adverse economic and business conditions that result in decreases in consumer spending and demand, or cause us to pass on increased costs to our customers, may cause certain of our customers to push out, cancel or refrain from purchasing our products, which could materially adversely impact demand for our products and our operating results. In addition, the COVID-19 pandemic, and transportation interruptions and other measures taken in response thereto, have had, and may continue to have, a significant adverse impact on the global and regional economic activity, as well as our ability to meet our customer demand.

Similarly, changes that result in sudden increases in consumer demand for electronic products have resulted in, and may continue to result in, a shortage of parts and materials needed to manufacture our products or the products in which our products are used. Such shortages, as well as shipment delays due to transportation interruptions, have adversely impacted, and may continue to adversely impact, our ability to meet our demand requirements.

Uncertain economic and industry conditions also make it more challenging for Corning to forecast its operating results, make business decisions, and identify and prioritize the risks that may affect its businesses, sources and uses of cash, financial condition and results of operations. If Corning does not appropriately manage its business operations in response to changing economic and industry conditions, it could have a significant negative impact on its business performance and financial condition. Even during periods of economic uncertainty or lower revenues, Corning must continue to invest in research and development and maintain a global business infrastructure to compete effectively and support its customers, which can have a negative impact on its operating margins and earnings.

We are also subject to a variety of other risks in managing a global organization, including those related to:

- The economic and political conditions in each country or region and among countries;
- Complex regulatory requirements affecting international trade and investment, including anti-dumping laws, export controls, the Foreign Corrupt Practices Act and local laws prohibiting improper payments. Our operations may be adversely affected by changes in the substance or enforcement of these regulatory requirements, and by actual or alleged violations of them;
- Fluctuations in currency exchange rates, convertibility of currencies and restrictions involving the movement of funds between jurisdictions and countries;
- Governmental protectionist policies and sovereign and political risks that may adversely affect Corning's profitability and assets;
- Tariffs, trade duties and other trade barriers including anti-dumping duties;
- Geographical concentration of our factories and operations, and regional shifts in our customer base;
- Periodic health epidemic or pandemic concerns, such as COVID-19;
- Political unrest, geopolitical tensions, confiscation or expropriation of assets by foreign governments, terrorism and the potential for other hostilities;
- Difficulty in protecting intellectual property, sensitive commercial and operations data, and information technology systems;
- Differing legal systems, including protection and treatment of intellectual property and patents;
- Complex, changing or competing tax regimes;
- Difficulty in collecting obligations owed to us;
- Natural disasters such as floods, earthquakes, tsunamis and windstorms; and
- Potential loss of utilities or other disruption affecting manufacturing.

We have significant exposure to foreign currency movements

A large portion of our sales, profit and cash flows are transacted in non-U.S. dollar currencies. The Company expects to continue to experience fluctuations in the U.S. dollar value of these activities if it is not possible, cost-effective or should we not elect to hedge certain currency exposure. Additionally, gains or losses may be experienced if the underlying exposure which has been hedged increases or decreases significantly.

The ultimate realized gain or loss with respect to currency fluctuations will generally depend on the size and type of cross-currency exposure that we have, the changes in exchange rates associated with those exposures, whether we have entered into foreign currency contracts to offset these exposures and other factors.

These factors, which are variable and generally outside of our control, could materially impact our results of operations, anticipated future results, financial position and cash flows.

We may have significant exposure to counterparties of our related derivatives portfolio

We maintain a significant portfolio of over the counter derivatives to hedge our projected currency exposure. We are exposed to potential losses in the event of non-performance by our counterparties to these derivative contracts. Any failure of a counterparty to pay on such a contract when due could materially impact our results of operations, financial position, and cash flows.

Current or future litigation or regulatory investigations may harm our financial condition or results of operations

As a global technology and manufacturing company, we are engaged in various litigation and regulatory matters. Litigation and regulatory proceedings may be uncertain, and adverse rulings could occur, resulting in significant liabilities, penalties or damages. Any such substantial legal liability or regulatory action could have a material adverse effect on our business, financial condition, cash flows and reputation.

Our business is subject to various governmental regulations, and compliance with these regulations may cause us to incur significant expense. If we fail to maintain compliance with applicable regulations, we may be forced to cease the manufacture and distribution of certain products, and we could be subject to administrative proceedings and civil or criminal penalties

Our products and operations are also subject to regulation by U.S. and non-U.S. regulatory agencies, such as the U.S. Federal Trade Commission (“FTC”). From time to time, we may also be involved or required to participate in regulatory investigations or inquiries, into certain of our contracting and business practices, which may evolve into legal or other administrative proceedings. Growing public concern over concentration of economic power in corporations is likely to result in increased anti-competition legislation, regulation, administrative rule making, and enforcement activity. Involvement in regulatory investigations or inquiries, can be costly, lengthy, complex and time consuming, diverting the attention and energies of our management and technical personnel. If any pending or future governmental investigations result in an unfavorable resolution, we could be required to cease the manufacture and sale of the subject products or technology, pay fines or disgorge profits or other payments, and/or cease certain conduct and/or modify our contracting or business practices, which could have a material adverse effect on our business, financial condition and results of operations. We may be obligated to indemnify our current or former directors or employees, or former directors or employees of companies that we have acquired, in connection with regulatory investigations. These liabilities could be substantial and may include, among other things, the cost of government, law enforcement or regulatory investigations and civil or criminal fines and penalties.

Our global operations are subject to extensive trade and anti-corruption laws and regulations

Due to the international scope of our operations, we are subject to a complex system of import- and export-related laws and regulations, including U.S. regulations issued by Customs and Border Protection, the Bureau of Industry and Security, the Office of Anti-boycott Compliance, the Directorate of Defense Trade Controls and the Office of Foreign Assets Control, as well as the counterparts of these agencies in other countries. Any alleged or actual violation by an employee or the Company may subject us to government scrutiny, investigation and civil and criminal penalties, and may limit our ability to import or export our products or to provide services outside the U.S. We cannot predict the nature, scope or effect of future regulatory requirements to which our operations might be subject to, based on the way existing laws might be administered or interpreted.

In addition, the U.S. Foreign Corrupt Practices Act and similar foreign anti-corruption laws generally prohibit companies and their intermediaries from making improper payments or providing anything of value to improperly influence foreign government officials to obtain or retain business, or obtaining an unfair advantage. Recent years have seen a substantial increase in the global enforcement of anti-corruption laws. Our continued operation and expansion outside the U.S., including in developing countries, could increase the risk of alleged violations. Violations of these laws may result in severe criminal or civil sanctions, could disrupt our business, and result in an adverse effect on our reputation, business and results of operations or financial condition.

Moreover, several of our key customers are domiciled in areas of the world with laws, rules and business practices that may notably differ from those in the U.S., and we face the reputational and legal risk that our related partners may violate applicable laws, rules and business practices.

International trade policies may negatively impact our ability to sell and manufacture our products outside of the U.S.

Government policies on international trade and investment such as import quotas, tariffs, and capital controls, whether adopted by individual governments or addressed by regional trade blocs, can affect the demand for our products and services, impact the competitive position of our products or prevent us, our equity affiliates or joint ventures, from being able to sell and manufacture products in certain countries. The implementation of more restrictive trade policies, such as higher tariffs or new barriers to entry, together with anti-dumping claims, duties, slowed regulatory approvals and other restrictions, in countries in which we import raw materials and components or sell large quantities of products and services could negatively impact our business, results of operations and financial condition. For example, a government’s adoption of “buy national” policies or retaliation by another government against such policies could have a negative impact on our results of operations.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties

Corning operates 119 manufacturing plants and processing facilities in 15 countries, of which approximately 32% are in the U.S. We own approximately 54% of our executive and corporate buildings, with 94% located in and around Corning, New York. The Company also owns approximately 65% of our sales and administrative office square footage, 80% of our research and development square footage, 67% of our manufacturing square footage, and 6% of our warehousing square footage.

Manufacturing, sales and administrative, research and development facilities and warehouse facilities have an aggregate floor space of approximately 64.4 million square feet. Distribution of this total area is as follows:

(million square feet)	Total	Domestic	Foreign
Manufacturing	55.8	21.1	34.7
Sales and administrative	2.4	1.8	0.6
Research and development	2.5	2.1	0.4
Warehouse	3.7	3.0	0.7
Total	64.4	28.0	36.4

Total assets and capital expenditures by operating segment are included in Note 20 (Reportable Segments) to the consolidated financial statements. Information concerning lease commitments is included in Note 7 (Leases) and Note 14 (Commitments, Contingencies and Guarantees) to the consolidated financial statements.

Item 3. Legal Proceedings

Corning is a defendant in various lawsuits and is subject to various claims that arise in the normal course of business, the most significant of which are summarized in Note 14 (Commitments, Contingencies and Guarantees) to the consolidated financial statements. In the opinion of management, the likelihood that the ultimate disposition of these matters will have a material adverse effect on Corning's consolidated financial position, liquidity, or results of operations, is remote.

Environmental Litigation

Corning has been named by the Environmental Protection Agency (the Agency) under the Superfund Act, or by state governments under similar state laws, as a potentially responsible party for 15 active hazardous waste sites. Under the Superfund Act, all parties who may have contributed any waste to a hazardous waste site, identified by the Agency, are jointly and severally liable for the cost of cleanup unless the Agency agrees otherwise. It is Corning's policy to accrue for its estimated liability related to Superfund sites and other environmental liabilities related to property owned by Corning based on expert analysis and continual monitoring by both internal and external consultants. At December 31, 2021 and 2020, Corning had accrued approximately \$55 million (undiscounted) and \$68 million (undiscounted), respectively, for the estimated liability for environmental cleanup and related litigation. Based upon the information developed to date, management believes that the accrued reserve is a reasonable estimate of the Company's liability and that the risk of an additional loss in an amount materially higher than that accrued is remote.

Item 4. Mine Safety Disclosure

None.

PART II

Item 5. Market for Registrant's Common Equity, Related Shareholder Matters and Issuer Purchases of Equity Securities

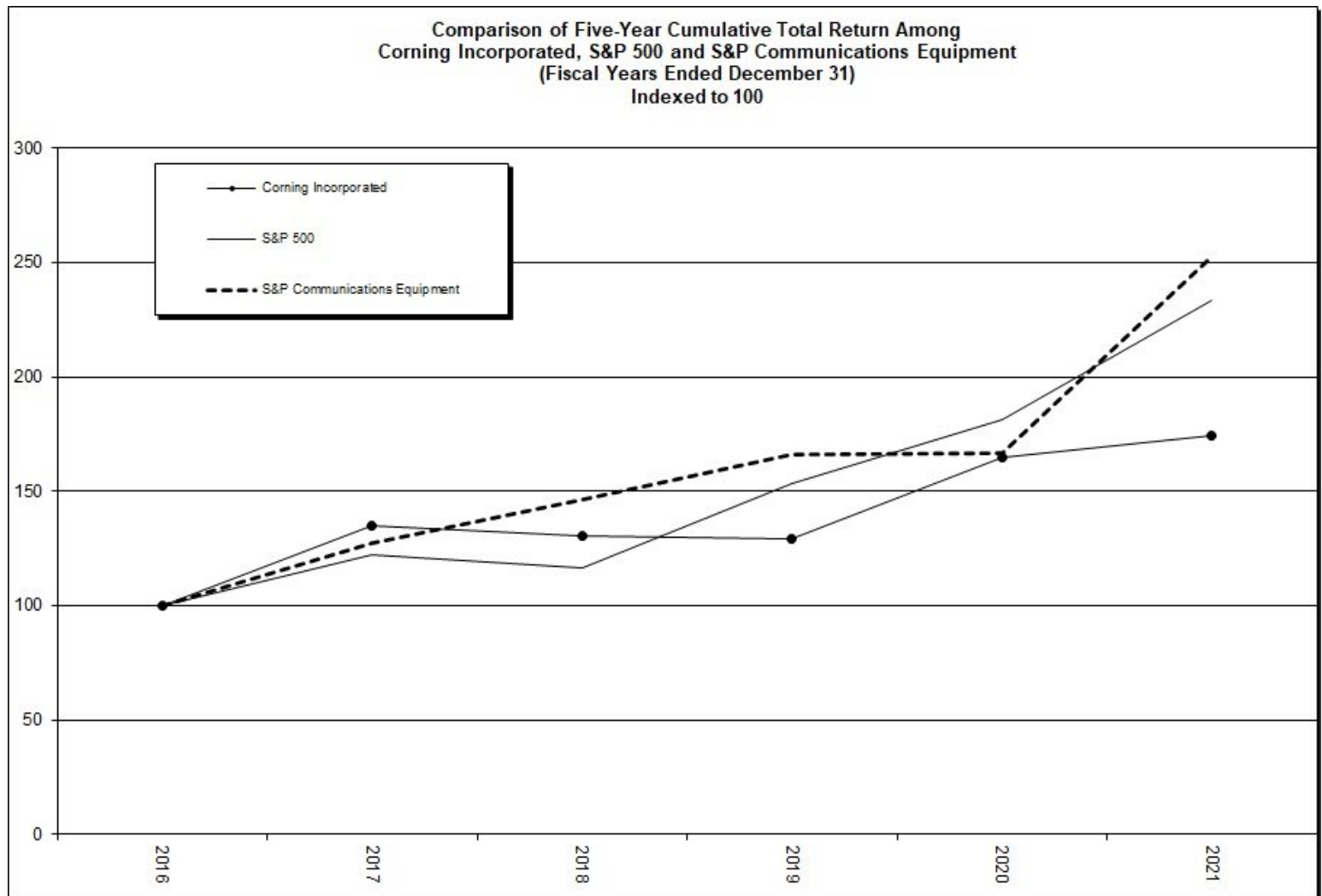
- (a) Corning Incorporated common stock is listed on the New York Stock Exchange. In addition, it is traded on the Boston, Midwest and Philadelphia stock exchanges. Common stock options are traded on the Chicago Board Options Exchange. The NYSE ticker symbol for Corning Incorporated is "GLW".

As of December 31, 2021, there were approximately 12,000 registered holders of common stock and approximately 680,000 beneficial shareholders.

Information with respect to securities authorized for issuance under equity compensation plans is included herein under Item 12.

Performance Graph

The following graph illustrates the cumulative total shareholder return over the last five years of Corning's common stock, the S&P 500 and the S&P Communications Equipment Companies. The graph includes the capital-weighted-performance results of those companies in the communications equipment company classification that are also included in the S&P 500.



(b) Not applicable.

(c) The following table provides information about purchases of common stock by the Company during the fiscal fourth quarter of 2021:

Issuer Purchases of Equity Securities

Period	Total number of shares purchased (1)	Average price paid per share (2)	Number of shares purchased as part of publicly announced programs	Approximate dollar value of shares that may yet be purchased under the programs
October 1-31, 2021	1,117,269	\$ 36.83	1,051,401	
November 1-30, 2021	2,825,712	\$ 37.95	2,825,313	
December 1-31, 2021	2,752,023	\$ 37.45	2,742,712	
Total	6,695,004	\$ 37.56	6,619,426	\$ 3,522,218,861

- (1) This column reflects: (i) 24,145 shares of common stock related to the vesting of employee restricted stock units; (ii) 296 shares of common stock related to the vesting of employee performance stock units; (iii) 51,078 shares of common stock related to the vesting of employee restricted stock; (iv) 59 shares of common stock related to the exercise of employee stock options and payment of the exercise price, and (v) the purchase of 6,619,426 shares of common stock in open market repurchases under the 2019 Repurchase Program.
- (2) Represents the stock price at the time of surrender.

Item 6. [Reserved]

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations

For discussion of 2020 results year-over-year comparison with 2019 results refer to "Management's Discussion and Analysis of Financial Conditions and Results of Operations" in our Annual Report on Form 10-K for the fiscal year ended December 31, 2020.

Organization of Information

Management's Discussion and Analysis provides a historical and prospective narrative on the Company's financial condition and results of operations. This discussion includes the following sections:

- Overview
- Results of Operations
- Core Performance Measures
- Reportable Segments
- Liquidity and Capital Resources
- Environment
- Critical Accounting Estimates
- New Accounting Standards
- Forward-Looking Statements

OVERVIEW

In response to the COVID-19 pandemic ("the pandemic") and the ensuing economic uncertainty, including changing market conditions, the Company has and will continue to focus on three core priorities: protecting employees and communities; delivering on customer commitments and preserving the financial health of the Company. We are continuing to build a stronger, more resilient company that is committed to rewarding shareholders and supporting all global stakeholders.

Despite the pandemic and resulting global disruptions, Corning adapted rapidly and remained resilient. We acted quickly to preserve our financial strength by executing well and advancing major innovations with industry leaders. We have continued to effectively leverage our focused and cohesive portfolio to create value and outperform our underlying markets, contributing to sales and earnings growth and strong free cash flow in the second half of 2020 and full year 2021.

Corning announced the Strategy & Growth Framework in 2019, highlighting significant opportunities to sell more Corning content through each of our Market-Access Platforms. The Company is focused on our cohesive portfolio and the utilization of our financial strength, supported by strong operating cash flow generation, which we expect to continue. Corning has and will continue to use its cash to grow, extend its leadership and reward shareholders. Our key growth drivers remain intact, and some are accelerating as key trends converge around Corning's capabilities.

Corning will continue to advance the objectives of the Strategy & Growth Framework, which sets its leadership priorities and articulates opportunities across its businesses. Our probability of success increases as we invest in our world-class capabilities. Corning is concentrating approximately 80% of its research, development and engineering investment along with capital spending on a cohesive set of three core technologies, four manufacturing and engineering platforms, and five Market-Access Platforms. This strategy allows us to quickly apply our talents and repurpose our assets across the Company, as needed, to capture high-return opportunities.

2021 Results

Net sales in the year ended December 31, 2021 were \$14.1 billion, a net increase of \$2.8 billion, or 25%, when compared to the year ended December 31, 2020, driven by higher sales for all segments.

For the year ended December 31, 2021, we generated net income of \$1,906 million, or \$1.28 per diluted share, compared to a net income of \$512 million, or \$0.54 per diluted share, for 2020. When compared to 2020, the \$1.4 billion increase in net income was primarily due to the following items (amounts presented after tax):

- Higher net income of \$505 million for reportable segments;
- Lower restructuring, impairment and other charges of \$543 million;
- The positive impact of mark-to-market translated earnings contract gains of \$309 million;
- Higher translation gains on Japanese yen-denominated debt of \$205 million; and
- Lower net losses of \$163 million for "All Other" primarily driven by full-year consolidation of HSG.

The increases in net income, outlined above, were partially offset by the absence of a gain on a previously held equity investment in HSG of \$387 million in 2020.

Diluted earnings per share increased in 2021 by \$0.74 per diluted share, or 137%, when compared to 2020, primarily driven by the increase in net income, described above, partially offset by the immediate repurchase and retirement of 35 million Common Shares which resulted in an \$803 million one-time reduction to net income available to common shareholders during the second quarter of 2021. Refer to Note 17 (Shareholders' Equity) and Note 18 (Earnings per Common Share) to the consolidated financial statements for additional information.

The translation impact of fluctuations in foreign currency exchange rates, including the impact of hedges realized in the current year, positively impacted Corning's net income by approximately \$104 million in the year ended December 31, 2021, when compared to the same period in 2020.

2022 Corporate Outlook

We believe 2022 will be another year of growth and strong cash-flow generation. We expect full year net sales of approximately \$15 billion in 2022.

RESULTS OF OPERATIONS

Selected highlights from our operations follow (in millions):

	Year ended December 31,			% change	
	2021	2020	2019	21 vs. 20	20 vs. 19
Net sales	\$ 14,082	\$ 11,303	\$ 11,503	25	(2)
Gross margin	\$ 5,063	\$ 3,531	\$ 4,035	43	(12)
(gross margin %)	36%	31%	35%		
Selling, general and administrative expenses	\$ 1,827	\$ 1,747	\$ 1,585	5	10
(as a % of net sales)	13%	15%	14%		
Research, development and engineering expenses	\$ 995	\$ 1,154	\$ 1,031	(14)	12
(as a % of net sales)	7%	10%	9%		
Equity in earnings (losses) of affiliated companies	\$ 35	\$ (25)	\$ 17	*	*
(as a % of net sales)	0%	(0)%	0%		
Translated earnings contract gain (loss), net	\$ 354	\$ (38)	\$ 248	*	*
(as a % of net sales)	3%	(0)%	2%		
Transaction-related gain, net		\$ 498		*	*
(as a % of net sales)		4%			
Income before income taxes	\$ 2,397	\$ 623	\$ 1,216	285	(49)
(as a % of net sales)	17%	6%	11%		
Provision for income taxes	\$ (491)	\$ (111)	\$ (256)	(342)	57
(as a % of net sales)	(3)%	(1)%	(2)%		
Net income attributable to Corning Incorporated	\$ 1,906	\$ 512	\$ 960	272	(47)
(as a % of net sales)	14%	5%	8%		

* Percent change not meaningful.

Segment Net Sales

The following table presents segment net sales by reportable segment (in millions):

	Year ended December 31,			%	%
	2021	2020	2019	change 21 vs. 20	change 20 vs. 19
Display Technologies	\$ 3,700	\$ 3,172	\$ 3,254	17%	(3)%
Optical Communications	4,349	3,563	4,064	22%	(12)%
Specialty Materials	2,008	1,884	1,594	7%	18%
Environmental Technologies	1,586	1,370	1,499	16%	(9)%
Life Sciences	1,234	998	1,015	24%	(2)%
All Other	1,243	465	230	167%	102%
Net sales of reportable segments and All Other	\$ 14,120	\$ 11,452	\$ 11,656	23%	(2)%
Impact of foreign currency movements (1)	(38)	(44)	(153)	14%	71%
Cumulative adjustment related to customer contract (2)		(105)		*	*
Consolidated net sales	\$ 14,082	\$ 11,303	\$ 11,503	25%	(2)%

(1) This amount primarily represents the impact of foreign currency adjustments in the Display Technologies segment.

(2) Amount represents the negative impact of a cumulative adjustment recorded during the first quarter of 2020 to reduce revenue in the amount of \$105 million. The adjustment was associated with a previously recorded commercial benefit asset, reflected as a prepayment, to a customer with a long-term supply agreement that substantially exited its production of LCD panels.

* Percent change not meaningful.

For the year ended December 31, 2021, segment and "All Other" net sales increased by \$2.7 billion, or 23%, when compared to the same period in 2020. The primary sales drivers by segment were as follows:

- Display Technologies' net sales increased by \$528 million, primarily driven by volume increases of approximately mid-teens in percentage terms and pricing consistent with 2020;
- Optical Communications' net sales increased \$786 million, as sales increased for carrier products by \$588 million and enterprise products by \$198 million, primarily driven by strong growth of 5G, broadband and cloud computing;
- Net sales for Environmental Technologies increased \$216 million, primarily due to increased sales of heavy-duty diesel products and gas-particulate filters;
- Net sales in the Life Sciences segment increased by \$236 million, primarily driven by ongoing increased demand to support the global pandemic response, continued recovery in research labs, and strong demand for bioproduction vessels and diagnostic-related consumables.;
- Net sales increased in the Specialty Materials segment in the amount of \$124 million, primarily driven by strong demand for premium cover materials and advanced optics content used in semiconductor manufacturing; and
- Net sales for "All Other" increased by \$778 million, primarily driven by full-year consolidation of HSG.

Movements in foreign exchange rates positively impacted Corning's consolidated net sales by \$83 million in the year ended December 31, 2021, when compared to the same period in 2020.

In 2021 and 2020, sales in international markets accounted for 68% and 70% of total net sales, respectively.

Cost of Sales

The types of expenses included in the cost of sales line item are: raw materials consumption, including direct and indirect materials; salaries, wages and benefits; depreciation and amortization; production utilities; production-related purchasing; warehousing (including receiving and inspection); repairs and maintenance; inter-location inventory transfer costs; production and warehousing facility property insurance; rent for production facilities; and other production overhead.

Gross Margin

In the year ended December 31, 2021, gross margin increased by \$1,532 million, or 43%. Gross margin as a percentage of sales increased by 5 percentage points. The increase in gross margin was primarily driven by higher sales in all segments, as well as lower charges for severance and capacity realignment costs of \$89 million and \$252 million, respectively, partially offset by increased expenses due to elevated freight, logistics and raw material costs for the year ended December 31, 2021.

Movements in foreign exchange rates had a positive impact of \$77 million on Corning's consolidated gross margin in the year ended December 31, 2021, when compared to the same period in 2020.

Selling, General and Administrative Expenses

When compared to the year ended December 31, 2020, selling, general and administrative expenses increased by \$80 million, or 5%, in the year ended December 31, 2021. The increase was primarily driven by higher litigation and share-based compensation costs. Selling, general and administrative expenses decreased by 2 percentage points as a percentage of sales.

The types of expenses included in the selling, general and administrative expenses line item are: salaries, wages and benefits; stock-based compensation expense; travel; sales commissions; professional fees; and depreciation and amortization, utilities and rent for administrative facilities.

Research, Development and Engineering Expenses

For the year ended December 31, 2021, research, development and engineering expenses decreased by \$159 million, or 14%, when compared to the same period in the prior year, primarily driven by the absence of a pre-tax asset impairment loss of \$211 million related to the reassessment and reprioritization of research and development programs within "All Other" that was incurred in 2020. As a percentage of sales, these expenses were 3 percentage points lower when compared to the same period last year.

Translated earnings contract gain (loss), net

Included in the line item translated earnings contract gain (loss), net, is the impact of foreign currency contracts which hedge our translation exposure arising from movements in the Japanese yen, South Korean won, new Taiwan dollar, euro, Chinese yuan and British pound and its impact on our net income.

The following table provides detailed information on the impact of our translated earnings contracts gains and losses for the years ended December 31, 2021, 2020 and 2019:

(in millions)	Income (loss) before tax	Net income (loss)	(Loss) income before tax	Net (loss) income	Income before tax	Net income
	2021		2020		2021 vs. 2020	
Hedges related to translated earnings:						
Realized gain (loss), net ⁽¹⁾	\$ 47	\$ 36	\$ (8)	\$ (5)	\$ 55	\$ 41
Unrealized gain (loss), net ⁽²⁾	307	237	(30)	(24)	337	261
Total translated earnings contract gain (loss), net	\$ 354	\$ 273	\$ (38)	\$ (29)	\$ 392	\$ 302
	2020		2019		2020 vs. 2019	
Hedges related to translated earnings:						
Realized (loss) gain, net ⁽¹⁾	\$ (8)	\$ (5)	\$ 18	\$ 14	\$ (26)	\$ (19)
Unrealized (loss) gain, net ⁽²⁾	(30)	(24)	230	179	(260)	(203)
Total translated earnings contract (loss) gain, net	\$ (38)	\$ (29)	\$ 248	\$ 193	\$ (286)	\$ (222)

(1) Includes pre-tax realized losses related to the expiration of option contracts for the year ended December 31, 2021, 2020, and 2019 of \$20 million, \$20 million and \$37 million, respectively. These amounts were reflected in operating activities in the consolidated statements of cash flows.

(2) The impact to income was primarily driven by Japanese yen, South Korean won, and euro-denominated hedges of translated earnings.

Income Before Income Taxes

The translation impact of fluctuations in foreign currency exchange rates, including the impact of hedges realized in the current year, positively impacted Corning's income before income taxes by \$134 million in the year ended December 31, 2021, when compared to the same period in 2020.

Provision for Income Taxes

Our provision for income taxes and the related effective income tax rates were as follows (in millions):

	Year ended December 31,		
	2021	2020	2019
Provision for income taxes	\$ (491)	\$ (111)	\$ (256)
Effective tax rate	20.5%	17.8%	21.1%

For the year ended December 31, 2021, the effective income tax rate differed from the U.S. statutory rate of 21% primarily due to the following:

- A net provision of \$52 million due to differences arising from foreign earnings, including the impact of intercompany asset sales;
- A net benefit of \$37 million related to share-based compensation payments; and
- A net benefit of \$62 million due to tax credits.

For the year ended December 31, 2020, the effective income tax rate differed from the U.S. statutory rate of 21% primarily due to the following:

- Additional net provision of \$73 million from changes to our tax reserves;
- A net provision of \$45 million due primarily to stronger foreign earnings relative to U.S. earnings in the current year, as well as U.S. income inclusion under the Internal Revenue Code ("Subpart F income"); and
- A net benefit of \$116 million due to a net operating loss carryback allowed under the CARES Act.

During 2021, the Company distributed approximately \$2.3 billion from foreign subsidiaries to their respective U.S. parent companies. As of December 31, 2021, Corning has approximately \$2.4 billion of indefinitely reinvested foreign earnings. It remains impracticable to calculate the tax cost of repatriating our unremitted earnings which are considered indefinitely reinvested.

Refer to Note 8 (Income Taxes) to the consolidated financial statements for further details regarding income tax matters.

Net Income Attributable to Corning Incorporated

As a result of the items discussed above, net income and per share data was as follows (in millions, except per share amounts):

	Year ended December 31,			
	2021	2020	2019	
Net income attributable to Corning Incorporated	\$ 1,906	\$ 512	\$ 960	
Series A convertible preferred stock dividend	(24)	(98)	(98)	
Excess consideration paid for redemption of preferred stock (1)	(803)			
Net income available to common shareholders used in basic earnings per common share calculation	\$ 1,079	\$ 414	\$ 862	
Net income available to common shareholders used in diluted earnings per common share calculation	\$ 1,079	\$ 414	\$ 960	
Basic earnings per common share	\$ 1.30	\$ 0.54	\$ 1.11	
Diluted earnings per common share	\$ 1.28	\$ 0.54	\$ 1.07	
Weighted-average common shares outstanding - basic	828	761	776	
Weighted-average common shares outstanding - diluted	844	772	899	

(1) On January 16, 2021, the Preferred Stock became convertible into 115 million Common Shares, in whole or in part, at the option of the holder, Samsung Display Co., Ltd. ("SDC"). On April 5, 2021, Corning and SDC executed a Share Repurchase Agreement ("SRA"). Refer to Note 18 (Earnings per Common Share) to the consolidated financial statements for additional information.

Comprehensive Income

(In millions)	Year ended December 31,			
	2021	2020	2019	
Net income attributable to Corning Incorporated	\$ 1,906	\$ 512	\$ 960	
Foreign currency translation adjustments and other (Note 17)	(604)	528	(143)	
Net unrealized gains on investments			1	
Unamortized gains (losses) and prior service credits (costs) for postretirement benefit plans	178	(88)	(64)	
Net unrealized (losses) gains on designated hedges	(9)	(9)	45	
Other comprehensive (loss) income, net of tax	(435)	431	(161)	
Comprehensive income attributable to Corning Incorporated	\$ 1,471	\$ 943	\$ 799	

For the year ended December 31, 2021, comprehensive income increased by \$528 million, when compared to the same period in 2020, primarily due to the following:

- An increase in net income of \$1.4 billion; and
- The positive change of \$266 million of unamortized gains (losses) and prior service credits (costs) for postretirement benefit plans.

This gain was partially offset by the following:

- The unfavorable change in foreign currency translation adjustments of \$1.1 billion, largely driven by the Japanese yen, South Korean won and Chinese yuan.

Refer to Note 13 (Employee Retirement Plans) and Note 17 (Shareholders' Equity) to the consolidated financial statements for additional details.

CORE PERFORMANCE MEASURES

In managing the Company and assessing our financial performance, we adjust certain measures provided by our consolidated financial statements to exclude specific items to report core performance measures. These items include gains and losses on our translated earnings contracts, acquisition-related costs, certain discrete tax items and other tax-related adjustments, restructuring, impairment losses, and other charges and credits, certain litigation-related expenses, pension mark-to-market adjustments and other items which do not reflect on-going operating results of the Company or our equity affiliates. Corning utilizes constant-currency reporting for our Display Technologies, Environmental Technologies, Specialty Materials and Life Sciences segments for the Japanese yen, South Korean won, Chinese yuan, new Taiwan dollar and the euro. The Company believes that the use of constant-currency reporting allows investors to understand our results without the volatility of currency fluctuations and reflects the underlying economics of the translated earnings contracts used to mitigate the impact of changes in currency exchange rates on our earnings and cash flows. Corning also believes that reporting core performance measures provides investors greater transparency to the information used by our management team to make financial and operational decisions.

Core performance measures are not prepared in accordance with Generally Accepted Accounting Principles in the U.S. ("GAAP"). We believe investors should consider these non-GAAP measures in evaluating our results as they are more indicative of our core operating performance and how management evaluates our operational results and trends. These measures are not, and should not be viewed as a substitute for, GAAP reporting measures. With respect to the Company's outlook for future periods, it is not possible to provide reconciliations for these non-GAAP measures because the Company does not forecast the movement of foreign currencies against the U.S. dollar, or other items that do not reflect ongoing operations, nor does it forecast items that have not yet occurred or are out of the Company's control. As a result, the Company is unable to provide outlook information on a GAAP basis.

For a reconciliation of non-GAAP performance measures to their most directly comparable GAAP financial measure, please see "Reconciliation of Non-GAAP Measures".

RESULTS OF OPERATIONS – CORE PERFORMANCE MEASURES

Selected highlights from our continuing operations, excluding certain items, follow (in millions):

	Year ended December 31,			% change	
	2021	2020	2019	21 vs. 20	20 vs. 19
Core net sales	\$ 14,120	\$ 11,452	\$ 11,656	23%	(2)%
Core equity in earnings of affiliated companies	\$ 38	\$ 86	\$ 237	(56)%	(64)%
Core net income	\$ 1,811	\$ 1,237	\$ 1,578	46%	(22)%

Core Net Sales

Core net sales are consistent with net sales by reportable segment and "All Other". The following table presents segment net sales by reportable segment and "All Other" (in millions):

	Year ended December 31,			% change	
	2021	2020	2019	21 vs. 20	20 vs. 19
Display Technologies	\$ 3,700	\$ 3,172	\$ 3,254	17%	(3)%
Optical Communications	4,349	3,563	4,064	22%	(12)%
Specialty Materials	2,008	1,884	1,594	7%	18%
Environmental Technologies	1,586	1,370	1,499	16%	(9)%
Life Sciences	1,234	998	1,015	24%	(2)%
All Other	1,243	465	230	167%	102%
Net sales of reportable segments and All Other	\$ 14,120	\$ 11,452	\$ 11,656	23%	(2)%

Segment and "All Other" net sales and variances are discussed in detail in the Reportable Segments section of our MD&A.

Core Equity in Earnings of Affiliated Companies

The following provides a summary of core equity in earnings of affiliated companies (in millions):

	Year ended December 31,			% change	
	2021	2020	2019	21 vs. 20	20 vs. 19
Hemlock Semiconductor Group (1)		\$ 82	\$ 229	(100)%	(64)%
All other	\$ 38	4	8	850%	(50)%
Total core equity earnings	\$ 38	\$ 86	\$ 237	(56)%	(64)%

(1) The year ended December 31, 2020, includes HSG's results of operations through September 8, 2020. Corning began consolidating HSG on September 9, 2020.

Core Net Income

In the year ended December 31, 2021, we generated core net income of \$1.8 billion or \$2.07 per share, compared to core net income generated in the year ended December 31, 2020 of \$1.2 billion, or \$1.39 per share. The increase in core net income of \$574 million was driven by the following items:

- Higher reportable segment net income of \$505 million, primarily driven by higher sales volume; and
- Lower net losses of \$163 million for "All Other" primarily driven by full-year consolidation of HSG.

Core earnings per share increased in the year ended December 31, 2021 to \$2.07 per share, primarily driven by the increase in core net income, outlined above.

Core Earnings per Common Share

The following table sets forth the computation of core basic and core diluted earnings per common share (in millions, except per share amounts):

	2021	2020	2019
Core net income attributable to Corning Incorporated	\$ 1,811	\$ 1,237	\$ 1,578
Less: Series A convertible preferred stock dividend	24	98	98
Core net income available to common shareholders - basic	1,787	1,139	1,480
Plus: Series A convertible preferred stock dividend	24	98	98
Core net income available to common shareholders - diluted	\$ 1,811	\$ 1,237	\$ 1,578
Weighted-average common shares outstanding - basic	828	761	776
Effect of dilutive securities:			
Stock options and other dilutive securities	16	11	8
Series A convertible preferred stock	31	115	115
Weighted-average common shares outstanding - diluted	875	887	899
Core basic earnings per common share	\$ 2.16	\$ 1.50	\$ 1.91
Core diluted earnings per common share	\$ 2.07	\$ 1.39	\$ 1.76

Reconciliation of Non-GAAP Measures

We utilize certain financial measures and key performance indicators that are not calculated in accordance with GAAP to assess our financial and operating performance. A non-GAAP financial measure is defined as a numerical measure of a company's financial performance that (i) excludes amounts, or is subject to adjustments that have the effect of excluding amounts, that are included in the comparable measure calculated and presented in accordance with GAAP in the consolidated statements of income or statements of cash flows, or (ii) includes amounts, or is subject to adjustments that have the effect of including amounts, that are excluded from the comparable measure as calculated and presented in accordance with GAAP in the consolidated statements of income or statements of cash flows.

Core net sales, core equity in earnings of affiliated companies, core net income and the related per share numbers are non-GAAP financial measures utilized by our management to analyze financial performance without the impact of items that are driven by general economic conditions and events that do not reflect the underlying fundamentals and trends in the Company's operations.

See "Items Excluded from GAAP Measures" for the descriptions of the footnoted reconciling items.

The following tables reconcile our non-GAAP financial measures to their most directly comparable GAAP financial measure (amounts in millions except percentages and per share amounts):

	Year ended December 31, 2021					
	Net Sales	Equity earnings	Income before income taxes	Net income	Effective tax rate (a)	Earnings per share
As reported	\$ 14,082	\$ 35	\$ 2,397	\$ 1,906	20.5%	\$ 1.28
Preferred stock redemption (b)						0.90
Subtotal	14,082	35	2,397	1,906	20.5%	2.18
Constant-currency adjustment (1)	38	3	87	76		0.09
Translation gain on Japanese yen-denominated debt (2)			(180)	(138)		(0.16)
Translated earnings contract gain, net (3)			(354)	(273)		(0.32)
Acquisition-related costs (4)			159	123		0.15
Discrete tax items and other tax-related adjustments (5)				(24)		(0.03)
Pension mark-to-market adjustment (6)			32	25		0.03
Restructuring, impairment and other charges and credits (7)			110	78		0.09
Litigation, regulatory and other legal matters (8)			16	27		0.03
Preferred stock conversion (9)			17	17		0.02
Bond redemption loss (10)			31	23		0.03
Loss on investment (11)			23	17		0.02
Gain on sale of business (12)			(54)	(46)		(0.05)
Core performance measures	\$ 14,120	\$ 38	\$ 2,284	\$ 1,811	20.7%	\$ 2.07

(a) Based upon statutory tax rates in the specific jurisdiction for each event.

(b) On January 16, 2021, the Preferred Stock became convertible into 115 million Common Shares, in whole or in part, at the option of the holder, Samsung Display Co., Ltd. ("SDC"). On April 5, 2021, Corning and SDC executed a Share Repurchase Agreement ("SRA"). Pursuant to the SRA, the Preferred Stock was converted into 115 million Common Shares. Corning immediately repurchased 35 million of the converted Common Shares and excluded them from the weighted-average common shares outstanding for the calculation of the Company's basic and diluted earnings per share. The redemption of these Common Shares resulted in an \$803 million reduction of retained earnings which reduced the net income available to common shareholders.

See “Items Excluded from GAAP Measures” for the descriptions of the footnoted reconciling items.

Year ended December 31, 2020						
	Net sales	Equity (losses) earnings	Income before income taxes	Net income	Effective tax rate (a)	Earnings per share
As reported	\$ 11,303	\$ (25)	\$ 623	\$ 512	17.8%	\$ 0.54
Constant-currency adjustment (1)	44		22	17		0.02
Translation loss on Japanese yen-denominated debt (2)			86	67		0.09
Translated earnings contract loss, net (3)			46	36		0.05
Acquisition-related costs (4)			156	114		0.15
Discrete tax items and other tax-related adjustments (5)				(24)		(0.03)
Pension mark-to-market adjustment (6)			31	24		0.03
Restructuring, impairment and other charges and credits (7)			827	621		0.80
Litigation, regulatory and other legal matters (8)			144	120		0.16
Bond redemption loss (10)			22	17		0.02
Gain on investment (11)			(107)	(83)		(0.11)
Equity in losses of affiliated companies (13)		111	111	98		0.13
Transaction-related gain, net (14)			(498)	(387)		(0.50)
Cumulative adjustment related to customer contract (15)	105		105	105		0.14
Core performance measures	\$ 11,452	\$ 86	\$ 1,568	\$ 1,237	21.1%	\$ 1.39

Year ended December 31, 2019						
	Net sales	Equity earnings	Income before income taxes	Net income	Effective tax rate (a)	Earnings per share
As reported	\$ 11,503	\$ 17	\$ 1,216	\$ 960	21.1%	\$ 1.07
Constant-currency adjustment (1)	153	1	115	115		0.13
Translation loss on Japanese yen-denominated debt (2)			3	2		0.00
Translated earnings contract gain, net (3)			(245)	(190)		(0.21)
Acquisition-related costs (4)			130	99		0.11
Discrete tax items and other tax-related adjustments (5)				37		0.04
Litigation, regulatory and other legal matters (8)			(17)	(13)		(0.01)
Restructuring, impairment and other charges and credits (7)		6	439	334		0.37
Pension mark-to-market adjustment (6)			95	69		0.08
Equity in losses of affiliated companies (13)		213	213	165		0.18
Core performance measures	\$ 11,656	\$ 237	\$ 1,949	\$ 1,578	19.0%	\$ 1.76

(a) Based upon statutory tax rates in the specific jurisdiction for each event.

Items Excluded from GAAP Measures

Items we exclude from GAAP measures to arrive at core performance measures are as follows:

- (1) Constant-currency adjustment: Because a significant portion of segment revenue and expenses are denominated in currencies other than the U.S. dollar, management believes it is important to understand the impact on core net income of translating these currencies into U.S. dollars. Our Display Technologies and Specialty Materials segments sales and net income are primarily denominated in Japanese yen, but are also impacted by the South Korean won, Chinese yuan, and new Taiwan dollar. Environmental Technologies and Life Science segment sales and net income are primarily impacted by the euro and Chinese yuan. Presenting results on a constant-currency basis mitigates the translation impact and allows management to evaluate performance period over period, analyze underlying trends in our businesses, and establish operational goals and forecasts. We establish constant-currency rates based on internally derived management estimates which are closely aligned with the currencies we have hedged.

Constant-currency rates are as follows:

Currency	Japanese yen	Korean won	Chinese yuan	New Taiwan dollar	Euro
Rate	¥107	₩1,175	¥6.7	NT\$31	€81

- (2) Translation (gain) loss on Japanese yen-denominated debt: We have excluded the gain or loss on the translation of our yen-denominated debt to U.S. dollars.
- (3) Translated earnings contract (gain) loss, net: We have excluded the impact of the realized and unrealized gains and losses of our Japanese yen, South Korean won, Chinese yuan, euro and new Taiwan dollar-denominated foreign currency hedges related to translated earnings, as well as the unrealized gains and losses of our British pound-denominated foreign currency hedges related to translated earnings.
- (4) Acquisition-related costs: These expenses include intangible amortization, inventory valuation adjustments and external acquisition-related deal costs.
- (5) Discrete tax items and other tax-related adjustments: For 2021, 2020 and 2019, these include discrete period tax items such as changes in tax law, the impact of tax audits, changes in tax reserves, changes in judgement about the realizability of certain deferred tax assets, net Subpart F income, and other tax-related adjustments.
- (6) Pension mark-to-market adjustment: Defined benefit pension mark-to-market gains and losses, which arise from changes in actuarial assumptions and the difference between actual and expected returns on plan assets and discount rates.
- (7) Restructuring, impairment and other charges and credits: This amount includes restructuring, impairment losses and other charges and credits, as well as other expenses, primarily accelerated depreciation and asset write-offs, which are not related to continuing operations and are not classified as restructuring expense. During the third quarter of 2021, we recorded asset write-offs and charges related to facility repairs resulting from the impact of power outages. The Company is pursuing recoveries under its applicable property insurance policies.
- (8) Litigation, regulatory and other legal matters: Includes amounts that reflect developments in commercial litigation, intellectual property disputes, adjustments to our estimated liability for environmental-related items and other legal matters.
- (9) Preferred stock conversion: This amount is the put option from the Share Repurchase Agreement with Samsung Display Co., Ltd.
- (10) Bond redemption loss: Amount represents premiums on redemption of debentures.
- (11) (Loss) gain on investment: Amount represents the gain or loss recognized on investment due to mark-to-mark adjustments for the change in fair value or the disposition of the investment.
- (12) Gain on sale of business: Amount represents the gain recognized for the sale of certain businesses.
- (13) Equity in losses of affiliated companies: These adjustments relate to costs not related to continuing operations of our affiliated companies, such as restructuring, impairment losses, inventory adjustments, and other charges and credits and settlements under “take-or-pay” contracts. The year ended December 31, 2020 includes the Company’s share of a loss related to the sale of a business.
- (14) Transaction-related gain, net: Amount represents the gain recorded on a previously held equity investment in HSG.
- (15) Cumulative adjustment related to customer contract: The negative impact of a cumulative adjustment recorded during the first quarter of 2020 to reduce revenue by \$105 million. The adjustment was associated with a previously recorded commercial benefit asset, reflected as a prepayment, to a customer with a long-term supply agreement that substantially exited its production of LCD panels.

REPORTABLE SEGMENTS

Reportable segments are as follows:

- Display Technologies – manufactures glass substrates for flat panel liquid crystal displays and other high-performance display panels.
- Optical Communications – manufactures carrier network and enterprise network components for the telecommunications industry.
- Specialty Materials – manufactures products that provide more than 150 material formulations for glass, glass ceramics and fluoride crystals to meet demand for unique customer needs.
- Environmental Technologies – manufactures ceramic substrates and filters for automotive and diesel applications.
- Life Sciences – manufactures glass and plastic labware, equipment, media, serum and reagents enabling workflow solutions for drug discovery and bioproduction.

All other businesses that do not meet the quantitative threshold for separate reporting have been grouped as “All Other.” This group is primarily comprised of the results of HSG, pharmaceutical technologies, auto glass, new product lines and development projects, as well as other businesses and certain corporate investments.

The Company obtained a controlling interest in HSG during the third quarter of 2020 and has consolidated results in “All Other” since September 9, 2020. Refer to Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for additional information on this transaction.

Financial results for the reportable segments are prepared on a basis consistent with the internal disaggregation of financial information to assist the Chief Operating Decision Maker (“CODM”) in making internal operating decisions. The impact of changes in the Japanese yen, South Korean won, Chinese yuan and new Taiwan dollar are excluded from segment sales and segment net income for the Display Technologies and Specialty Materials segments. The impact of changes in the euro and Chinese yuan are excluded from segment sales and segment net income for the Environment Technologies segment. The impact of changes in the euro, Chinese yuan and Japanese yen are excluded from segment sales and segment net income for the Life Sciences segment. Certain income and expenses are included in the unallocated amounts in the reconciliation of reportable segment net income (loss) to consolidated net income. These include items that are not used by the CODM in evaluating the results of or in allocating resources to the segments and include the following items: the impact of the translated earnings contracts; acquisition-related costs; certain discrete tax items and other tax-related adjustments; certain litigation, regulatory and other legal matters; restructuring, impairment losses and other charges and credits; adjustments relating to acquisitions; and other non-recurring non-operational items. Although these amounts are excluded from segment results, they are included in reported consolidated results.

Earnings of equity affiliates that are closely associated with the reportable segments are included in the respective segment’s net income (loss). Certain common expenses among reportable segments have been allocated differently than they would for stand-alone financial information. Segment net income (loss) may not be consistent with measures used by other companies.

Display Technologies

The following table provides net sales and net income for the Display Technologies segment (in millions):

	Year ended December 31,			% change	% change
	2021	2020	2019	21 vs. 20	20 vs. 19
Segment net sales	\$ 3,700	\$ 3,172	\$ 3,254	17%	(3%)
Segment net income	\$ 960	\$ 717	\$ 786	34%	(9%)

Net sales in the Display Technologies segment increased by \$528 million, or 17%, for the year ended December 31, 2021, when compared to the prior year, primarily driven by volume increases of approximately mid-teens in percentage terms and pricing consistent with 2020.

Net income in the Display Technologies segment increased by \$243 million, or 34%, in the year ended December 31, 2021, primarily driven by the changes in sales, outlined above.

Optical Communications

The following table provides net sales and net income for the Optical Communications segment (in millions):

	Year ended December 31,			% change	% change
	2021	2020	2019	21 vs. 20	20 vs. 19
Segment net sales	\$ 4,349	\$ 3,563	\$ 4,064	22%	(12%)
Segment net income	\$ 553	\$ 366	\$ 489	51%	(25%)

Net sales increased by \$786 million, or 22%, in the year ended December 31, 2021, when compared to the same period in 2020, primarily due to higher sales in carrier products and enterprise products, up \$588 million and \$198 million, respectively, primarily driven by strong growth of 5G, broadband and cloud computing.

Net income in the year ended December 31, 2021 increased by \$187 million, or 51%, primarily driven by the changes in sales, outlined above, partially offset by increased raw material, freight and logistics costs.

Movements in foreign currency exchange rates did not materially impact net income in this segment in the year ended December 31, 2021 when compared to the same period in 2020.

Specialty Materials

The following table provides net sales and net income for the Specialty Materials segment (in millions):

	Year ended December 31,			% change	% change
	2021	2020	2019	21 vs. 20	20 vs. 19
Segment net sales	\$ 2,008	\$ 1,884	\$ 1,594	7%	18%
Segment net income	\$ 371	\$ 423	\$ 302	(12%)	40%

Net sales in the Specialty Materials segment increased by \$124 million, or 7%, in the year ended December 31, 2021, when compared to the same period in 2020, primarily driven by demand for our premium cover materials and advanced optics content used in semiconductor manufacturing.

Net income in the year ended December 31, 2021 decreased by \$52 million, or 12%, when compared to the same period in 2020, primarily driven by increased investments in innovation programs that are moving towards commercialization.

Environmental Technologies

The following table provides net sales and net income for the Environmental Technologies segment (in millions):

	Year ended December 31,			% change	% change
	2021	2020	2019	21 vs. 20	20 vs. 19
Segment net sales	\$ 1,586	\$ 1,370	\$ 1,499	16%	(9%)
Segment net income	\$ 269	\$ 197	\$ 263	37%	(25%)

Net sales increased \$216 million, or 16% in the year ended December 31, 2021, primarily due to increased sales of heavy-duty diesel products and gas-particulate filters.

Net income in the year ended December 31, 2021 increased by \$72 million, or 37%, driven by the sales increase outlined above, but negatively impacted by inflation and increased freight and logistics costs.

Life Sciences

The following table provides net sales and net income for the Life Sciences segment (in millions):

	Year ended December 31,			% change 21 vs. 20	% change 20 vs. 19
	2021	2020	2019		
Segment net sales	\$ 1,234	\$ 998	\$ 1,015	24%	(2%)
Segment net income	\$ 194	\$ 139	\$ 150	40%	(7%)

Net sales in the Life Sciences segment increased by \$236 million, or 24%, primarily driven by ongoing increased demand to support the global pandemic response, continued recovery in research labs, and strong demand for bioproduction vessels and diagnostic-related consumables.

Net income increased by \$55 million, or 40%, in the year ended December 31, 2021, primarily driven by the changes in sales outlined above.

All Other

All other businesses that do not meet the quantitative threshold for separate reporting have been grouped as “All Other.” This group is primarily comprised of the results of HSG, pharmaceutical technologies, auto glass, new product lines and development projects, as well as other businesses and certain corporate investments.

The Company obtained a controlling interest in HSG during the third quarter of 2020 and has consolidated results in “All Other” since September 9, 2020. Refer to Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for additional information on this transaction.

The following table provides net sales and net loss for “All Other” (in millions):

	Year ended December 31,			% change 21 vs. 20	% change 20 vs. 19
	2021	2020	2019		
Segment net sales	\$ 1,243	\$ 465	\$ 230	167%	102%
Segment net loss	\$ (51)	\$ (214)	\$ (289)	76%	26%

Net sales of this segment increased by \$778 million, or 167%, in the year ended December 31, 2021, when compared to the same period in 2020, driven primarily by full-year consolidation of HSG.

The decrease in the net loss of \$163 million is primarily driven by the increases in sales outlined above.

LIQUIDITY AND CAPITAL RESOURCES

Financing and Capital Structure

The following items discuss Corning’s financing and changes in capital structure during 2021 and 2020:

2021

In the third quarter of 2021, Corning redeemed \$250 million of 3.7% debentures due in 2023, paying a premium of \$19 million by exercising our make-whole call. The bond redemption resulted in a \$20 million loss during the same quarter.

In the second quarter of 2021, Corning redeemed \$375 million of 2.9% debentures due in 2022, paying a premium of \$10 million by exercising our make-whole call. The bond redemption resulted in an \$11 million loss during the same quarter.

Losses on bond redemption have been recorded in other income (expense), net on the consolidated statements of income during the quarter in which they occurred.

Borrowings under the three unsecured variable rate loan facilities for the year ended December 31, 2021, totaled 1,764 million Chinese yuan, or approximately \$277 million.

As of December 31, 2021, the 25 billion Japanese yen facility, equivalent to \$217 million, has not been drawn upon.

2020

During the fourth quarter of 2020, Corning redeemed \$100 million of 7.0% debentures due in 2024 with a carrying amount of \$99 million, paying a \$21 million make-whole call premium. The total payment of \$121 million is disclosed in financing activities in the consolidated statements of cash flows. The redemption resulted in a loss of \$22 million.

In conjunction with the change in control of HSG on September 9, 2020, a variable interest rate loan of \$175 million, maturing on September 8, 2021, was made to DC HSC Holdings, LLC, now a consolidated subsidiary of Corning. As of December 31, 2021, the third-party debt has been fully repaid. Refer to Note 3 (Investments) to the consolidated financial statements for additional information.

During the second quarter of 2020, Corning established an incremental liquidity facility for 25 billion Japanese yen, equivalent to \$232 million with a maturity of three years. As of December 31, 2020, the facility has not been drawn upon.

In the first quarter of 2020, Corning established two unsecured variable rate loan facilities for 1,050 million Chinese yuan, equivalent to \$150 million, and 749 million Chinese yuan, equivalent to \$105 million, each with a maturity of five years. In the fourth quarter of 2020, Corning established a third unsecured variable rate loan facility for 546 million Chinese yuan, equivalent to \$84 million, with a maturity of five years. Borrowings under these loan facilities for the year ended December 31, 2020, totaled 1,691 million Chinese yuan, or approximately \$243 million. These Chinese yuan-denominated proceeds will not be converted into USD and will be used for capital projects. Payments of principal and interest on the Notes will be in Chinese yuan, or should yuan be unavailable due to circumstances beyond Corning's control, a USD equivalent. These loans are the sole obligations of the subsidiary borrowers and are not guaranteed by any other Corning entity.

Common Stock Dividends

On February 2, 2022, Corning's Board of Directors declared a 13% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.24 to \$0.27 per share of common stock, beginning with the dividend paid in the first quarter of 2022. This increase marks the eleventh dividend increase since October 2011.

On February 3, 2021, Corning's Board of Directors declared a 9% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.22 to \$0.24 per share of common stock, beginning with the dividend paid in the first quarter of 2021.

On February 5, 2020, Corning's Board of Directors declared a 10% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.20 to \$0.22 per share of common stock, beginning with the dividend paid in the first quarter of 2020.

Fixed Rate Cumulative Convertible Preferred Stock, Series A

As of December 31, 2020, Corning had 2,300 outstanding shares of Fixed Rate Cumulative Convertible Preferred Stock, Series A (the "Preferred Stock").

On January 16, 2021, the Preferred Stock became convertible into 115 million Common Shares, in whole or in part, at the option of SDC. On April 5, 2021, Corning and SDC executed the SRA.

Pursuant to the SRA, on April 8, 2021 (the "Initial Closing Date"), the Preferred Stock was fully converted into Common Shares. Immediately following the conversion, Corning repurchased and retired 35 million of the Common Shares held by SDC for an aggregate purchase price of approximately \$1.5 billion, of which approximately \$507 million was paid on the Initial Closing Date. Subsequent payments of approximately \$507 million will be paid on each of the first and second anniversaries of the Initial Closing Date.

- The 35 million Common Shares repurchased by Corning were excluded from the weighted-average common shares outstanding for the calculation of the Company's basic and diluted earnings per share starting on the Initial Closing Date.
- The Common Shares repurchased were accounted for as a redemption of Preferred Stock. The excess of the \$1.5 billion consideration paid over the carrying value of the Preferred Stock reduced the net income available to common shareholders by \$803 million.

The remaining 80 million Common Shares were accounted for as a conversion of Preferred Stock and resulted in an increase of common stock and additional paid-in-capital based on the carrying value of the Preferred Stock and were included in the weighted-average common shares outstanding for the calculation of the Company's basic and diluted earnings per share.

Refer to Note 17 (Shareholders' Equity) to the consolidated financial statements for additional information.

Customer Deposits

As of December 31, 2021 and 2020, Corning had customer deposits of approximately \$1.3 billion and \$1.4 billion. The majority of these were non-refundable cash deposits by customers to secure rights to products produced by Corning under long-term supply agreements. The duration of these long-term supply agreements ranges up to 10 years. As products are shipped to customers, Corning will recognize revenue and reduce the amount of the customer deposit liability.

In the years ended December 31, 2021 and 2020, customer deposits used were \$216 million and \$140 million, respectively. As of December 31, 2021 and 2020, \$1.1 billion was recorded as other long-term liabilities and the remaining \$223 million and \$211 million, respectively, were classified as other current liabilities on our consolidated balance sheets.

Deferred Revenue

During the third quarter of 2020, Corning obtained a controlling interest in HSG and recorded deferred revenue of \$1,070 million at fair value related to the performance obligations of non-refundable consideration previously received by HSG from its customers under long term supply agreements.

The deferred revenue is tracked on a per-customer contract-unit basis. As customers take delivery of the committed volumes under the terms of the contract, a per unit amount of deferred revenue is recognized when control of the promised goods is transferred to the customer based upon the units shipped compared to the remaining contractual units.

As of December 31, 2021 and 2020, \$764 million and \$872 million, respectively, were classified as a long-term liability and \$148 million and \$152 million, respectively, were classified as a current liability.

Capital Spending

Capital spending was \$1.6 billion in 2021, an increase of \$260 million when compared to 2020. We expect our 2022 capital expenditures to be consistent with 2021.

Cash Flows

Summary of cash flow data (in millions):

	Year ended December 31,		
	2021	2020	2019
Net cash provided by operating activities	\$ 3,412	\$ 2,180	\$ 2,031
Net cash used in investing activities	\$ (1,419)	\$ (1,310)	\$ (1,891)
Net cash used in financing activities	\$ (2,452)	\$ (729)	\$ (47)

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Net cash provided by operating activities increased by \$1,232 million in the year ended December 31, 2021, when compared to the same period in the prior year. The change was primarily driven by an increase in net income.

Net cash used in investing activities increased by \$109 million in the year ended December 31, 2021, when compared to the same period last year, primarily driven by an increase in capital expenditures.

Net cash used in financing activities increased by \$1,723 million in the year ended December 31, 2021, when compared to the same period last year. The increase was primarily driven by higher debt repayments, redemption of Preferred Stock and repurchases of common stock of \$639 million, \$507 million and \$169 million, respectively.

Defined Benefit Pension Plans

We have defined benefit pension plans covering certain domestic and international employees. Our largest single pension plan is Corning's U.S. qualified plan. At December 31, 2021, this plan accounted for 77% of our consolidated defined benefit pension plans' projected benefit obligation and 86% of the related plans' assets.

In 2021, Corning made no voluntary contributions to our domestic defined benefit pension plan and cash contributions of \$24 million to our international pension plans. During 2022, the Company anticipates making cash contributions of \$29 million to the international pension plans.

Refer to Note 13 (Employee Retirement Plans) to the consolidated financial statements for additional information.

Key Balance Sheet Data

Balance sheet and working capital measures are provided in the following table (in millions):

	December 31,	
	2021	2020
Working capital	\$ 2,853	\$ 4,237
Current ratio	1.6:1	2.1:1
Trade accounts receivable, net of doubtful accounts	\$ 2,004	\$ 2,133
Days sales outstanding	49	57
Inventories	\$ 2,481	\$ 2,438
Inventory turns	3.7	3.2
Days payable outstanding ⁽¹⁾	50	44
Long-term debt	\$ 6,989	\$ 7,816
Total debt	\$ 7,044	\$ 7,972
Total debt to total capital	36%	37%

(1) Includes trade payables only.

Management Assessment of Liquidity

We ended 2021 with \$2.1 billion of cash and cash equivalents. Our cash and cash equivalents are held in various locations throughout the world and are generally unrestricted. We utilize a variety of strategies to ensure that our worldwide cash is available in the locations in which it is needed. At December 31, 2021, approximately 58% of the consolidated cash and cash equivalents were held outside the U.S.

Corning also has a commercial paper program pursuant to which we may issue short-term, unsecured commercial paper notes up to a maximum aggregate principal amount outstanding at any one time of \$1.5 billion. Under this program, the Company may issue the paper from time to time and will use the proceeds for general corporate purposes. At December 31, 2021, Corning did not have outstanding commercial paper.

The Company's \$1.5 billion Revolving Credit Agreement is available to support obligations under the commercial paper program and for general corporate purposes, if needed. At December 31, 2021, Corning did not have any amounts outstanding under the Revolving Credit Agreement.

Share Repurchases

During the years ended December 31, 2021 and 2020, the Company repurchased 7.3 million and 4.1 million shares of common stock, respectively, on the open market for approximately \$274 million and \$105 million as part of its 2018 and 2019 Repurchase Programs.

On April 8, 2021, the Company repurchased 35 million shares of common stock, under the 2018 and 2019 Repurchase Programs. These shares were repurchased immediately following the conversion of Preferred Stock, for an aggregate purchase price of approximately \$1.5 billion, of which approximately \$507 million was paid on the Initial Closing Date. Subsequent payments of approximately \$507 million will be paid on each of the first and second anniversaries of the Initial Closing Date.

Refer to Note 17 (Shareholders' Equity) to the consolidated financial statements for additional information.

Other

We complete comprehensive reviews of our significant customers and their creditworthiness by analyzing their financial strength at least annually or more frequently for customers where we have identified a measure of increased risk. We closely monitor payments and developments to identify potential customer credit issues. From time to time, we factor or sell accounts receivable. Sales of accounts receivable during 2021 were \$602 million. We believe \$405 million would have been collected during the normal course of business in 2021. We currently have not identified any potential material impact on our liquidity resulting from customer credit issues.

Our major source of funding for 2021 and beyond will be our operating cash flow, our existing balances of cash and cash equivalents and proceeds from any issuances of debt. We believe we have sufficient liquidity to fund operations, acquisitions, capital expenditures, scheduled debt repayments, dividend payments and share repurchase programs for the next twelve months.

Our Revolving Credit Agreement includes affirmative and negative covenants with which we must comply, including a leverage (debt to capital ratio) financial covenant. The required leverage ratio is a maximum of 60%. At December 31, 2021, our leverage using this measure was approximately 36%. As of December 31, 2021, Corning was in compliance and no amounts were outstanding under the Company's Revolving Credit Agreement.

Our debt instruments contain customary event of default provisions, which allow the lenders the option of accelerating all obligations upon the occurrence of certain events. In addition, some of our debt instruments contain a cross default provision, whereby an uncured default exceeding a specified amount on one debt obligation of the Company, also would be considered a default under the terms of another debt instrument. As of December 31, 2021, we were in compliance with all such provisions.

Management is not aware of any known trends or any known demands, commitments, events or uncertainties that will result in or that are reasonably likely to result in a material decrease in our liquidity. In addition, other than items discussed, there are no known material trends, favorable or unfavorable, in our capital resources and no expected material changes in the mix and relative cost of such resources.

Translated Earnings Contracts

Corning has hedged a significant portion of its projected yen exposure for the period 2022 through 2024, with average rate forwards and options. In the years ended December 31, 2021 and 2020, we recorded a pre-tax net gain of \$363 million and a pre-tax net loss of \$38 million, respectively, related to changes in the fair value of these instruments. Included in these amounts is a realized gain of \$27 million and a realized loss of \$31 million, respectively. The gross notional value outstanding for these instruments which hedge our exposure to the Japanese yen at December 31, 2021 and 2020, was \$6.5 billion.

We have entered into average rate forwards to hedge our translation exposure resulting from movements in the South Korean won and its impact on our net income. In the years ended December 31, 2021 and 2020, we recorded a pre-tax net loss of \$33 million and a pre-tax net gain of \$24 million, respectively, related to changes in the fair value of these instruments. Included in these amounts are realized gains of \$11 million and \$1 million, respectively. These instruments had a gross notional value outstanding at December 31, 2021 and 2020, of \$1.2 billion and \$0.4 billion, respectively.

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We have entered into a portfolio of average rate forwards to hedge against our euro translation exposure. In the years ended December 31, 2021 and 2020, we recorded pre-tax losses of \$24 million and \$21 million, respectively. Included in these amounts are realized gains of \$12 million and \$20 million, respectively. At December 31, 2021 and 2020, the euro-denominated average rate instruments had a gross notional amount of \$0.2 billion and \$0.5 billion, respectively.

These derivative instruments are not designated as accounting hedges, and changes in fair value are recorded in earnings in the translated earnings contract gain (loss), net line of the consolidated statements of income.

Off Balance Sheet Arrangements

Off balance sheet arrangements are transactions, agreements, or other contractual arrangements with an unconsolidated entity for which Corning has an obligation to the entity that is not recorded in our consolidated financial statements.

Corning's off balance sheet arrangements include guarantee and indemnity contracts. At the time a guarantee is issued, the Company is required to recognize a liability for the fair value or market value of the obligation it assumes. In the normal course of our business, we do not routinely provide significant third-party guarantees. Generally, third-party guarantees provided by Corning are limited to certain financial guarantees, including stand-by letters of credit and performance bonds, and the incurrence of contingent liabilities in the form of purchase price adjustments related to attainment of milestones. These guarantees have various terms, and none of these guarantees are individually significant.

Refer to Note 14 (Commitments, Contingencies and Guarantees) to the consolidated financial statements for additional information.

For variable interest entities, we assess the terms of our interest in each entity to determine if we are the primary beneficiary. The primary beneficiary of a variable interest entity is the party that holds a controlling financial interest. Variable interests are the ownership, contractual, or other pecuniary interests in an entity, that change with changes in the fair value, of the entity's net assets excluding variable interest entities.

Corning has identified nine entities that qualify as variable interest entities and are not consolidated. These entities are not significant to Corning's consolidated financial statements.

Corning does not have retained interest in assets transferred to an unconsolidated entity that serve as credit, liquidity or market risk support to that entity.

ENVIRONMENT

Refer to Item 3. Legal Proceedings or Note 14 (Commitments, Contingencies and Guarantees) to the consolidated financial statements for information.

CRITICAL ACCOUNTING ESTIMATES

The preparation of financial statements requires us to make estimates and assumptions that affect amounts reported therein. The estimates that required us to make difficult, subjective or complex judgments, including future projections of performance and relevant discount rates, are set forth below.

Valuation of the Previously Held Equity Interest from the Consolidation of HSG

We account for the change in controlling interest using the acquisition method of accounting, which requires us to estimate the fair values of the assets and liabilities recorded. Assets recorded include intangible assets such as developed technologies and know-how, tradenames and customer-related intangibles, fixed assets and inventories. Liabilities recorded include contract liabilities such as customer deposits and deferred revenue, debt, and other liabilities. These assets and liabilities recorded are assessed at the time of the change in control and require judgment in ascertaining the fair values. In this business combination, achieved in stages, we also remeasure the previously held equity interest in HSG at the time of the change in control at fair value and recognize the resulting gain in earnings. Independent appraisals assisted the Company in the determination of the fair value of certain assets and liabilities. Such appraisals are based on acceptable valuation models as well as inputs and assumptions provided by us. Additional information related to the fair value of the assets and liabilities recorded during the allocation period, not to exceed one year, may result in changes to the recorded values of assets and liabilities, resulting in an offsetting adjustment to the goodwill associated with the business combination. Changes in assumptions and estimates after completing the allocation of the purchase price to the assets and liabilities acquired, as well as differences in actual and estimated results could result in impacts to Corning's financial results.

In September 2020, HSG redeemed DuPont's entire ownership interest in HSG for \$250 million (the "Redemption"). Upon completion of the Redemption, Corning recognized a pre-tax gain of \$498 million on its previously held equity investment in HSG as a result of the consolidation resulting from the Redemption. The gain was calculated based on the difference between fair value and carrying value of the equity method investment immediately preceding the Redemption. The fair value of Corning's equity interest in HSG was estimated by applying the income approach, which was based on significant assumptions such as projected revenue and discount rate. The Company used a discount rate of 16.5% and terminal growth rate of zero.

Upon completion of the Redemption, we recognized intangible assets consisting primarily of \$215 million of developed technologies and know-how, and \$70 million of other intangibles that are amortized over the weighted average useful life of approximately 20 and 15 years, respectively. The developed technologies and know-how intangible assets were valued using two appropriate valuation methods. The developed technologies and know-how intangibles assets valued at \$125 million utilized the relief from royalty method, which was based on significant inputs such as projected revenue and key assumptions, including a discount rate of 21.0% and a royalty rate of 7.0%. The developed technologies and know-how intangibles assets valued at \$90 million utilized the multi-period excess earnings method under the income approach, which was based on significant inputs such as projected revenue and the key assumption of a discount rate of 19.0%.

Valuation of Deferred Revenue and Customer Deposits from the consolidation of HSG

Upon completion of the Redemption and resulting consolidation, we recorded a customer deposit liability and deferred revenue.

Corning recorded a customer deposit of \$264 million, at the fair value, of refundable payments that HSG received from a customer under a long-term supply agreement. The discount rates used to calculate the present value of the customer deposit range from 2.54% to 3.23%. The deposits will be repaid from 2029 to 2034 provided that all purchase obligations of this customer under the supply agreement have been satisfied.

We recorded deferred revenue of \$1,070 million at fair value related to the performance obligations of non-refundable consideration previously received by HSG from its customers under long term supply agreements. The fair values of deferred revenue were estimated by applying a bottoms-up cost buildup method of the cost approach based on significant inputs such as the cost to fulfill the obligations as well as key assumptions including a normal profit margin.

Refer to Note 3 (Investments) and Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for more information.

Impairment of assets held for use

We are required to assess the recoverability of the carrying value of long-lived assets when an indicator of impairment has been identified. We review long-lived assets in each quarter in which impairment indicators are present. We must exercise judgment in assessing whether an event of impairment has occurred.

Manufacturing equipment includes certain components of production equipment that are constructed of precious metals, primarily platinum and rhodium. These metals are not depreciated because they have very low physical losses and are repeatedly reclaimed and reused in our manufacturing process over a very long useful life. Precious metals are reviewed for impairment as part of our assessment of long-lived assets. This review considers all the Company's precious metals that are either in place in the production process; in reclamation, fabrication, or refinement in anticipation of re-use; or awaiting use to support increased capacity. Precious metals are only acquired to support our operations and are not held for trading or other non-manufacturing related purposes.

Examples of events or circumstances that may be indicative of impairments include, but are not limited to:

- A significant decrease in the market price of an asset;
- A significant change in the use of a long-lived asset or its physical condition;
- A significant adverse change in legal factors or in the business climate that could affect the value of the asset, including an adverse action or assessment by a regulator;
- An accumulation of costs significantly more than the amount originally expected for the acquisition or construction of an asset;
- A current-period operating or cash flow loss combined with a history of operating or cash flow losses or a projection or forecast that demonstrates continuing losses associated with the use of an asset; and
- A current expectation that, more likely than not, an asset will be sold or otherwise disposed of significantly before the end of its previously estimated useful life.

For purposes of recognition and measurement of an impairment loss, a long-lived asset or assets is grouped with other assets and liabilities at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities. We must exercise judgment in assessing the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities. Our assessment is performed at the reportable segment level. For most of our reportable segments, we concluded that locations or businesses within these segments which share production along the supply chain must be combined to appropriately identify cash flows that are largely independent of the cash flows of other assets and liabilities.

For long-lived assets, when impairment indicators are present, we compare estimated undiscounted future cash flows, including the eventual disposition of the asset group at market value, to the assets' carrying value to determine if the asset group is recoverable. This assessment requires the exercise of judgment in assessing the future use of and projected value to be derived from the assets to be held and used. Assessments also consider changes in asset utilization, including the temporary idling of capacity and the expected timing for placing this capacity back into production.

For an asset group that fails the test of recoverability, the estimated fair value of long-lived assets is determined using an "income approach" that starts with the forecast of all the expected future net cash flows, including the eventual disposition at market value of long-lived assets, and considers the fair market value of all precious metals, if applicable. We assess the recoverability of the carrying value of long-lived assets at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities. If there is an impairment, a loss is recorded to reflect the difference between the assets' fair value and carrying value. Our estimates are based upon our historical experience, our commercial relationships, and available external information about future trends. We believe fair value assessments are most sensitive to market growth and the corresponding impact on volume and selling prices and that these are also more subjective than manufacturing cost and other assumptions. The Company believes its current assumptions and estimates are reasonable and appropriate.

At December 31, 2021 and 2020, the carrying value of precious metals was \$3.5 billion and \$3.4 billion, respectively, and significantly lower than the fair market value. Most of these precious metals are utilized by the Display Technologies and Specialty Materials segments. The potential for impairment exists in the future if negative events significantly decrease the cash flow of these segments. Such events include, but are not limited to, a significant decrease in demand for products or a significant decrease in profitability in our Display Technologies or Specialty Materials segments.

For the year ended December 31, 2020, Corning incurred a long-lived asset impairment and disposal loss for an asset group related to the reassessment and reprioritization of research and development programs within "All Other". Given the economic environment and market opportunities, Corning discontinued its investment in these research and development programs. The impairment analysis and disposition of certain assets resulted in a total pre-tax charge of \$217 million, which was substantially all the carrying value, inclusive of an insignificant amount of goodwill. The fair value of the asset group for the impairment analysis was measured using unobservable (Level 3) inputs.

Refer to Note 2 (Restructuring, Impairment and Other Charges and Credits) to the consolidated financial statements for additional information on restructuring activities and impairment.

Income taxes

We are required to exercise judgment about our future results in assessing the realizability of our deferred tax assets. Inherent in this estimation process is the requirement for us to estimate future book and taxable income and possible tax planning strategies. These estimates require us to exercise judgment about our future results, the prudence and feasibility of possible tax planning strategies, and the economic environments in which we do business. It is possible that actual results will differ from assumptions and require adjustments to allowances.

Corning accounts for uncertain tax positions in accordance with ASC Topic 740, Income Taxes, which requires that companies only record tax benefits for technical positions that are believed to have a greater than 50% likelihood of being sustained on their technical merits and then only to the extent of the amount of tax benefit that is greater than 50% likely of being realized upon settlement. In estimating these amounts, we must exercise judgment around factors such as the weighting of the tax law in our favor, the willingness of a tax authority to aggressively pursue an opposing position, or alternatively, consider a negotiated compromise, and our willingness to dispute a tax authorities' assertion to the level of appeal we believe is required to sustain our position. As a result, it is possible that our estimate of the benefits we will realize for uncertain tax positions may change when we become aware of new information affecting these judgments and estimates.

Fair value measures

As required, Corning uses two kinds of inputs to determine the fair value of assets and liabilities: observable and unobservable. Observable inputs are based on market data or independent sources, while unobservable inputs are based on the Company's own market assumptions. Once inputs have been characterized, we prioritize the inputs used to measure fair value into one of three broad levels. Characterization of fair value inputs is required for those accounting pronouncements that prescribe or permit fair value measurement. In addition, observable market data must be used when available and the highest-and-best-use measure should be applied to non-financial assets. Corning's major categories of financial assets and liabilities required to be measured at fair value are short-term and long-term investments, certain pension asset investments and derivatives. These categories use observable inputs only and are measured using a market approach based on quoted prices in markets considered active or in markets in which there are few transactions.

Derivative assets and liabilities may include interest rate swaps and forward exchange contracts that are measured using observable quoted prices for similar assets and liabilities. Included in our forward exchange contracts are foreign currency hedges that hedge our cash flow and translation exposure resulting from movements in the Japanese yen, South Korean won, euro, new Taiwan dollar, Chinese yuan and British pound. Changes in the fair value of contracts designated as cash flow hedges are recorded in accumulated other comprehensive loss in shareholders' equity and reclassified into income when the underlying hedged item impacts earnings. For contracts that are not designated as accounting hedges, changes in fair value are recorded in earnings in the translated earnings contract gain (loss), net line of the consolidated statements of income. In arriving at the fair value of Corning's derivative assets and liabilities, we have considered the appropriate valuation and risk criteria, including such factors as credit risk of the relevant party to the transaction. Amounts related to credit risk are not material.

Refer to Note 16 (Fair Value Measurements) to the consolidated financial statements for additional information.

Probability of litigation outcomes

Corning is required to make judgments about future events that are inherently uncertain. In making determinations of likely outcomes of litigation matters, we consider the evaluation of legal counsel knowledgeable about each matter, case law, and other case-specific issues. See Part II – Item 3. Legal Proceedings for a discussion of Corning's material litigation matters.

Other possible liabilities

The Company is required to make judgments about future events that are inherently uncertain. In making determinations of likely outcomes of certain matters, including certain tax planning and environmental matters, these judgments require us to consider events and actions that are outside our control in determining whether probable or possible liabilities require accrual or disclosure. It is possible that actual results will differ from assumptions and require adjustments to accruals.

Pension and other postretirement employee benefits (OPEB)

Corning offers employee retirement plans consisting of defined benefit pension plans covering certain domestic and international employees and postretirement plans that provide health care and life insurance benefits for eligible retirees and dependents. The costs and obligations related to these benefits reflect the Company's assumptions related to general economic conditions (particularly interest rates), expected return on plan assets, rate of compensation increase for employees and health care trend rates. The cost of providing plan benefits depends on demographic assumptions including retirements, mortality, turnover and plan participation. While management believes that the assumptions used are appropriate, differences in actual experience or changes in assumptions may affect Corning's employee pension and other postretirement obligations, and current and future expense.

Costs for our defined benefit pension plans consist of two elements: 1) on-going costs recognized quarterly, which are comprised of service and interest costs, expected return on plan assets and amortization of prior service costs; and 2) mark-to-market gains and losses outside of the corridor, where the corridor is equal to 10% of the greater of the benefit obligation or the market-related value of plan assets at the beginning of the year, which are recognized annually in the fourth quarter of each year. These gains and losses result from changes in actuarial assumptions and the differences between actual and expected return on plan assets. Any interim remeasurement, such as curtailments, settlements, significant plan changes, or adjustments to the annual valuation, is recognized as a mark-to-market adjustment in the quarter in which such an event occurs.

Costs for OPEB plans consist of on-going costs recognized quarterly, and are comprised of service and interest costs, amortization of prior service costs and amortization of actuarial gains and losses. We recognize the actuarial gains and losses resulting from changes in actuarial assumptions as a component of accumulated other comprehensive loss in shareholders' equity on an annual basis and amortize them into our operating results over the average remaining service period of employees expected to receive benefits under the plans, to the extent such gains and losses are outside of the corridor.

The following table presents our actual and expected return on assets, as well as the corresponding percentages:

(In millions)	December 31,					
	2021		2020		2019	
Actual return on plan assets – Domestic plans	\$	208	\$	420	\$	576
Expected return on plan assets – Domestic plans		209		186		161
Actual return on plan assets – International plans		(2)		49		39
Expected return on plan assets – International plans		7		9		10
Weighted-average actual and expected return on assets:						
Actual return on plan assets – Domestic plans		6.17%		13.90%		21.89%
Expected return on plan assets – Domestic plans		6.00%		6.00%		6.00%
Actual return on plan assets – International plans		(0.33)%		10.00%		7.99%
Expected return on plan assets – International plans		1.26%		1.71%		2.01%

As of December 31, 2021, the Projected Benefit Obligation (PBO) for U.S. pension plans was \$4.1 billion.

The following information illustrates the sensitivity to a change in certain assumptions for U.S. pension plans:

Change in assumption	Effect on 2022 pre-tax pension expense	Effect on December 31, 2021 PBO
25 basis point decrease in each spot rate	- 3 million	+ 115 million
25 basis point increase in each spot rate	+ 3 million	- 109 million
25 basis point decrease in expected return on assets	+ 9 million	
25 basis point increase in expected return on assets	- 9 million	

The above sensitivities reflect the impact of changing one assumption at a time. Note that economic factors and conditions often affect multiple assumptions simultaneously and the effects of changes in key assumptions are not necessarily linear. These changes in assumptions would have no effect on Corning's funding requirements.

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In addition, at December 31, 2021, a 25 basis point decrease in each spot rate would decrease shareholders' equity by \$137 million before tax, and a 25 basis point increase in each spot rate would increase shareholders' equity by \$129 million. In addition, the impact of greater than a 25 basis point decrease in each spot rate would not be proportional to the first 25 basis point decrease in each spot rate.

The following table illustrates the sensitivity to a change in each spot rate assumption related to Corning's U.S. OPEB plans:

Change in assumption	Effect on 2022 pre-tax OPEB expense	Effect on December 31, 2021 APBO*
25 basis point decrease in each spot rate	+ 2 million	+ 22 million
25 basis point increase in each spot rate	- 2 million	- 20 million

* Accumulated Postretirement Benefit Obligation (APBO).

The above sensitivities reflect the impact of changing one assumption at a time. Note that economic factors and conditions often affect multiple assumptions simultaneously and the effects of changes in key assumptions are not necessarily linear.

Revenue recognition

The Company recognizes revenue when all performance obligations under the terms of a contract with our customer are satisfied, and control of the product has been transferred to the customer. If customer acceptance clauses are present and it cannot be objectively determined that control has been transferred, revenue is only recorded when customer acceptance is received and all performance obligations have been satisfied. Sales of goods typically do not include multiple product and/or service elements. Corning also has contractual arrangements with certain customers in which we recognize revenue over time. The performance obligations under these contracts generally require services to be performed over time, resulting in either a straight-line amortization method or an input method using incurred and forecasted expense to predict revenue recognition patterns which follows satisfaction of the performance obligation.

NEW ACCOUNTING STANDARDS

Refer to Note 1 (Summary of Significant Accounting Policies) to the consolidated financial statements.

FORWARD-LOOKING STATEMENTS

The statements in this Annual Report on Form 10-K, in reports subsequently filed by Corning with the Securities and Exchange Commission (SEC) on Form 10-Q and Form 8-K, and related comments by management that are not historical facts or information and contain words such as “will,” “believe,” “anticipate,” “expect,” “intend,” “plan,” “seek,” “see,” “would,” and “target” and similar expressions are forward-looking statements. Such statements relate to future events that by their nature address matters that are, to different degrees, uncertain. These forward-looking statements relate to, among other things, the Company’s future operating performance, the Company’s share of new and existing markets, the Company’s revenue and earnings growth rates, the Company’s ability to innovate and commercialize new products, the Company’s expected capital expenditure, and the Company’s implementation of cost-reduction initiatives and measures to improve pricing, including the optimization of the Company’s manufacturing capacity.

Although the Company believes that these forward-looking statements are based upon reasonable assumptions regarding, among other things, current estimates and forecasts, general economic conditions, its knowledge of its business, and key performance indicators that impact the Company, actual results could differ materially. Some of the risks, uncertainties and other factors that could cause actual results to differ materially from those expressed in or implied by the forward-looking statements include, but are not limited to:

- the duration and severity of the COVID-19 pandemic, and its impact across our businesses on demand, operations, our global supply chains and stock price;
- the effects of acquisitions, dispositions and other similar transactions;
- global economic trends, competition and geopolitical risks, or an escalation of sanctions, tariffs or other trade tensions between the U.S. and China or other countries, and related impacts on our businesses’ global supply chains and strategies;
- changes in macroeconomic and market conditions and market volatility, including developments and volatility arising from the COVID-19 pandemic, inflation, interest rates, the value of securities and other financial assets, precious metals, oil, natural gas and other commodity prices and exchange rates (particularly between the U.S. dollar and the Japanese yen, new Taiwan dollar, euro, Chinese yuan and South Korean won), decreases or sudden increases of consumer demand, and the impact of such changes and volatility on our financial position and businesses;
- product demand and industry capacity;
- competitive products and pricing;
- availability and costs of critical components, materials, equipment, natural resources and utilities;
- new product development and commercialization;
- order activity and demand from major customers;
- the amount and timing of our cash flows and earnings and other conditions, which may affect our ability to pay our quarterly dividend at the planned level or to repurchase shares at planned levels;
- possible disruption in commercial activities or our supply chain due to terrorist activity, cyber-attack, armed conflict, political or financial instability, natural disasters, international trade disputes or major health concerns;
- loss of intellectual property due to theft, cyber-attack, or disruption to our information technology infrastructure;
- unanticipated disruption to Corning’s, our suppliers’ and manufacturers’ supply chain, equipment, facilities, IT systems or operations;
- effect of regulatory and legal developments;
- ability to pace capital spending to anticipated levels of customer demand;
- our ability to increase margins through implementation of operational changes, pricing actions and cost reduction measures;
- rate of technology change;
- ability to enforce patents and protect intellectual property and trade secrets;
- adverse litigation;
- product and components performance issues;
- retention of key personnel;
- customer ability to maintain profitable operations and obtain financing to fund ongoing operations and manufacturing expansions and pay receivables when due;
- loss of significant customers;
- changes in tax laws, regulations and international tax standards;
- the impacts of audits by taxing authorities; and
- the potential impact of legislation, government regulations, and other government action and investigations.

While the Company continually reviews trends and uncertainties affecting the Company’s results of operations and financial condition, the Company does not assume any obligation to update or supplement any particular forward-looking statements contained in this document, unless required by law.

Item 7A. Quantitative and Qualitative Disclosures About Market Risks

We operate and conduct business in many foreign countries and as a result are exposed to movements in foreign currency exchange rates. Our exposure to exchange rates has the following effects:

- Exchange rate movements on financial instruments and transactions denominated in foreign currencies that impact earnings; and
- Exchange rate movements upon conversion of net assets and net income of foreign subsidiaries for which the functional currency is not the U.S. dollar.

Our most significant foreign currency exposure relates to the Japanese yen, South Korean won, new Taiwan dollar, Chinese yuan, and the euro. We seek to mitigate the impact of exchange rate movements in our income statement by using over-the-counter (OTC) derivative instruments including foreign exchange forward and option contracts. In general, these hedges expire coincident with the timing of the underlying foreign currency commitments and transactions.

We are exposed to potential losses in the event of non-performance by our counterparties to these derivative contracts. However, we minimize this risk by maintaining a diverse group of highly-rated major financial institutions as our counterparties. We do not expect to record any losses as a result of such counterparty default. Neither we nor our counterparties are required to post collateral for these financial instruments.

Our cash flow hedging activities utilize OTC foreign exchange forward contracts to reduce the risk that movements in exchange rates will adversely affect the net cash flows resulting from the sale of products to foreign customers and purchases from foreign suppliers. In our net investment hedging activity, we use OTC foreign exchange forward contracts to hedge a portion of our net investment in certain foreign operations against movements in exchange rates. We also use OTC foreign exchange forward and option contracts that are not designated as hedged instruments. These contracts are used to offset economic currency risks. The undesignated hedges limit exposure to foreign functional currency fluctuations related to certain subsidiaries' monetary assets, monetary liabilities and net earnings in foreign currencies. A significant portion of the Company's non-U.S. revenue is denominated in Japanese yen. When this revenue is translated back to U.S. dollars, the Company is exposed to foreign exchange rate movements in the Japanese yen. To protect translated earnings against movements in the Japanese yen, the Company has entered into a series of average rate forwards and other derivative instruments.

We use a sensitivity analysis to assess the market risk associated with foreign currency exposure. Market risk is defined as the potential change in fair value of assets and liabilities resulting from an adverse movement in foreign currency exchange rates. At December 31, 2021, with respect to open foreign exchange forward and option contracts, and foreign denominated debt with values exposed to exchange rate movements, a 10% adverse movement in quoted foreign currency exchange rates could result in a loss in fair value of these instruments of \$0.7 billion compared to \$1.0 billion at December 31, 2020. Specific to the Japanese yen, a 10% adverse movement in quoted yen exchange rates could result in a loss in fair value of these instruments of \$0.6 billion and \$0.8 billion at December 31, 2021 and 2020, respectively. The Company expects that these hypothetical losses from a 10% adverse movement in quoted foreign currency exchange rates on the derivative financial instruments should largely offset gains on the assets, liabilities and future transactions being hedged.

Item 8. Financial Statements and Supplementary Data

The response to this Item 8 is included in our audited Consolidated Financial Statements and Notes to Consolidated Financial Statements, which are contained in Part IV, Item 15 of this Form 10-K.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

Disclosure Controls and Procedures

The Company's principal executive and principal financial officers, after evaluating the effectiveness of disclosure controls and procedures (as defined in the Securities Exchange Act of 1934 (Exchange Act) Rules 13a-15(e) or 15d-15(e) as of the end of the period covered by this report, have concluded that based on the evaluation of these controls and procedures required by paragraph (b) of Exchange Act Rules 13a-15 or 15d-15, that Corning's disclosure controls and procedures were effective.

Disclosure controls and procedures mean controls and other procedures of an issuer that are designed to ensure that information required to be disclosed by the issuer in the reports that it files or submits under the Exchange Act is recorded, processed, summarized, and reported, within the time periods specified in the SEC's rules and forms. Corning's disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by Corning in the reports that it files or submits under the Exchange Act is accumulated and communicated to Corning's management, including Corning's principal executive and principal financial officers, or other persons performing similar functions, as appropriate to allow timely decisions regarding required disclosure.

Internal Control Over Financial Reporting

(a) Management's Annual Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting for Corning.

Corning's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the U.S. Corning's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of Corning's assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with accounting principles generally accepted in the U.S., and that Corning's receipts and expenditures are being made only in accordance with authorizations of Corning's management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of Corning's assets that could have a material effect on the financial statements. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies and procedures may deteriorate.

Management conducted an evaluation of the effectiveness of the Company's internal control over financial reporting based on the framework in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

Based on this evaluation, management concluded that the Company's internal control over financial reporting was effective as of December 31, 2021. The effectiveness of the Company's internal control over financial reporting as of December 31, 2021 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report and is included herein.

(b) Changes in Internal Control Over Financial Reporting

There were no changes in the Company's internal control over financial reporting identified by the evaluation required by paragraph (d) of Exchange Act Rules 13a-15 or 15d-15 that occurred during the most recently completed fiscal quarter that have materially affected, or are reasonably likely to materially affect, internal control over financial reporting.

Item 9B. Other Information

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

The sections titled “Proposal 1 Election of Directors,” “Corporate Governance and the Board of Directors” and “Delinquent Section 16(a) Reports” in our Definitive Proxy Statement relating to our Annual Meeting of Shareholders to be held on April 28, 2022, are incorporated by reference in this Annual Report on Form 10-K.

Executive Officers of the Registrant

Refer to Part I, Item 1. of this Form 10-K for a listing of executive officers.

Corning’s Board of Directors

Donald W. Blair *Retired Executive Vice President and Chief Financial Officer, NIKE, Inc.*

Mr. Blair was the executive vice president and chief financial officer of NIKE, Inc. from 1999 to October 2015. Prior to joining NIKE, he served 15 years at PepsiCo, Inc. in a number of senior executive-level corporate and operating unit financial assignments, including chief financial officer roles for PepsiCo Japan (based in Tokyo) and Pepsi-Cola International’s Asia Division (based in Hong Kong). He began his career in 1981 as an accountant with Deloitte Haskins & Sells. Mr. Blair joined Corning’s Board in 2014. Age 63.

Leslie A. Brun *Chairman and Chief Executive Officer, Sarr Group LLC*

Mr. Brun is chairman and chief executive officer of Sarr Group, LLC, co-founder, chairman and chief executive officer of Ariel Alternatives, LLC, vice chairman and senior advisor of G100 Companies and World 50 and a member of the Council on Foreign Relations. He is also the founder and former chief executive officer and chairman of Hamilton Lane, where he served as chief executive officer and chairman from 1991 until 2005, former lead director of Merck & Co., Inc.; a former director and chairman of the board of Automatic Data Processing, Inc., and a former director of Hewlett Packard Enterprise Company. In addition, Mr. Brun also served as a managing director and co-founder of the investment banking group of Fidelity Bank, and vice president in the corporate finance division of E.F. Hutton & Co. Mr. Brun joined Corning’s Board in 2018. Age 69.

Stephanie A. Burns *Retired Chairman and Chief Executive Officer, Dow Corning Corporation*

Dr. Burns has nearly 37 years of global innovation and business leadership experience. Dr. Burns joined Dow Corning in 1983 as a researcher and specialist in organosilicon chemistry. In 1994, she became the company’s first director of women’s health. She was elected to the Dow Corning Board of Directors in 2001 and elected as president in 2003. She served as chief executive officer from 2004 until May 2011 and served as chair from 2006 until her retirement in December 2011. Dr. Burns joined Corning’s Board in 2012. Age 67.

Richard T. Clark *Retired Chairman, Chief Executive Officer and President, Merck & Co., Inc. Lead Independent Director*

Mr. Clark retired from Merck in 2011. He joined Merck in 1972 and held a broad range of senior management positions. He became president and chief executive officer of Merck in May 2005 and chairman of the board in April 2007. He transitioned from the chief executive officer role in January 2011 and served as Merck board chairman through November 2011. He was president of the Merck Manufacturing Division (June 2003 to May 2005) of Merck Sharp & Dohme Corp. He is chairman emeritus of the board of Project Hope and a trustee of several charitable non-profit organizations. Mr. Clark joined Corning’s Board in 2011. Age 76.

Pamela J. Craig *Retired Chief Financial Officer, Accenture plc.*

From 2006 through 2013, Ms. Craig served as chief financial officer of Accenture plc., a global management consulting, technology services and outsourcing company, following many other leadership roles in line management, consulting and operations during her 34 years with the company. Ms. Craig has extensive finance, management, operational, technology and international business expertise, including her accomplishments and executive abilities as chief financial officer at Accenture. Ms. Craig joined Corning’s Board in 2021. Age 65.

Robert F. Cummings, Jr. *Retired Vice Chairman of Investment Banking, JPMorgan Chase & Co.*

Mr. Cummings retired as vice chairman of Investment Banking at JPMorgan Chase & Co. (JPM) in February 2016. He had served in that role since December 2010, advising on client opportunities across sectors and industry groups. Mr. Cummings began his business career in the investment banking division of Goldman, Sachs & Co. in 1973 and was a partner of that firm from 1986 until his retirement in 1998. He served as an advisory director at Goldman Sachs until 2002. Mr. Cummings joined Corning’s Board in 2006. Age 72.

Roger W. Ferguson, Jr. *Retired President and Chief Executive Officer, TIAA*

Mr. Ferguson was the President and Chief Executive Officer of TIAA from April 2008 – March 2021. He is also the former Vice Chairman of the Board of Governors of the U.S. Federal Reserve System. Prior to joining TIAA in April 2008, Mr. Ferguson was head of financial services for Swiss Re and Chairman of Swiss Re America Holding Corporation. From 1984 to 1997, he was an Associate and Partner at McKinsey & Company. He began his career as an attorney at the New York City office of Davis Polk & Wardwell. Mr. Ferguson joined Corning's Board in 2021. Age 70.

Deborah A. Henretta *Retired Group President of Global E-Business, Procter & Gamble Company*

Ms. Henretta has over 36 years of business leadership experience across both developed and developing markets, as well as expertise in brand building, marketing, philanthropic program development and government relations. She joined Procter & Gamble (P&G) in 1985. In 2005, she was appointed President of P&G's business in ASEAN, Australia and India. She was appointed group president, P&G Asia in 2007, group president of P&G Global Beauty Sector in June 2013, and group president of P&G E-Business in February 2015. She retired from P&G in June 2015. Ms. Henretta joined Corning's Board in 2013. Age 60.

Daniel P. Huttenlocher *Dean, MIT Stephen A. Schwarzman College of Computing*

Dr. Huttenlocher is the Dean of the MIT Schwarzman College of Computing. Prior to joining MIT, Dr. Huttenlocher served as dean and vice provost of Cornell Tech from 2012 – 2019 and worked for Cornell University from 1988 to 2012 in various positions. Before Cornell, Dr. Huttenlocher worked at Xerox Palo Alto Research Center and was Chief Technology Officer at Intelligent Markets, Inc. Mr. Huttenlocher joined Corning's Board in 2015. Age 63.

Kurt M. Landgraf *Retired President, Washington College*

From July 2017 to July 2020, Mr. Landgraf was president of Washington College. He previously served as president and chief executive officer of Educational Testing Service (ETS), a private non-profit educational testing and measurement organization, from 2000 until his retirement in December 2013. Prior to that, he was executive vice president and chief operating officer of E.I. Du Pont de Nemours and Company (DuPont), where he previously held a number of senior leadership positions, including chief financial officer. Mr. Landgraf joined Corning's Board in 2007. Age 75.

Kevin J. Martin *Vice President, US Public Policy, Meta Platforms, Inc.*

Mr. Martin is Vice President, US Public Policy at Meta Platforms, Inc. Prior to joining Meta, he was a partner and co-chair of the telecommunications practice at Squire Patton Boggs, an international law firm (2009 to 2015). From March 2005 to January 2009, he was chairman of the Federal Communications Commission (FCC). Mr. Martin joined Corning's Board in 2013. Age 55.

Deborah D. Rieman *Retired Executive Chairman, Metamarkets Group*

Dr. Rieman has more than 33 years of experience in the software industry. In 2016, she retired as executive chairman of Metamarkets Group. Previously, she was managing director of Equus Management Company, a private investment fund. From 1995 to 1999, she served as president and chief executive officer of Check Point Software Technologies, Incorporated. Dr. Rieman joined Corning's Board in 1999. Age 72.

Hansel E. Tookes II *Retired Chairman and Chief Executive Officer, Raytheon Aircraft Company*

Mr. Tookes retired from Raytheon Company in December 2002. He joined Raytheon in 1999 and served as president of Raytheon International, chairman and chief executive officer of Raytheon Aircraft, and executive vice president of Raytheon Company. From 1980 to 1999, Mr. Tookes served United Technologies Corporation as president of Pratt and Whitney's Large Military Engines Group and in a variety of other leadership positions. Mr. Tookes joined Corning's Board in 2001. Age 74.

Wendell P. Weeks *Chairman and Chief Executive Officer*

Mr. Weeks joined Corning in 1983 in the finance group. He has held a variety of financial, business development, commercial, and general management roles. He was named vice president and general manager of the Optical Fiber business in 1996 and president of Corning's Optical Communications division in 2001. He became Corning's president and chief operation officer in April 2002. He was named chief executive officer in April 2005 and chairman of the board in April 2007. Mr. Weeks is a director of Amazon.com, Inc. Mr. Weeks joined Corning's Board in 2000. Age 62.

Mark S. Wrighton *Interim President, George Washington University*

Dr. Wrighton has more than 28 years of leadership experience overseeing large research universities. He currently serves as interim president of George Washington University, on sabbatical from his position as a professor and chancellor emeritus of Washington University in St. Louis where he served 24 years as its chief executive officer and 14 years as chancellor. Before joining Washington University in St. Louis, he was a researcher and professor at the Massachusetts Institute of Technology, where he was head of the Department of Chemistry from 1987 to 1990, and then provost from 1990 to 1995. Dr. Wrighton served as a presidential appointee to the National Science Board from 2000 to 2006. He is also a past chair of the Association of American Universities, the Business Higher Education Forum, and the Consortium on Financing Higher Education. He was elected to membership in the American Academy of Arts and Sciences and the American Philosophical Society, and he is a Fellow of the American Association for the Advancement of Science. Dr. Wrighton joined Corning's Board in 2009. Age 72.

Code of Ethics

Our Board of Directors adopted the Code of Ethics ("Code") for the Chief Executive Officer and Financial Executives. This Code has been in existence for more than ten years. The Code applies to our Chief Executive Officer, Chief Financial Officer, Controller and other financial executives. During 2021, no amendments to or waivers of the provisions of the Code were made with respect to any of our directors or executive officers. A copy of the Code of Ethics is available on our website at <http://www.corning.com/worldwide/en/about-us/investor-relations/codes-of-conduct-ethics.html>. We will also provide a copy of the Code of Ethics to shareholders without charge upon written request to Corporate Secretary, Corning Incorporated, Corning, NY 14831. We will disclose future amendments to, or waivers from, the Code of Ethics on our website within four business days following the date of such amendment or waiver.

Item 11. Executive Compensation

The sections titled "Compensation Discussion and Analysis", "Director Compensation" and "Compensation Committee Interlocks and Insider Participation" in our Definitive Proxy Statement relating to the Annual Meeting of Shareholders to be held on April 28, 2022, are incorporated by reference in this Annual Report on Form 10-K.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The section titled "Beneficial Ownership Table" in our Definitive Proxy Statement relating to the Annual Meeting of Shareholders to be held on April 28, 2022, are incorporated by reference in this Annual Report on Form 10-K.

Equity Compensation Plan Information

The following table shows the total number of outstanding stock options and shares available for other future issuances of options under existing equity compensation plans as of December 31, 2021:

	A	B	C
	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column A)
Equity compensation plans approved by security holders ⁽¹⁾	11,904,441	\$ 22.31	38,657,008
Equity compensation plans not approved by security holders			
Total	11,904,441	\$ 22.31	38,657,008

(1) Shares indicated are total grants under the most recent shareholder approved plans.

Item 13. Certain Relationships and Related Transactions and Director Independence

The sections entitled “Policy on Transactions with Related Persons”, “Director Independence” and “Corporate Governance and the Board of Directors-Committees” in our Definitive Proxy Statement relating to the Annual Meeting of Shareholders to be held on April 28, 2022, are incorporated by reference in this Annual Report on Form 10-K.

Item 14. Principal Accounting Fees and Services

The sections entitled “Fees Paid to Independent Registered Public Accounting Firm” and “Policy Regarding Audit Committee Pre-Approval of Audit and Permitted Non-Audit Services of Independent Registered Public Accounting Firm” in our Definitive Proxy Statement relating to the Annual Meeting of Shareholders to be held on April 28, 2022, are incorporated by reference in this Annual Report on Form 10-K.

In April 2021, PricewaterhouseCoopers LLP (PwC) issued its annual Public Company Accounting Oversight Board Rule 3526 independence letter to the Audit Committee of our Board of Directors and therein reported that it is independent under applicable standards in connection with its audit opinion for the financial statements contained in this report. The Audit Committee has discussed with PwC its independence from Corning and concurred with PwC.

PART IV

Item 15. Exhibits**(a) Documents filed as part of this report:**1. [Financial statements](#)

See separate index to financial statements

Page
65**(b) Exhibits filed as part of this report:**

- [2.1](#) [Framework Agreement, dated as of October 22, 2013, by and among Samsung Display Co., Ltd.; Corning Incorporated and the other parties thereto. \(Incorporated by reference to Exhibit 10.65 to Corning's Form 10-K filed on February 10, 2014, as amended by its Form 10-K/A filed on March 21, 2014\). The Company has omitted certain schedules, exhibits and similar attachments to the Framework Agreement pursuant to Item 601\(b\)\(2\) of Regulation S-K.](#)
- [2.2](#) [Transaction Agreement, dated December 10, 2015, by and between Corning Incorporated, The Dow Chemical Company, Dow Corning Corporation and HS Upstate Inc. \(Incorporated by reference to Exhibit 1.1 of Corning's Form 8-K filed on December 11, 2015\).](#)
- [2.3](#) [Assignment Agreement, dated as of December 29, 2015, between Samsung Display Co., Ltd., Corning Incorporated, Corning Precision Materials Co., Ltd., and Corning Luxembourg S.à.r.l., Corning Hungary Data Services Limited Liability Company, Corning Japan K.K., and Samsung Corning Advanced Glass LLC \(Incorporated by reference to Exhibit 2.1 of Corning's Form 8-K filed on December 29, 2015\).](#)
- [3.1](#) [Restated Certificate of Incorporation dated April 27, 2012, filed with the Secretary of State of the State of New York on April 27, 2012 \(Incorporated by reference to Exhibit 3\(i\) 1 of Corning's Form 8-K filed on May 1, 2012\).](#)
- [3.2](#) [Certificate of Amendment to the Restated Certificate of Incorporation dated January 14, 2014, filed with the Secretary of State of the State of New York on January 14, 2014 \(Incorporated by reference to Exhibit 3.1 of Corning's Form 8-K filed on January 15, 2014\).](#)
- [3.3](#) [Amended and Restated By-Laws of Corning Incorporated, effective as of February 2, 2022 \(Incorporated by reference to Exhibit 3.1 of Corning's Form 8-K filed February 3, 2022\).](#)
- [4.1](#) [Indenture, dated November 8, 2000, by and between the Company and of The Bank of New York Mellon Trust Company, N.A. \(successor to J. P. Morgan Chase & Co., formerly The Chase Manhattan Bank\), as trustee \(Incorporated by reference to Exhibit 4.01 to Corning's Registration Statement on Form S-3, Registration Statement No. 333-251135\). The Company agrees to furnish to the Commission on request copies of other instruments with respect to long-term debt.](#)
- [4.2](#) [Form of certificate for shares of the common stock \(Incorporated by reference to Exhibit 4.4 to Corning's registration statement on Form S-8 dated May 7, 2010 \(Registration Statement No. 333-166642\)\).](#)
- [4.3](#) [Shareholder Agreement, dated as of October 22, 2013, by and between Samsung Display Co., Ltd. and Corning Incorporated \(Incorporated by reference to Exhibit 10.66 to Corning's Form 10-K filed on February 10, 2014, as amended by its Form 10-K/A filed on March 21, 2014 and further amended by the First Amendment to Shareholder Agreement, dated April 5, 2021, incorporated by reference to Exhibit 10.2 to Corning's Form 8-K filed on April 5, 2021\).](#)
- [4.4](#) [Standstill Agreement, dated as of October 22, 2013, by and among Samsung Electronics Co., Ltd., Samsung Display Co., Ltd. and Corning Incorporated \(Incorporated by reference to Exhibit 10.67 to Corning's Form 10-K filed on February 10, 2014, as amended by its Form 10-K/A filed on March 21, 2014\).](#)
- [4.5](#) [Description of the Registrant's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934. \(Incorporated by reference to Exhibit 4.5 to Corning's Form 10-K filed on February 12, 2021.\)](#)
- [10.1](#) [2000 Employee Equity Participation Program and 2003 Amendments \(Incorporated by reference to Exhibit 1 of Corning Proxy Statement, Definitive 14A filed March 10, 2003 for April 24, 2003 Annual Meeting of Shareholders\).](#)
- [10.2](#) [2003 Variable Compensation Plan \(Incorporated by reference to Exhibit 2 of Corning Proxy Statement, Definitive 14A filed March 10, 2003 for April 24, 2003 Annual Meeting of Shareholders\).](#)
- [10.3](#) [2003 Equity Plan for Non-Employee Directors \(Incorporated by reference to Exhibit 3 of Corning Proxy Statement, Definitive 14A filed March 10, 2003 for April 24, 2003 Annual Meeting of Shareholders\).](#)
- [10.4](#) [Form of Officer Severance Agreement dated as of February 1, 2004 between Corning Incorporated and each of the following individuals: Lawrence D. McRae and Eric S. Musser \(Incorporated by reference to Exhibit 10.1 of Corning's Form 10-Q filed May 4, 2004\).](#)

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<u>10.5</u>	<u>Form of Amendment dated as of February 1, 2004 to Change In Control Agreement dated as of October 4, 2000 between Corning Incorporated and Lawrence D. McRae (Incorporated by reference to Exhibit 10.4 of Corning's Form 10-Q filed May 4, 2004).</u>
<u>10.6</u>	<u>Form of Change In Control Amendment dated as of October 4, 2000 between Corning Incorporated and Lawrence D. McRae (Incorporated by reference to Exhibit 10.5 of Corning's Form 10-Q filed May 4, 2004).</u>
<u>10.7</u>	<u>Amendment dated as of February 1, 2004 to Change In Control Agreement dated as of April 23, 2002 between Corning Incorporated and Wendell P. Weeks (Incorporated by reference to Exhibit 10.8 of Corning's Form 10-Q filed May 4, 2004).</u>
<u>10.8</u>	<u>Change In Control Agreement dated as of April 23, 2002 between Corning Incorporated and Wendell P. Weeks (Incorporated by reference to Exhibit 10.9 of Corning's Form 10-Q filed May 4, 2004).</u>
<u>10.9</u>	<u>Form of Corning Incorporated Non-Qualified Stock Option Agreement (Incorporated by reference to Exhibit 10.4 of Corning's Form 10-Q filed October 28, 2004).</u>
<u>10.10</u>	<u>2005 Employee Equity Participation Program (Incorporated by reference to Exhibit I of Corning Proxy Statement, Definitive 14A filed March 1, 2005 for April 28, 2005 Annual Meeting of Shareholders).</u>
<u>10.11</u>	<u>2006 Variable Compensation Plan (Incorporated by reference to Appendix J of Corning Proxy Statement, Definitive 14A filed March 8, 2006 for April 27, 2006 Annual Meeting of Shareholders).</u>
<u>10.12</u>	<u>Amended 2003 Equity Plan for Non-Employee Directors (Incorporated by reference to Appendix K of Corning Proxy Statement, Definitive 14A filed March 8, 2006 for April 27, 2006 Annual Meeting of Shareholders).</u>
<u>10.13</u>	<u>Amended Corning Incorporated 2003 Equity Plan for Non-Employee Directors effective October 4, 2006 (Incorporated by reference to Exhibit 10.28 of Corning's Form 10-K filed February 27, 2007).</u>
<u>10.14</u>	<u>Amended Corning Incorporated 2005 Employee Equity Participation Program effective October 4, 2006 (Incorporated by reference to Exhibit 10.29 of Corning's Form 10-K filed February 27, 2007).</u>
<u>10.15</u>	<u>Form of Corning Incorporated Incentive Stock Plan Agreement for Restricted Stock Grants, amended effective December 6, 2006 (Incorporated by reference to Exhibit 10.30 of Corning's Form 10-K filed February 27, 2007).</u>
<u>10.16</u>	<u>Executive Supplemental Pension Plan effective February 7, 2007 and signed February 12, 2007 (Incorporated by reference to Exhibit 10.31 of Corning's Form 10-K filed February 27, 2007).</u>
<u>10.17</u>	<u>Executive Supplemental Pension Plan as restated and signed April 10, 2007 (Incorporated by reference to Exhibit 10 of Corning's Form 10-Q filed April 27, 2007).</u>
<u>10.18</u>	<u>Amendment No. 1 to 2006 Variable Compensation Plan dated October 3, 2007 (Incorporated by reference to Exhibit 10.34 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.19</u>	<u>Corning Incorporated Goalsharing Plan dated October 3, 2007 (Incorporated by reference to Exhibit 10.35 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.20</u>	<u>Corning Incorporated Performance Incentive Plan dated October 3, 2007 (Incorporated by reference to Exhibit 10.36 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.21</u>	<u>Amendment No. 1 to Deferred Compensation Plan for Directors dated October 3, 2007 (Incorporated by reference to Exhibit 10.37 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.22</u>	<u>Corning Incorporated Supplemental Pension Plan dated October 3, 2007 (Incorporated by reference to Exhibit 10.38 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.23</u>	<u>Corning Incorporated Supplemental Investment Plan dated October 3, 2007 (Incorporated by reference to Exhibit 10.39 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.24</u>	<u>Form of Corning Incorporated Non-Qualified Stock Option Agreement, amended effective December 5, 2007 (Incorporated by reference to Exhibit 10.41 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.25</u>	<u>Amendment No. 2 dated February 13, 2008 and Amendment dated as of February 1, 2004 to Letter of Understanding between Corning Incorporated and Wendell P. Weeks, and Letter of Understanding dated April 23, 2002 between Corning Incorporated and Wendell P. Weeks (Incorporated by reference to Exhibit 10.42 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.26</u>	<u>Form of Change in Control Agreement Amendment No. 2, effective December 5, 2007 (Incorporated by reference to Exhibit 10.43 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.27</u>	<u>Form of Officer Severance Agreement Amendment, effective December 5, 2007 (Incorporated by reference to Exhibit 10.44 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.28</u>	<u>Amendment No. 1 to Corning Incorporated Supplemental Investment Plan, approved December 17, 2007 (Incorporated by reference to Exhibit 10.45 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.29</u>	<u>Amendment No. 1 to Corning Incorporated Supplemental Pension Plan, approved December 17, 2007 (Incorporated by reference to Exhibit 10.46 of Corning's Form 10-K filed February 14, 2008).</u>
<u>10.30</u>	<u>Amendment No. 1 to Corning Incorporated Executive Supplemental Pension Plan, approved December 17, 2007 (Incorporated by reference to Exhibit 10.47 of Corning's Form 10-K filed February 14, 2008).</u>

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<u>10.31</u>	<u>Second Amended 2005 Employee Equity Participation Program (Incorporated by reference to Exhibit 10 of Corning's Form 8-K filed April 25, 2008).</u>
<u>10.32</u>	<u>Amendment No. 2 to Executive Supplemental Pension Plan effective July 16, 2008 (Incorporated by reference to Exhibit 10 of Corning's Form 10-Q filed July 30, 2008).</u>
<u>10.33</u>	<u>Form of Corning Incorporated Non-Qualified Stock Option Agreement effective as of December 3, 2008 (Incorporated by reference to Exhibit 10.50 of Corning's Form 10-K filed February 24, 2009).</u>
<u>10.34</u>	<u>Form of Change of Control Agreement Amendment No. 3 effective December 19, 2008 (Incorporated by reference to Exhibit 10.53 of Corning's Form 10-K filed February 24, 2009).</u>
<u>10.35</u>	<u>Form of Officer Severance Agreement Amendment No. 2 effective December 19, 2008 (Incorporated by reference to Exhibit 10.54 of Corning's Form 10-K filed February 24, 2009).</u>
<u>10.36</u>	<u>Amendment No. 3 dated December 19, 2008 to Letter of Understanding dated April 23, 2002 between Corning Incorporated and Wendell P. Weeks (Incorporated by reference to Exhibit 10.55 of Corning's Form 10-K filed February 24, 2009).</u>
<u>10.37</u>	<u>Amendment No. 2 to Corning Incorporated Supplemental Investment Plan approved April 29, 2009 (Incorporated by reference to Exhibit 10.1 of Corning's Form 10-Q filed July 29, 2009).</u>
<u>10.38</u>	<u>Amendment No. 2 to Deferred Compensation Plan dated April 29, 2009 (Incorporated by reference to Exhibit 10.2 of Corning's Form 10-Q filed July 29, 2009).</u>
<u>10.39</u>	<u>Amendment No. 2 to 2006 Variable Compensation Plan dated December 2, 2009 (Incorporated by reference to Exhibit 10.58 of Corning's Form 10-K filed February 10, 2010).</u>
<u>10.40</u>	<u>2010 Variable Compensation Plan (Incorporated by reference to Appendix A of Corning's Proxy Statement, Definitive 14A filed March 15, 2010 for April 29, 2010 Annual Meeting of Shareholders).</u>
<u>10.41</u>	<u>2010 Equity Plan for Non-Employee Directors (Incorporated by reference to Appendix B of Corning Proxy Statement, Definitive 14A filed March 15, 2010 for April 29, 2010 Annual Meeting of Shareholders).</u>
<u>10.42</u>	<u>Amendment No. 2 to Corning Incorporated Supplemental Pension Plan dated December 18, 2008 (Incorporated by reference to Exhibit 10.66 of Corning's Form 10-K filed February 10, 2011).</u>
<u>10.43</u>	<u>Amendment No. 2 to Deferred Compensation Plan for Directors dated February 1, 2012 (Incorporated by reference to Exhibit 10.62 of Corning's Form 10-K filed February 13, 2012).</u>
<u>10.44</u>	<u>Amendment No. 3 to Corning Incorporated Executive Supplemental Pension Plan effective December 31, 2008 (Incorporated by reference to Exhibit 10.59 of Corning's Form 10-K filed February 13, 2013).</u>
<u>10.45</u>	<u>2021 Long-Term Incentive Plan (Incorporated by reference to Appendix B of Corning Proxy Statement, Definitive 14A filed March 18, 2021, for April 29, 2021 Annual Meeting of Shareholders).</u>
<u>10.46</u>	<u>Amendment No. 3 to Deferred Compensation Plan for Directors dated December 28, 2012 (Incorporated by reference to Exhibit 10.61 of Corning's Form 10-K filed February 13, 2013).</u>
<u>10.47</u>	<u>Amendment No. 4 to Corning Incorporated Executive Supplemental Pension Plan effective December 31, 2012 (Incorporated by reference to Exhibit 10.62 of Corning's Form 10-K filed February 13, 2013).</u>
<u>10.48</u>	<u>Form of Corning Incorporated Cash Performance Unit Agreement, effective January 1, 2014 (Incorporated by reference to Exhibit 10.69 to Corning's Form 10-K filed on February 10, 2014, as amended by its Form 10-K/A filed on March 21, 2014).</u>
<u>10.49</u>	<u>Amendment No. 4 to Deferred Compensation Plan for Directors dated September 30, 2014 (Incorporated by reference to Exhibit 10.1 of Corning's Form 10-Q filed on October 29, 2014).</u>
<u>10.50</u>	<u>2014 Variable Compensation Plan (Incorporated by reference to Appendix B of Corning's Proxy Statement, Definitive 14A filed March 13, 2014 for the April 29, 2014 Annual Meeting of Shareholders).</u>
<u>10.51</u>	<u>Form of Corning Incorporated Incentive Stock Rights Agreement, effective January 1, 2015 (Incorporated by reference to Exhibit 10.64 of Corning's Form 10-K filed February 13, 2015).</u>
<u>10.52</u>	<u>Form of Corning Incorporated Cash Performance Unit Agreement, effective January 1, 2015 (Incorporated by reference to Exhibit 10.65 of Corning's Form 10-K filed February 13, 2015).</u>
<u>10.53</u>	<u>Form of Officer Severance Agreement dated as of January 1, 2015 between Corning Incorporated and each of the following individuals: Eric S. Musser; Lewis A. Steverson and R. Tony Tripeny (Incorporated by reference to Exhibit 10.1 of Corning's Form 10-Q filed July 30, 2015).</u>
<u>10.54</u>	<u>Form of Change in Control Agreement dated as of January 1, 2015 between Corning Incorporated and each of the following individuals: Eric S. Musser; Lewis A. Steverson and R. Tony Tripeny (Incorporated by reference to Exhibit 10.2 of Corning's Form 10-Q filed July 30, 2015).</u>
<u>10.55</u>	<u>Tax Matters Agreement, dated December 10, 2015, by and between Corning Incorporated, The Dow Chemical Company, Dow Corning Corporation and HS Upstate Inc. (Incorporated by reference to Exhibit 1.2 of Corning's Form 8-K filed on December 11, 2015).</u>
<u>10.56</u>	<u>Form of Corning Incorporated Incentive Stock Rights Agreement, effective January 1, 2016 (Incorporated by reference to Exhibit 10.69 of Corning's Form 10-K filed February 12, 2016).</u>

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<u>10.57</u>	<u>Form of Corning Incorporated Cash Performance Unit Agreement, effective January 1, 2016 (Incorporated by reference to Exhibit 10.70 of Corning's Form 10-K filed February 12, 2016).</u>
<u>10.58</u>	<u>Form of Corning Incorporated Incentive Stock Rights Agreement for Employees, effective January 1, 2017 (Incorporated by reference to Exhibit 10.71 of Corning's Form 10-K filed February 6, 2017).</u>
<u>10.59</u>	<u>Form of Corning Incorporated Cash Performance Unit Agreement, effective January 1, 2017 (Incorporated by reference to Exhibit 10.73 of Corning's Form 10-K filed February 6, 2017).</u>
<u>10.60</u>	<u>Form of Corning Incorporated Restricted Stock Unit Grant Notice and Agreement for Non-Employee Directors (for grants made under the 2012 Equity Plan for Non-Employee Directors), effective January 1, 2017 (Incorporated by reference to Exhibit 10.74 of Corning's Form 10-K filed February 6, 2017).</u>
<u>10.61</u>	<u>Form of Corning Incorporated Incentive Stock Rights Agreement for Employees, effective January 1, 2018 (Incorporated by reference to Exhibit 10.74 of Corning's Form 10-K filed February 15, 2018).</u>
<u>10.62</u>	<u>Form of Corning Incorporated Cash Performance Unit Agreement, effective January 1, 2018 (Incorporated by reference to Exhibit 10.75 of Corning's Form 10-K filed February 15, 2018).</u>
<u>10.63</u>	<u>Credit Agreement dated as of August 15, 2018, among Corning Incorporated, JPMorgan Chase Bank, N.A., Citibank, N.A., Bank of America, N.A., Goldman Sachs Bank USA, HSBC Bank USA, National Association, Morgan Stanley Bank, N.A., MUFG Bank, Ltd., Standard Chartered Bank, Sumitomo Mitsui Banking Corporation, Wells Fargo Bank, National Association, Bank of China New York Branch, and The Bank of New York Mellon (Incorporated by reference to Exhibit 10.1 to Corning's Form 8-K filed on August 15, 2018).</u>
<u>10.64</u>	<u>Corning Incorporated Deferred Compensation Plan for Non-Employee Directors as Amended and Restated on January 1, 2018 (Incorporated by reference to Exhibit 10.77 of Corning's Form 10-K filed February 14, 2020).</u>
<u>10.65</u>	<u>2019 Equity Plan for Non-Employee Directors (Incorporated by reference to Appendix B of Corning Proxy Statement, Definitive 14A filed March 22, 2019 for May 2, 2019 Annual Meeting of Shareholders).</u>
<u>10.66</u>	<u>Form of Corning Incorporated Restricted Stock Unit Grant Notice and Agreement for Non-Employee Directors (for grants made under the 2019 Equity Plan for Non-Employee Directors), effective January 1, 2020 (Incorporated by reference to Exhibit 10.79 of Corning's Form 10-K filed February 14, 2020).</u>
<u>10.67</u>	<u>Form of Corning Incorporated Performance Share Unit Agreement, effective January 1, 2020 (Incorporated by reference to Exhibit 10.80 of Corning's Form 10-K filed February 14, 2020).</u>
<u>10.68</u>	<u>Share Repurchase Agreement, dated April 5, 2021, between Samsung Display Co., Ltd. and Corning Incorporated (Incorporated by reference to Exhibit 10.1 to Corning's Form 8-K filed on April 5, 2021).</u>
<u>14</u>	<u>Corning Incorporated Code of Ethics for Chief Executive Officer and Financial Executives, and Code of Conduct for Directors and Executive Officers (Incorporated by reference to Appendix G of Corning Proxy Statement, Definitive 14A filed March 13, 2012 for April 26, 2012 Annual Meeting of Shareholders).</u>
<u>21</u>	<u>Subsidiaries of the Registrant at December 31, 2021.</u>
<u>23</u>	<u>Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm.</u>
<u>24</u>	<u>Powers of Attorney (included on the Signatures page of this Annual Report on Form 10-K).</u>
<u>31.1</u>	<u>Certification Pursuant to Rule 13a-15(e) and 15d-15(e), As Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>
<u>31.2</u>	<u>Certification Pursuant to Rule 13a-15(e) and 15d-15(e), As Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.</u>
<u>32</u>	<u>Certification Pursuant to 18 U.S.C. Section 1350, As Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.</u>
101.INS	Inline XBRL Instance Document
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Calculation Linkbase Document
101.LAB	Inline XBRL Taxonomy Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Presentation Linkbase Document
101.DEF	Inline XBRL Taxonomy Definition Document
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

Item 16. Form 10-K Summary.

None.

Signatures

Pursuant to the requirements of Section 13 or 15(d) of the Securities and Exchange Act of 1934, the Registrant has duly caused his report to be signed on its behalf by the undersigned, thereunto duly authorized.

Corning Incorporated

Date: February 14, 2022

By: /s/ Wendell P. Weeks
 Wendell P. Weeks
 Chairman of the Board of Directors,
 Chief Executive Officer

Power of Attorney

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints R. Tony Tripeny, Lewis A. Steverson and Edward A. Schlesinger, jointly and severally, his or her attorneys-in-fact, each with the power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact, or his substitute or substitutes, may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below by the following persons on behalf of the Registrant and in the capacities as indicated and on the 14th day of February, 2022.

Signature	Capacity
<u>/s/ Wendell P. Weeks</u> Wendell P. Weeks	Chairman of the Board of Directors, Chief Executive Officer, and Director (Principal Executive Officer)
<u>/s/ R. Tony Tripeny</u> R. Tony Tripeny	Executive Vice President and Chief Financial Officer (Principal Financial Officer)
<u>/s/ Edward A. Schlesinger</u> Edward A. Schlesinger	Senior Vice President and Corporate Controller (Principal Accounting Officer)
<u>/s/ Donald W. Blair</u> Donald W. Blair	Director
<u>/s/ Leslie A. Brun</u> Leslie A. Brun	Director
<u>/s/ Stephanie A. Burns</u> Stephanie A. Burns	Director
<u>/s/ Richard T. Clark</u> Richard T. Clark	Director
<u>/s/ Pamela J. Craig</u> Pamela J. Craig	Director

Signature	Capacity
<div>/s/ Robert F. Cummings, Jr.</div> <div>Robert F. Cummings, Jr.</div>	Director
<div>/s/ Roger W. Ferguson Jr.</div> <div>Roger W. Ferguson Jr.</div>	Director
<div>/s/ Deborah A. Henretta</div> <div>Deborah A. Henretta</div>	Director
<div>/s/Daniel P. Huttenlocher</div> <div>Daniel P. Huttenlocher</div>	Director
<div>/s/ Kurt M. Landgraf</div> <div>Kurt M. Landgraf</div>	Director
<div>/s/ Kevin J. Martin</div> <div>Kevin J. Martin</div>	Director
<div>/s/ Deborah D. Rieman</div> <div>Deborah D. Rieman</div>	Director
<div>/s/ Hansel E. Tookes II</div> <div>Hansel E. Tookes II</div>	Director
<div>/s/ Mark S. Wrighton</div> <div>Mark S. Wrighton</div>	Director
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2021 Annual Report
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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Corning Incorporated

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Corning Incorporated and its subsidiaries (the “Company”) as of December 31, 2021 and 2020, and the related consolidated statements of income, comprehensive income, changes in shareholders’ equity and cash flows for each of the three years in the period ended December 31, 2021, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company’s internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2021 and 2020, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2021 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

The Company’s management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in Management’s Annual Report on Internal Control Over Financial Reporting appearing under Item 9A. Our responsibility is to express opinions on the Company’s consolidated financial statements and on the Company’s internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company’s internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company’s internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company’s assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (i) relates to accounts or disclosures that are material to the consolidated financial statements and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Income Taxes - Receivables for South Korean Tax Disputes

As described in Notes 1, 8, and 11 to the consolidated financial statements, in evaluating the tax benefits associated with the Company's various tax filing positions, management records a tax benefit for uncertain tax positions using the highest cumulative tax benefit that is more likely than not to be realized. Adjustments are made to the asset or liability for unrecognized tax benefits in the period in which the Company files the return containing the tax position or when new information becomes available. The Company is currently appealing certain South Korean tax assessments and tax refund claims for tax years 2010 through 2018. The Company is required to deposit the disputed tax amounts with the South Korean government as a condition of its appeal of any tax assessments. The Company believes that it is more likely than not that the Company will prevail in the appeal process and as a result, management recorded a non-current receivable of \$350 million as of December 31, 2021.

The principal considerations for our determination that performing procedures relating to the receivables for South Korean tax disputes is a critical audit matter are (i) the significant judgment by management when applying the more likely than not recognition criteria to the Company's uncertain tax positions based on the application of the tax law; (ii) a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating audit evidence relating to management's assumption that the Company will prevail in the appeal of any tax assessments; and (iii) the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to uncertain tax positions, including management's assessment of the South Korean tax disputes. These procedures also included, among others, obtaining management's assessment and evidence supporting the more-likely-than-not tax position on the South Korean tax disputes and evaluating the reasonableness of the likelihood that the tax positions will ultimately be sustained upon examination by the South Korean tax authorities and through the appeal process. Professionals with specialized skill and knowledge were used to assist in evaluating management's assessment and supporting evidence related to the application of the tax law.

/s/ PricewaterhouseCoopers LLP
New York, New York
February 14, 2022

We have served as the Company's auditor since 1944.

Consolidated Statements of Income
Corning Incorporated and Subsidiary Companies

(In millions, except per share amounts)	Year ended December 31,		
	2021	2020	2019
Net sales	\$ 14,082	\$ 11,303	\$ 11,503
Cost of sales	9,019	7,772	7,468
Gross margin	5,063	3,531	4,035
Operating expenses:			
Selling, general and administrative expenses	1,827	1,747	1,585
Research, development and engineering expenses	995	1,154	1,031
Amortization of purchased intangibles	129	121	113
Operating income	2,112	509	1,306
Equity in earnings (losses) of affiliated companies (Note 3)	35	(25)	17
Interest income	11	15	21
Interest expense	(300)	(276)	(221)
Translated earnings contract gain (loss), net (Note 15)	354	(38)	248
Transaction-related gain, net (Note 4)		498	
Other income (expense), net	185	(60)	(155)
Income before income taxes	2,397	623	1,216
Provision for income taxes (Note 8)	(491)	(111)	(256)
Net income attributable to Corning Incorporated	\$ 1,906	\$ 512	\$ 960
Earnings per common share attributable to Corning Incorporated:			
Basic (Note 18)	\$ 1.30	\$ 0.54	\$ 1.11
Diluted (Note 18)	\$ 1.28	\$ 0.54	\$ 1.07
Reconciliation of net income attributable to Corning Incorporated versus net income available to common shareholders:			
Net income attributable to Corning Incorporated	\$ 1,906	\$ 512	\$ 960
Series A convertible preferred stock dividend	(24)	(98)	(98)
Excess consideration paid for redemption of preferred stock ⁽¹⁾	(803)		
Net income available to common shareholders	\$ 1,079	\$ 414	\$ 862

(1) Refer to Note 17 (Shareholders' Equity) and Note 18 (Earnings per Common Share) to the consolidated financial statements for additional information.

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated Statements of Comprehensive Income
Corning Incorporated and Subsidiary Companies

(In millions)	Year ended December 31,		
	2021	2020	2019
Net income attributable to Corning Incorporated	\$ 1,906	\$ 512	\$ 960
Foreign currency translation adjustments and other (Note 17)	(604)	528	(143)
Net unrealized gains on investments			1
Unamortized gains (losses) and prior service credits (costs) for postretirement benefit plans	178	(88)	(64)
Net unrealized (losses) gains on designated hedges	(9)	(9)	45
Other comprehensive (loss) income, net of tax	(435)	431	(161)
Comprehensive income attributable to Corning Incorporated	\$ 1,471	\$ 943	\$ 799

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated Balance Sheets
Corning Incorporated and Subsidiary Companies

(In millions, except share and per share amounts)	December 31,	
	2021	2020
Assets		
Current assets:		
Cash and cash equivalents	\$ 2,148	\$ 2,672
Trade accounts receivable, net of doubtful accounts - \$42 and \$46	2,004	2,133
Inventories, net (Note 6)	2,481	2,438
Other current assets (Note 11 and 15)	1,026	761
Total current assets	7,659	8,004
Property, plant and equipment, net of accumulated depreciation - \$13,969 and \$13,663 (Note 9)	15,804	15,742
Goodwill, net (Note 10)	2,421	2,460
Other intangible assets, net (Note 10)	1,148	1,308
Deferred income taxes (Note 8)	1,066	1,121
Other assets (Note 11 and 15)	2,056	2,140
Total Assets	\$ 30,154	\$ 30,775
Liabilities and Equity		
Current liabilities:		
Current portion of long-term debt and short-term borrowings (Note 12)	\$ 55	\$ 156
Accounts payable	1,612	1,174
Other accrued liabilities (Note 11 and 14)	3,139	2,437
Total current liabilities	4,806	3,767
Long-term debt (Note 12)	6,989	7,816
Postretirement benefits other than pensions (Note 13)	622	727
Other liabilities (Note 11 and 14)	5,192	5,017
Total liabilities	17,609	17,327
Commitments and contingencies (Note 14)		
Shareholders' equity (Note 17):		
Convertible preferred stock, Series A – Par value \$100 per share; Shares authorized 10 million; Shares issued: 0 and 2,300		2,300
Common stock – Par value \$0.50 per share; Shares authorized 3.8 billion; Shares issued: 1.8 billion and 1.7 billion	907	863
Additional paid-in capital – common stock	16,475	14,642
Retained earnings	16,389	16,120
Treasury stock, at cost; Shares held: 970 million and 961 million	(20,263)	(19,928)
Accumulated other comprehensive loss	(1,175)	(740)
Total Corning Incorporated shareholders' equity	12,333	13,257
Noncontrolling interest	212	191
Total equity	12,545	13,448
Total Liabilities and Equity	\$ 30,154	\$ 30,775

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated Statements of Cash Flows
Corning Incorporated and Subsidiary Companies

(In millions)	Year ended December 31,		
	2021	2020	2019
Cash Flows from Operating Activities:			
Net income	\$ 1,906	\$ 512	\$ 960
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation	1,352	1,399	1,390
Amortization of purchased intangibles	129	121	113
Loss on disposal of assets	57	138	123
Severance (reversals) charges	(13)	148	63
Severance payments	(26)	(147)	(28)
Share-based compensation expense	190	207	56
Equity in (earnings) losses of affiliated companies	(35)	25	(17)
Translation (gain) loss on Japanese yen-denominated debt	(180)	86	3
Dividends received from affiliated companies	8	1	106
Deferred tax provision (benefit)	16	(20)	(191)
Pension plan contributions	(24)	(221)	(2)
Translated earnings contract (gain) loss	(354)	38	(248)
Unrealized translation loss (gain) on transactions	77	(133)	33
Asbestos claim payments		(130)	(50)
Tax assessment refunds		101	
Asset impairment		217	
Transaction-related gain, net		(498)	
Gain on investment		(107)	
Changes in assets and liabilities:			
Trade accounts receivable	(54)	(274)	48
Inventories	(103)	423	(298)
Other current assets	(224)	(25)	(300)
Accounts payable and other current liabilities	806	139	31
Customer deposits and incentives	97	238	89
Deferred income	(116)	(46)	
Other, net	(97)	(12)	150
Net cash provided by operating activities	3,412	2,180	2,031
Cash Flows from Investing Activities:			
Capital expenditures	(1,637)	(1,377)	(1,978)
Proceeds from sale or disposal of assets	17	37	
Proceeds from sale of business	103		
Proceeds from and investment in unconsolidated entities, net	84	(28)	(26)
Sale of equipment for related party			78
Realized gains on translated earnings contracts	67	12	55
Other, net	(53)	46	(20)
Net cash used in investing activities	(1,419)	(1,310)	(1,891)
Cash Flows from Financing Activities:			
Repayments of short-term borrowings	(144)	(100)	
Repayments of long-term debt	(716)	(121)	(300)
Proceeds from issuance of long-term debt	22	243	1,831
Payment for redemption of preferred stock	(507)		
Payments of employee withholding tax on stock awards	(61)	(11)	(17)
Proceeds from exercise of stock options	97	124	58
Purchases of common stock for treasury	(274)	(105)	(940)
Dividends paid	(871)	(787)	(742)
Other, net	2	28	63
Net cash used in financing activities	(2,452)	(729)	(47)
Effect of exchange rates on cash	(65)	97	(14)
Net (decrease) increase in cash and cash equivalents	(524)	238	79
Cash and cash equivalents at beginning of year	2,672	2,434	2,355
Cash and cash equivalents at end of year	\$ 2,148	\$ 2,672	\$ 2,434

The accompanying notes are an integral part of these consolidated financial statements.

Consolidated Statements of Changes in Shareholders' Equity
Corning Incorporated and Subsidiary Companies

(In millions)	Convertible preferred stock	Common stock	Additional paid-in capital common	Retained earnings	Treasury stock	Accumulated other comprehensive loss	Total Corning Incorporated shareholders' equity	Non-controlling interests	Total
Balance at December 31, 2018	\$ 2,300	\$ 857	\$ 14,212	\$ 16,303	\$ (18,870)	\$ (1,010)	\$ 13,792	\$ 94	\$ 13,886
Net income				960			960	19	979
Other comprehensive loss						(161)	(161)		(161)
Purchase of common stock for treasury					(925)		(925)		(925)
Shares issued to benefit plans and for option exercises		2	111				113		113
Common dividends (\$0.80 per share)				(625)			(625)		(625)
Preferred dividends (\$42,500 per share)				(98)			(98)		(98)
Other, net ⁽¹⁾				(132)	(17)		(149)	(23)	(172)
Balance at December 31, 2019	\$ 2,300	\$ 859	\$ 14,323	\$ 16,408	\$ (19,812)	\$ (1,171)	\$ 12,907	\$ 90	\$ 12,997
Net income				512			512	11	523
Other comprehensive income						431	431	1	432
Purchase of common stock for treasury					(105)		(105)		(105)
Shares issued to benefit plans and for option exercises		4	319				323		323
Common dividends (\$0.88 per share)				(681)			(681)		(681)
Preferred dividends (\$42,500 per share)				(98)			(98)		(98)
Non-controlling interest in HSG ⁽²⁾								102	102
Other, net				(21)	(11)		(32)	(13)	(45)
Balance at December 31, 2020	\$ 2,300	\$ 863	\$ 14,642	\$ 16,120	\$ (19,928)	\$ (740)	\$ 13,257	\$ 191	\$ 13,448
Net income				1,906			1,906	29	1,935
Other comprehensive income						(435)	(435)	(1)	(436)
Redemption of preferred stock ⁽³⁾	(700)			(803)			(1,503)		(1,503)
Conversion of preferred stock to common stock ⁽⁴⁾	(1,600)	40	1,560						
Purchase of common stock for treasury					(274)		(274)		(274)
Shares issued to benefit plans and for option exercises		4	273				277		277
Common dividends (\$0.96 per share)				(812)			(812)		(812)
Preferred dividends (\$10,625 per share)				(24)			(24)		(24)
Other, net				2	(61)		(59)	(7)	(66)
Balance at December 31, 2021	\$ -	\$ 907	\$ 16,475	\$ 16,389	\$ (20,263)	\$ (1,175)	\$ 12,333	\$ 212	\$ 12,545

- (1) Adjustments to retained earnings include the effect of the accounting changes recorded for the adoption of the new standard for reclassification of stranded tax effects in accumulated other comprehensive loss in the amount of \$53 million and the impact of an equity affiliate's adoption of the new revenue standard in January 2019. A net reduction of \$186 million net of tax was recorded to beginning retained earnings for performance obligations of which a significant amount settled by the end of 2019.
- (2) Refer to Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for more information.
- (3) Refer to Note 17 (Shareholders' Equity) and Note 18 (Earnings per Common Share) to the consolidated financial statements for additional information.
- (4) Refer to Note 17 (Shareholders' Equity) to the consolidated financial statement for additional information.

The accompanying notes are an integral part of these consolidated financial statements.

Corning Incorporated and Subsidiary Companies
Notes to Consolidated Financial Statements

1. Summary of Significant Accounting Policies

Organization

Corning Incorporated is a provider of high-performance glass for notebook computers, flat panel desktop monitors, display televisions, and other information display applications; carrier network and enterprise network products for the telecommunications industry; ceramic substrates for gasoline and diesel engines in automotive and heavy-duty vehicle markets; laboratory products for the scientific community and specialized polymer products for biotechnology applications; advanced optical materials for the semiconductor industry and the scientific community; polycrystalline silicon products and other technologies. In these notes, the terms “Corning,” “Company,” “we,” “us,” or “our” mean Corning Incorporated and subsidiary companies.

Basis of Presentation and Principles of Consolidation

Corning’s consolidated financial statements were prepared in conformity with generally accepted accounting principles in the U.S. and include the assets, liabilities, revenue and expenses of all majority-owned subsidiaries over which Corning exercises control.

The equity method of accounting is used for investments in affiliated companies that are not controlled by Corning and in which our interest is generally between 20% and 50% and we have significant influence over the entity. Our share of earnings or losses of these affiliated companies is included in consolidated operating results.

For our investments in companies that we do not control and for which we do not have the ability to exercise significant influence over operating and financial policies, we use the fair value method to account for the investments if readily determinable fair values are available. For the investments without readily determinable fair values, we measure them at cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or a similar investment.

On September 9, 2020, HSG redeemed the entire ownership interest of DuPont in HSG with a value of \$250 million. Upon completion of the Redemption, the Company obtained a 100% interest in HS LLC and an 80.5% interest in HSO LLC, which are affiliated entities within HSG. HSG’s results have been consolidated in “All Other”. Refer to Note 3 (Investments) and Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for more information.

All intercompany accounts, transactions and profits are eliminated in consolidation.

Certain prior year amounts have been reclassified to conform to the current year’s presentation. These reclassifications had no impact on the results of operations, financial position, or changes in shareholders’ equity.

Use of Estimates

The preparation of financial statements, in conformity with GAAP, requires management to make estimates and assumptions affecting reported amounts of assets, liabilities, revenue, expenses and the disclosure of contingent assets and liabilities in the consolidated financial statements and related notes. Significant estimates and assumptions in these consolidated financial statements include estimates associated with revenue recognition, restructuring charges, goodwill and long-lived asset impairment tests, estimates of acquired assets and liabilities, estimates of fair value of investments, equity interests, environmental and legal liabilities, income taxes and deferred tax valuation allowances, assumptions used in calculating pension and other postretirement employee benefit expenses and the fair value of share-based compensation. Due to the inherent uncertainty involved in making estimates, actual results reported in future periods may be different from these estimates.

1. Summary of Significant Accounting Policies (Continued)

Revenue Recognition

Most of the Company's revenue is generated by delivery of products to customers and recognized at a point in time based on evaluation of when the customer obtains control of the products. Revenue is recognized when all performance obligations under the terms of a contract are satisfied, and control of the product has been transferred to the customer. If customer acceptance clauses are present and it cannot be objectively determined that control has been transferred, revenue is only recorded when customer acceptance is received and all performance obligations have been satisfied. Sales of goods typically do not include multiple product and/or service elements.

Revenue is measured as the amount of consideration expected in exchange for transferring goods or providing services. Sales tax, value-added tax, and other taxes are collected concurrently with revenue-producing activities are excluded from revenue. Incidental contract costs that are not material in the context of the delivery of goods and services are recognized as expense.

At the time revenue is recognized, allowances are recorded, with the related reduction to revenue, for estimated product returns, allowances and price discounts based upon historical experience and related terms of customer arrangements. Where product warranties are offered, liabilities are established for estimated warranty costs based upon historical experience and specific warranty provisions. Warranty liabilities are adjusted when experience indicates the expected outcome will differ from initial estimates of the liability.

In addition, Corning also has contractual arrangements with certain customers in which revenue is recognized over time. The performance obligations under these contracts generally require services to be performed over time, resulting in either a straight-line amortization method or an input method using incurred and forecasted expense to predict revenue recognition patterns which follows satisfaction of the performance obligation.

Research and Development Costs

Research and development costs are charged to expense as incurred. Research and development costs totaled \$0.8 billion, \$1.0 billion and \$0.8 billion in 2021, 2020 and 2019, respectively.

Foreign Currency Translation and Transactions

The determination of the functional currency for Corning's foreign subsidiaries is made based on the appropriate economic factors. For most foreign operations, the local currencies are generally considered to be the functional currencies. Corning's most significant exception is a Taiwanese subsidiary, which uses the Japanese yen as its functional currency. For all transactions denominated in a currency other than a subsidiary's functional currency, exchange rate gains and losses are included in income for the period in which the exchange rates changed. A net foreign currency translation gain of \$126 million was recorded for the year ended December 31, 2021. Net losses of \$37 million and \$19 million were recorded for foreign currency transaction activity for the years ended December 31, 2020 and 2019, respectively. Foreign subsidiary functional currency balance sheet accounts are translated at current exchange rates, and statement of operations accounts are translated at average exchange rates for the year. Translation gains and losses are recorded as a separate component of accumulated other comprehensive loss in shareholders' equity. The effects of remeasuring non-functional currency assets and liabilities into the functional currency are included in current earnings, except for those related to intra-entity foreign currency transactions of a long-term investment nature, which are recorded together with translation gains and losses in accumulated other comprehensive loss in shareholders' equity. Upon sale or substantially complete liquidation of an investment in a foreign entity, the amount of net translation gains or losses that have been accumulated in other comprehensive income attributable to that investment are reported as a gain or loss for the period in which the sale or liquidation occurs.

1. Summary of Significant Accounting Policies (Continued)***Share-Based Compensation***

Corning's share-based compensation programs include employee stock option grants, time-based or performance-based restricted stock and restricted stock units, as more fully described in Note 19 (Share-Based Compensation) to the consolidated financial statements.

The cost of share-based compensation awards is equal to the fair value of the award at the date of grant and compensation expense is recognized for those awards earned over the vesting period. Corning estimates the fair value of share-based awards using a multiple-point Black-Scholes option valuation model, which incorporates assumptions including expected volatility, dividend yield, risk-free rate, expected term and departure rates.

Cash and Cash Equivalents

Cash equivalents consist of highly liquid investments that are readily convertible into cash. Securities with contractual maturities of three months or less, when purchased, are considered cash equivalents. The carrying amount of these securities approximates fair value because of the short-term maturity of these instruments.

Supplemental disclosure of cash flow information is as follows (in millions):

	Year ended December 31,		
	2021	2020	2019
Non-cash transactions:			
Accruals for capital expenditures	\$ 357	\$ 231	\$ 592
Cash paid for interest and income taxes:			
Interest ⁽¹⁾	\$ 287	\$ 298	\$ 248
Income taxes, net of refunds received	\$ 377	\$ 220	\$ 474

(1) Included in this amount are approximately \$36 million, \$58 million and \$54 million of interest costs that were capitalized as part of property, plant and equipment, net of accumulated depreciation, in 2021, 2020 and 2019, respectively.

Allowance for Doubtful Accounts

The allowance for doubtful accounts is based on the best estimate of the amount of probable lifetime credit losses in existing accounts receivable. The Company determines the allowances based on historical write-off experience and expected future default rate by industry. In addition, in circumstances where the Company is made aware of a specific customer's inability to meet its financial obligations, a specific allowance is established. The Company does not have any significant off-balance-sheet credit exposure related to its customers.

Environmental Liabilities

The Company accrues for its environmental investigation, remediation, operating and maintenance costs when it is probable that a liability has been incurred and the amount can be reasonably estimated. For environmental matters, the most likely cost to be incurred is accrued based on an evaluation of currently available facts with respect to each individual site, current laws and regulations and prior remediation experience. For sites with multiple potentially responsible parties, the Company considers its likely proportionate share of the anticipated remediation costs and the ability of the other parties to fulfill obligations in establishing a provision for those costs. Where no amount within a range of estimates is more likely to occur than another, the minimum undiscounted amount is accrued. When future liabilities are determined to be reimbursable by insurance coverage, an accrual is recorded for the potential liability and a receivable is recorded related to the insurance reimbursement when reimbursement is virtually certain.

The uncertain nature inherent in such remediation and the possibility that initial estimates may not reflect the outcome could result in additional costs being recognized by the Company in future periods.

Inventories, net

Inventories are stated at the lower of cost or net realizable value, which is defined as estimated selling prices in the ordinary course of business, less reasonably predictable costs of completion, disposal and transportation. Cost is determined on a first-in, first-out basis.

1. Summary of Significant Accounting Policies (Continued)

Property, Plant and Equipment, Net of Accumulated Depreciation

Land, buildings, and equipment, including precious metals, are recorded at cost. Depreciation is based on estimated useful lives of properties using the straight-line method. Except as described in Note 9 (Property, Plant and Equipment, Net of Accumulated Depreciation) to the consolidated financial statements related to the depletion of precious metals, the estimated useful lives range from 10 to 40 years for buildings and 2 to 20 years for equipment.

Included in the subcategory of equipment are the following types of assets (excluding precious metals):

Asset type	Range of useful life (in years)
Computer hardware and software	3 to 7
Manufacturing equipment	2 to 15
Furniture and fixtures	5 to 10
Transportation equipment	3 to 20

Manufacturing equipment includes certain components of production equipment that are constructed of precious metals. These assets are not depreciated because they have very low physical losses and are repeatedly reclaimed and reused in the Company's manufacturing processes over a very long useful life. The physical loss of precious metals in the manufacturing and reclamation process is treated as depletion and these losses are accounted for as a period expense based on actual units lost. Precious metals are integral to many glass production processes and are only acquired to support operations. These metals are not held for trading or other purposes.

Leases

Corning leases certain real estate, vehicles and equipment from third parties, which are classified as operating or finance leases. The Right of Use ("ROU") assets for operating leases are included in other assets, with the corresponding liability in other accrued liabilities and other liabilities, on the consolidated balance sheets. The ROU assets for finance leases are included in Property, Plant & Equipment, with the corresponding liability in current and long-term debt, on the consolidated balance sheets. Lease expense is recognized on a straight-line basis over the lease term for operating leases. Interest expense and amortization of the ROU assets related to finance leases are calculated and recognized using the effective interest and straight-line methods, respectively. Renewals and terminations are included in the calculation of the ROU assets and lease liabilities when considered to be reasonably certain to be exercised. When the implicit rate is unknown, the incremental borrowing rate, based on commencement date, is used in determining the present value of lease payments.

As a practical expedient, lease and non-lease components of a contract are accounted for as a single lease component across all underlying asset classes. Corning does not have any significant agreements as a lessor.

Corning's leases do not include residual value guarantees. The Company is not the primary beneficiary in, and does not have other forms of variable interests, with the lessor of the leased assets.

Refer to Note 7 (Leases) to the consolidated financial statements for additional information.

Impairment of Long-Lived Assets

The recoverability of long-lived assets, such as plant and equipment and intangible assets, is reviewed when events or changes in circumstances occur that indicate the carrying value of the asset or asset group may not be recoverable. When impairment indicators are present, the estimated undiscounted future cash flows, including the eventual disposition of the asset group at market value, is compared to the assets' carrying value to determine if the asset group is recoverable. For an asset group that fails the test of recoverability, the estimated fair value of long-lived assets is determined using an "income approach" that starts with the forecast of all the expected future net cash flows including the eventual disposition at market value of long-lived assets, and considers the fair market value of all precious metals. The recoverability of the carrying value of long-lived assets was assessed at the lowest level for which identifiable cash flows are largely independent of the cash flows of other assets and liabilities. If there is an impairment, a loss is recorded to reflect the difference between the assets' fair value and carrying value.

1. Summary of Significant Accounting Policies (Continued)

We are required to assess the recoverability of the carrying value of long-lived assets when an indicator of impairment has been identified. We review long-lived assets in each quarter in which impairment indicators are present. We must exercise judgment in assessing whether an event of impairment has occurred. Refer to Note 2 (Restructuring, Impairment and Other Charges and Credits) to the consolidated financial statements for more information.

Employee Retirement Plans

Corning offers employee retirement plans consisting of defined benefit pension plans covering certain domestic and international employees and postretirement plans that provide health care and life insurance benefits for eligible retirees and dependents. The costs and obligations related to these benefits reflect the Company's assumptions related to general economic conditions, particularly interest rates, expected return on plan assets, rate of compensation increase for employees and health care trend rates. The cost of providing plan benefits depends on demographic assumptions including retirements, mortality, turnover and plan participation.

Costs for defined benefit pension plans consist of two elements: (1) on-going costs recognized quarterly, which are comprised of service and interest costs, expected return on plan assets and amortization of prior service costs; and (2) mark-to-market gains and losses outside of the corridor, where the corridor is equal to 10% of the greater of the benefit obligation or the market-related value of plan assets at the beginning of the year, which are recognized annually in the fourth quarter of each year. These gains and losses result from changes in actuarial assumptions and the differences between actual and expected return on plan assets. Any interim remeasurement, triggered by a curtailment, settlement or significant plan change, as well as any true-up to the annual valuation, is recognized as a mark-to-market adjustment in the quarter in which such event occurs.

Costs for postretirement benefit plans consist of on-going costs recognized quarterly, and are comprised of service and interest costs, amortization of prior service costs and amortization of actuarial gains and losses. Actuarial gains and losses resulting from changes in actuarial assumptions are recognized as a component of accumulated other comprehensive loss in shareholders' equity on an annual basis and amortized into operating results over the average remaining service period of employees expected to receive benefits under the plans, to the extent such gains and losses are outside the corridor.

Refer to Note 13 (Employee Retirement Plans) to the consolidated financial statements for additional detail.

Income Taxes

The Company accounts for income taxes using the asset and liability method. Under this method, deferred tax assets and liabilities are recognized for the future tax consequences attributable to operating loss and tax credit carryforwards and for differences between the carrying amounts of existing assets and liabilities and their respective tax bases.

The effective income tax rate reflects the assessment of the ultimate outcome of tax audits. In evaluating the tax benefits associated with our various tax filing positions, we record a tax benefit for uncertain tax positions using the highest cumulative tax benefit that is more likely than not to be realized. Adjustments are made to our asset or liability for unrecognized tax benefits in the period in which we file the return containing the tax position or when new information becomes available. The liability for unrecognized tax benefits, including accrued penalties and interest, is included in other accrued liabilities and other long-term liabilities on the consolidated balance sheets and in income tax expense in the consolidated statements of income.

Discrete events such as audit settlements or changes in tax laws are recognized in the period in which they occur. Valuation allowances are established when management is unable to conclude that it is more likely than not that some portion, or all, of the deferred tax asset will ultimately be realized.

Generally, Corning will indefinitely reinvest the foreign earnings of: (1) any subsidiaries that lack sufficient local statutory earnings from which to make a distribution or otherwise lacks the ability to repatriate its earnings, (2) any subsidiaries where Corning's intention is to reinvest those earnings in operations, (3) legal entities for which Corning holds a non-controlling interest, (4) any subsidiaries with an accumulated deficit in earnings and profits, or (5) any subsidiaries where a future distribution would trigger a significant net cost to the U.S. shareholder.

1. Summary of Significant Accounting Policies (Continued)

Equity Method Investments

Equity method investments are reviewed for impairment on a periodic basis, or if an event occurs or circumstances change that indicate the carrying amount may be impaired. This assessment is based on a review of the equity investments' performance and a review of indicators of impairment to determine whether there is evidence of a loss in value.

For an equity investment with impairment indicators, the fair value is measured based on discounted cash flows, or other appropriate valuation methods, depending on the nature of the company involved. If it is probable that the carrying amount of the investment cannot be recovered, the impairment is considered other-than-temporary and recorded in earnings, and the equity investment balance is reduced to its fair value.

All equity securities that do not result in consolidation and are not accounted for under the equity method are measured at fair value with changes therein reflected in net income. The Company utilizes the measurement alternative for equity investments that do not have readily determinable fair values and measures these investments at cost less impairment, plus or minus observable price changes in orderly transactions. The balance of these investments is disclosed in Note 3 (Investments) to the consolidated financial statements.

Fair Value Measurements

Major categories of financial assets and liabilities, including short-term investments, other assets and derivatives are measured at fair value on a recurring basis. Certain assets and liabilities are measured at fair value on a nonrecurring basis when impaired, which include long-lived assets, goodwill, asset retirement obligations, equity method investments and other investments that Corning cannot significantly influence.

Fair value is the price that would be received from selling an asset, or paid to transfer a liability, in an orderly transaction between market participants at the measurement date. When determining the fair value measurements for assets and liabilities required to be recorded at fair value, the principal, or most advantageous, market in which Corning would transact is analyzed. Assumptions that market participants would use when pricing the asset or liability, such as inherent risk, transfer restrictions, and risk of non-performance, are considered.

Derivative Instruments

The Company enters into a variety of foreign exchange forward contracts and foreign exchange option contracts to manage the exposure to fluctuations in foreign exchange rates. Interest rate swaps are utilized to reduce the risk of changes in a benchmark interest rate from the probable forecasted issuance of debt and manage the mix of fixed and floating rate debt. Financial exposure is managed in accordance with corporate policies and procedures.

All derivatives are recorded at fair value on the consolidated balance sheets. Changes in the fair value of derivatives designated as cash flow hedges and hedges of net investments in foreign operations are not recognized in current operating results but are recorded in accumulated other comprehensive loss. Amounts related to cash flow hedges are reclassified from accumulated other comprehensive loss when the underlying hedged item impacts earnings. This reclassification is recorded in the same line item of the consolidated statements of income where the underlying hedging transaction was recorded, typically sales, cost of sales or other income (expense), net. Changes in the fair value of derivatives not designated as hedging instruments are recorded in the consolidated statements of income in the translated earnings contract gain (loss), net and the other income (expense), net lines.

New Accounting Standards

During the first quarter of 2021, Corning early adopted ASU 2020-06. This simplifies an issuer's accounting for convertible instruments by eliminating separate accounting for beneficial and cash conversion features under ASC 470-20. The ASU clarifies the settlement assessment that entities are required to perform to determine whether a contract qualifies for equity classification under ASC 815-40. Entities are required to use the if-converted method for all convertible instruments in the diluted earnings per share calculation, to include the effect of potential share settlement if the effect is more dilutive, for instruments that may be settled in cash or shares under ASC 260. The adoption of ASU 2020-06 did not have a one-time impact on Corning's consolidated financial statements as of January 1, 2021.

1. Summary of Significant Accounting Policies (Continued)

In November 2021, the FASB issued ASU 2021-10 Government Assistance (Topic 832): Disclosures by Business Entities about Government Assistance. The ASU requires business entities that account for transactions with a government by analogizing to a grant or contribution accounting model to make certain annual disclosures. ASU 2021-10 is effective for annual periods beginning after December 15, 2021. We expect that the impact of adoption will not have a material impact on Corning's financial statements. Adoption of the new standard is effective January 1, 2022.

As of December 31, 2021, there are no other newly issued accounting standards expected to have a material impact on Corning's financial statements or disclosures.

2. Restructuring, Impairment and Other Charges and Credits

The following restructuring, impairment and other charges and credits were recorded (in millions):

	Year ended December 31,		
	2021	2020	2019
Severance	\$ (13)	\$ 148	\$ 63
Asset impairment		217	
Capacity realignment	46	304	312
Other charges and credits	77	158	64
Total restructuring, impairment and other charges and credits	\$ 110	\$ 827	\$ 439

Corning periodically assesses the operating efficiency and cost structure of the Company's asset base and global workforce and takes appropriate actions to align corporate resources with the business environment.

In 2020, and in response to uncertain global economic conditions, Corning undertook actions to transform the Company's cost structure and improve operational efficiency. These actions included a corporate-wide workforce reduction program, disposals of certain assets and accelerated depreciation associated with the capacity realignment of certain manufacturing facilities as well as other exit charges and credits.

Severance

In the second quarter of 2020, the Company implemented a corporate-wide workforce reduction program. Severance charges were primarily incurred to facilitate realignment of capacity in the Asia regions for the Display Technologies segment, optimize the Optical Communications segment and contain corporate costs. For the years ended December 31, 2020 and 2019, severance charges were \$148 million and \$63 million, respectively. As of December 31, 2021, the payments related to the severance liability have been substantially completed.

Asset Impairment

For the year ended December 31, 2020, Corning incurred a long-lived asset impairment and disposal loss for an asset group related to the reassessment of research and development programs within "All Other". Given the economic environment and market opportunities, Corning discontinued its investment in these research and development programs. The impairment analysis and disposition of certain assets resulted in a total pre-tax charge of \$217 million, which was substantially all the carrying value, inclusive of an insignificant amount of goodwill.

Capacity Realignment

Capacity realignment for the year ended December 31, 2020, primarily includes accelerated depreciation and asset disposals associated with the exit of certain facilities and other exit activities in the Display Technologies and Specialty Materials business segments. Capacity realignment for the year ended December 31, 2019, is primarily comprised of accelerated depreciation associated with the exit of certain facilities in the Display Technologies segment.

2. Restructuring, Impairment and Other Charges and Credits (Continued)

The following tables present the impact and respective location of total restructuring, impairment, and other charges and credits on the consolidated statements of income (in millions):

Year ended December 31, 2021					
	Gross margin (1)	Selling, general and administrative expenses	Research, development and engineering expenses	Other	Total
Severance	\$ (6)	\$ (5)	\$ (2)		\$ (13)
Capacity realignment	36	7	3		46
Other charges and credits	50	(5)		\$ 32	77
Total restructuring, impairment and other charges and credits	\$ 80	\$ (3)	\$ 1	\$ 32	\$ 110

Year ended December 31, 2020					
	Gross margin (1)	Selling, general and administrative expenses	Research, development and engineering expenses	Other	Total
Severance	\$ 83	\$ 34	\$ 31		\$ 148
Asset impairment		6	211		217
Capacity realignment	288	16			304
Other charges and credits	72	60	5	\$ 21	158
Total restructuring, impairment and other charges and credits	\$ 443	\$ 116	\$ 247	\$ 21	\$ 827

Year ended December 31, 2019					
	Gross margin (1)	Selling, general and administrative expenses	Research, development and engineering expenses	Other	Total
Severance	\$ 30	\$ 20	\$ 13		\$ 63
Capacity realignment	298		14		312
Other charges and credits	60	8	3	\$ (7)	64
Total restructuring, impairment and other charges and credits	\$ 388	\$ 28	\$ 30	\$ (7)	\$ 439

(1) Activity reflected in cost of sales.

3. Investments

Investments are comprised of the following (in millions):

	Ownership interest	December 31,	
		2021	2020
Affiliated companies accounted for by the equity method	50% or less	\$ 264	\$ 258
Other investments		64	177
Total investment assets		\$ 328	\$ 435

3. Investments (Continued)

Affiliated Companies at Equity Method

The results of operations and financial position of the investments accounted for under the equity method are presented below as of December 31 for each respective year (in millions):

	2021	2020	2019
Statement of operations (1):			
Net sales	\$ 816	\$ 1,201	\$ 1,508
Gross profit	\$ 104	\$ 136	\$ 79
Net income (loss)	\$ 113	\$ (48)	\$ (102)
Net income (loss) attributable to the affiliated companies	\$ 114	\$ (15)	\$ 70
Corning's equity in earnings (losses) of affiliated companies	\$ 35	\$ (25)	\$ 17
Related party transactions:			
Corning sales to affiliated companies	\$ 312	\$ 253	\$ 277
Corning purchases from affiliated companies	\$ 12	\$ 8	\$ 12
Corning transfers of assets, at cost, to affiliated companies	\$ 1	\$ 9	\$ 8
Dividends received from affiliated companies	\$ 6	\$ 1	\$ 106
Intercompany sales within HSG (included in net sales)		\$ 55	\$ 112

	2021	2020
Balance sheet:		
Current assets	\$ 648	\$ 534
Noncurrent assets	\$ 549	\$ 466
Short-term borrowings, including current portion of long-term debt	\$ 6	\$ 2
Other current liabilities	\$ 159	\$ 164
Long-term debt	\$ 58	\$ 60
Other long-term liabilities	\$ 66	\$ 11
Related party transactions:		
Balances due from affiliated companies	\$ 38	\$ 36
Balances due to affiliated companies	\$ 1	\$ 1

(1) The year ended December 31, 2020, only includes HSG's results of operations through September 8, 2020. Immediately following the Redemption, Corning began consolidating HSG on September 9, 2020.

As of December 31, 2021 and 2020, the undistributed earnings of equity companies included in retained earnings were not material.

Hemlock Semiconductor Group ("HSG")

In 2016, Corning realigned its ownership interest in Dow Corning, exchanging its 50% interest in the joint venture between Corning and Dow Chemical for a newly formed company that held a 49.9% interest in Hemlock Semiconductor LLC and a 40.25% interest in Hemlock Semiconductor Operations LLC which were recorded as equity method investments of Corning and are affiliated companies of HSG. DuPont de Nemours, Inc. ("DuPont") subsequently undertook Dow Chemical Company's ownership interest in HSG. HSG manufactures polysilicon products for the semiconductor and solar industries, and it is one of the world's leading providers of ultra-pure polycrystalline silicon to the semiconductor industry.

3. Investments (Continued)

On September 9, 2020, HSG entered into a series of agreements with DuPont resulting in a change in control and consolidation for Corning.

Through the agreements, HSG acquired DuPont's TCS manufacturing assets, which were determined to be a business and recorded as a business combination. The fair value of the purchase price was \$255 million. In conjunction with this acquisition, HSG settled the pre-existing TCS relationship ("TCS Settlement") for a contractual amount of \$175 million, which was determined to have a fair value of \$200 million. HSG is paying for the TCS Settlement over three years with equal annual payments of approximately \$58 million. Corning's share of the pre-tax loss related to the TCS Settlement was \$81 million and was recorded in equity in earnings (losses) of affiliated companies in the consolidated statements of income (loss) for the year ended December 31, 2020.

HSG also completed the Redemption, redeeming Dupont's entire ownership of HSG with a value of \$250 million. The Redemption was funded with HSG's existing cash on-hand of \$75 million and its newly obtained third-party debt of \$175 million, maturing on September 8, 2021. Debt repayments have been recorded as a financing activity on Corning's consolidated statements of cash flows. As of December 31, 2021, the third-party debt has been fully repaid.

Upon completion of the Redemption, Corning obtained a 100% interest in HS LLC and an 80.5% interest in HSO LLC. Corning accounted for the Redemption under the acquisition method of accounting in accordance with business combinations without the transfer of net cash consideration. The Redemption price of \$250 million approximated the fair value of Corning's equity interest in HSG immediately preceding the Redemption.

See Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for more information.

HSG's results of operations and balance sheet as of September 8, 2020 were as follows (in millions):

	2020	2019
Statement of operations:		
Net sales	\$ 423	\$ 779
Gross profit	\$ 87	\$ 9
Net income (loss) (1)	\$ 11	\$ (117)
Net income attributable to HSG	\$ 44	\$ 54
Corning's equity in earnings of affiliated companies	\$ 22	\$ 27
Related party transactions:		
Dividends received from affiliated companies		\$ 100
Intercompany sales within HSG (included in net sales)	\$ 55	\$ 112
Balance sheet:		
	2020	
Current assets	\$ 853	
Noncurrent assets	\$ 725	
Short-term borrowings, including current portion of long-term debt	\$ 178	
Other current liabilities	\$ 337	
Long-term debt	\$ 6	
Other long-term liabilities	\$ 1,499	
Non-controlling interest	\$ 9	
Related party transactions:		
Intercompany receivables and payables within HSG (included in current assets and other current liabilities)	\$ 8	

- (1) HSG's net income for the period ended September 8, 2020, included a pre-tax gain recorded in the second quarter of 2020, related to the settlement of a long-term supply agreement of approximately \$165 million, partially offset by an inventory provision of approximately \$44 million associated with the settlement of the agreement. Prior to the Redemption, in the third quarter of 2020, HSG recorded a pre-tax loss of \$200 million resulting from the TCS Settlement, of which Corning's share of the pre-tax loss was \$81 million. Accordingly, Corning's share of the net impact was an equity loss of \$19 million.

4. HSG Transactions and Acquisitions

HSG Transactions

On September 9, 2020, HSG acquired DuPont's TCS manufacturing assets, which was determined to be a business and recorded as a business combination. The fair value of the purchase price was \$255 million.

On September 9, 2020, HSG redeemed Dupont's entire ownership of HSG with a value of \$250 million. Upon completion of the Redemption, Corning obtained a 100% interest in HS LLC and 80.5% interest in HSO LLC. Corning accounted for the Redemption under the acquisition method of accounting in accordance with business combinations without the transfer of net cash consideration. The Redemption price of \$250 million approximated the fair value of Corning's equity interest in HSG immediately preceding the Redemption.

The fair value of Corning's equity interest in HSG was estimated by applying the income approach, which was based on significant assumptions such as projected revenue and discount rate. The Company used a discount rate of 16.5% and terminal growth rate of zero. As no net-cash consideration was transferred, the fair value of Corning's previously held equity interest in HSG was used to measure the goodwill resulting from the Redemption and the Company's controlling interest after the Redemption.

Corning recognized a pre-tax gain of \$498 million on its previously held equity investment in HSG as a result of the consolidation resulting from the Redemption. The gain was calculated based on the difference between the fair value and carrying value of the equity method investment immediately preceding the Redemption and included in the transaction-related gain, net in Corning's consolidated statements of income for the year ended December 31, 2020.

The net gain on previously owned equity was calculated as follows (in millions):

Fair value of previously held equity investment	\$	250
Equity investment liability balance as of acquisition date		(248)
Corning's gain on previously held equity investment	\$	498

The following table summarizes the amounts of recorded assets acquired and liabilities assumed on September 9, 2020, which include the TCS assets and liabilities acquired by HSG immediately prior to the Redemption and the consolidation by Corning.

Recognized amounts of identified assets and liabilities recorded at fair value (in millions):

Inventory	\$	503
Property, plant and equipment		651
Intangible assets		285
Other current and non-current assets (1)		173
Short-term borrowings		(178)
Trade payables and other accrued liabilities		(329)
Other liabilities		(1,261)
Total identified net liabilities		(156)
Non-controlling interests (2)		(102)
Total fair value of Corning's previously held equity investment (2)		(250)
Goodwill (3)	\$	508

- (1) The other current and non-current assets included a contingent consideration asset of \$20 million at fair value for a cost adjustment contract related to the TCS Transaction. Refer to Note 16 (Fair Value Measurements) to the consolidated financial statements for additional information.
- (2) The purchase price used to measure the goodwill of the Redemption is \$352 million, including the fair value of Corning's previously held equity interest and non-controlling interest, in the amount of \$250 million and \$102 million, respectively.
- (3) The goodwill recognized is not deductible for U.S. income tax purposes. The goodwill was allocated to "All Other" within segment reporting as disclosed in Note 20 (Reportable Segments) to the consolidated financial statements for more information.

Upon completion of the Redemption and resulting consolidation, Corning recorded assets acquired and liabilities assumed from HSG, including a customer deposit liability and deferred revenue.

4. HSG Transactions and Acquisitions (Continued)

Corning recorded a customer deposit liability of \$264 million at the fair value of refundable payments that HSG received from a customer under a long-term supply agreement. The discount rates used to calculate the present value of the customer deposit range from 2.54% to 3.23%. The deposits will be repaid from 2029 to 2034 provided that all purchase obligations of this customer under the supply agreement have been satisfied.

Corning also recorded deferred revenue of \$1,070 million at fair value related to the performance obligations of non-refundable consideration previously received by HSG from its customers under long term supply agreements. The fair values of deferred revenue were estimated by applying a bottoms-up cost buildup method of the cost approach based on significant inputs such as the cost to fulfill the obligations as well as key inputs including a normal profit margin.

The goodwill is primarily related to other intangibles and synergies of the acquired business which do not qualify for separate recognition. Intangible assets consist primarily of \$215 million of developed technologies and know-how, and \$70 million of other intangibles that are amortized over the weighted average useful life of approximately 20 and 15 years, respectively. Acquisition-related costs of \$12 million for the year ended December 31, 2020, included costs for legal and other professional services and were included in selling, general and administrative expense in the consolidated statements of income.

The fair value of the non-controlling interest in HSG was estimated to be \$102 million by applying the income approach, using the same key assumptions as the estimate of fair value for Corning's equity interest in HSG.

Since September 9, 2020, HSG's revenue has been consolidated in "All Other" in Corning's consolidated statements of income. The amount of net income is not material to Corning's consolidated financial statements for the years ended December 31, 2021 and 2020.

Acquisitions

There were no other material acquisitions completed in 2021, 2020 or 2019.

5. Revenue

Product Revenue (Point in Time)

Most of the Company's revenue is generated by delivery of products to customers and recognized at a point in time based on evaluation of when the customer obtains control of the products. Revenue is recognized when all performance obligations under the terms of a contract are satisfied, and control of the product has been transferred to the customer. If customer acceptance clauses are present and it cannot be objectively determined that control has been transferred, revenue is only recorded when customer acceptance is received and all performance obligations have been satisfied. Sales of goods typically do not include multiple product and/or service elements.

Revenue is measured as the amount of consideration expected to be received in exchange for transferring goods or providing services. Sales tax, value-added tax, and other taxes are collected concurrently with revenue-producing activities and excluded from revenue. Incidental contract costs that are not material in the context of the delivery of goods and services are recognized as expense.

At the time revenue is recognized, allowances are recorded, with the related reduction to revenue, for estimated product returns, allowances and price discounts based upon historical experience and related terms of customer arrangements. Where product warranties are offered, liabilities are established for estimated warranty costs based upon historical experience and specific warranty provisions. Warranty liabilities are adjusted when experience indicates the expected outcome will differ from initial estimates of the liability. Product warranty liabilities were not material at December 31, 2021 and 2020.

5. Revenue (Continued)

Other Revenue (Over Time)

Corning's revenue over time is mainly related to Telecommunications products, and comprised of design, installation, training and software maintenance services. The performance obligations under these contracts generally require services to be performed over time, resulting in either a straight-line amortization method or an input method using incurred and forecasted expense to predict revenue recognition patterns which follow satisfaction of the performance obligations. Corning's other revenue is not material to consolidated results.

Revenue Disaggregation Table

The following table shows revenue by major product categories, similar to the reportable segment disclosure. Within each product category, contract terms, conditions and economic factors affecting the nature, amount, timing and uncertainty around revenue recognition and cash flows are substantially similar. The commercial markets and selling channels are also similar. Except for an insignificant number of Telecommunications products, product category revenue is recognized at point in time when control transfers to the customer.

Revenue by product category is as follows (in millions):

	Year ended December 31,		
	2021	2020	2019
Display products	\$ 3,666	\$ 3,077	\$ 3,180
Telecommunication products	4,349	3,563	4,064
Specialty glass products	2,008	1,884	1,594
Environmental substrate and filter products	1,584	1,333	1,440
Life science products	1,232	981	995
All Other ⁽¹⁾	1,243	465	230
Total Revenue	\$ 14,082	\$ 11,303	\$ 11,503
Impact of foreign currency movements ⁽²⁾	38	44	153
Cumulative adjustment related to customer contract ⁽³⁾		105	
Net sales of reportable segments and All Other	\$ 14,120	\$ 11,452	\$ 11,656

(1) The Company obtained a controlling interest in HSG during the third quarter of 2020 and has consolidated results in "All Other" beginning on September 9, 2020.

(2) This amount primarily represents the impact of foreign currency adjustments in the Display Technologies segment.

(3) Amount represents the negative impact of a cumulative adjustment to reduce revenue by \$105 million recorded during the first quarter of 2020. The adjustment was associated with a previously recorded commercial benefit asset, reflected as a prepayment, to a customer with a long-term supply agreement that substantially exited its production of LCD panels.

Refer to Note 20 (Reportable Segments) to the consolidated financial statements for additional information.

Contract Assets and Liabilities

Contract assets, such as incremental costs to obtain or fulfill contracts, are an insignificant component of Corning's revenue recognition process. Most of Corning's cost of fulfillment as a manufacturer of products is classified as inventory, fixed assets and intangible assets, which are accounted for under the respective guidance for those asset types. Other costs of contract fulfillment are immaterial due to the nature of the products and their respective manufacturing processes.

Contract liabilities include deferred revenue, other advanced payments and customer deposits. Other advanced payments are not significant to operations and are classified as part of other accrued liabilities in the financial statements. Customer deposits are predominately related to Display products and deferred revenue is predominately related to obtaining a controlling interest in HSG.

5. Revenue (Continued)

Customer Deposits

As of December 31, 2021 and 2020, Corning had customer deposits of approximately \$1.3 billion and \$1.4 billion. Most of these customer deposits were non-refundable and allowed customers to secure rights to products produced by Corning under long-term supply agreements. The duration of these long-term supply agreements ranges up to 10 years. As products are shipped to customers, Corning will recognize revenue and reduce the amount of the customer deposit liability.

In the years ended December 31, 2021 and 2020, customer deposits used were \$216 million and \$140 million, respectively. As of December 31, 2021 and 2020, \$1.1 billion was recorded as an other long-term liability. The remaining \$223 million and \$211 million, respectively, were classified as other current liabilities.

Deferred Revenue

As of December 31, 2021 and 2020, Corning had deferred revenue of approximately \$912 million and \$1.0 billion, respectively. The deferred revenue was related to the performance obligations of non-refundable consideration previously received by HSG from its customers under long term supply agreements.

The deferred revenue is tracked on a per-customer contract-unit basis. As customers take delivery of the committed volumes under the terms of the contract, a per unit amount of revenue is recognized from deferred revenue when control of the promised goods is transferred to the customer based upon the units shipped compared to the remaining contractual units.

As of December 31, 2021 and 2020, \$764 million and \$872 million, respectively, were classified as a long-term liability and \$148 million and \$152 million, respectively, were classified as a current liability.

Refer to Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for additional information.

Practical Expedients and Exemptions

The value of unsatisfied performance obligations is not disclosed for (i) contracts with an original expected length of one year or less and (ii) contracts for which revenue has been recognized at an amount for which the right exists to invoice for services performed.

Shipping and handling fees are treated as fulfillment costs and not as separate performance obligations under the terms of revenue contracts due to the perfunctory nature of the shipping and handling obligations.

Significant Customers

For 2021, 2020 and 2019, no customer met or exceeded 10% of Corning's consolidated net sales.

6. Inventories, Net

Inventories, net, are comprised of the following (in millions):

	December 31,	
	2021	2020
Finished goods	\$ 1,190	\$ 1,236
Work in process	358	357
Raw materials and accessories	427	370
Supplies and packing materials	506	475
Total inventories, net	\$ 2,481	\$ 2,438

7. Leases

Corning has operating and finance leases for real estate, vehicles, and equipment.

The following table shows components of lease expense (in millions):

	Year ended December 31,	
	2021	2020
Finance:		
Depreciation of right-of-use assets	\$ 17	\$ 15
Interest on lease liabilities	8	7
Total finance lease expense	\$ 25	\$ 22
Operating lease expense	\$ 139	\$ 133
Variable lease expense	59	41
Short-term lease expense	2	4
Total lease expense	\$ 225	\$ 200

The following table shows components of cash paid for amounts included in the measurement of lease liabilities (in millions) (1):

	December 31,	
	2021	2020
Finance:		
Principal	\$ 13	\$ 10
Interest	8	7
Total finance lease payments	\$ 21	\$ 17
Operating lease payments	\$ 134	\$ 121
Total lease payments	\$ 155	\$ 138

(1) Principle payments for finance leases have been classified as an investing outflow, and cash payments for operating leases, along with interest payments for finance leases, have been classified as an operating outflow on the consolidated statements of cash flows.

Supplemental balance sheet information related to leases was as follows (in millions, except lease term and discount rate):

	December 31,	
	2021	2020
Operating Leases:		
Operating lease right-of-use assets, net (1)	\$ 741	\$ 680
Other current liabilities	\$ 94	\$ 96
Operating lease liabilities (2)	691	633
Total operating lease liabilities	\$ 785	\$ 729
Finance Leases:		
Property and equipment, at cost	\$ 200	\$ 184
Accumulated depreciation	(40)	(27)
Property and equipment, net	\$ 160	\$ 157
Current portion of long-term debt	\$ 15	\$ 10
Long-term debt	168	163
Total finance lease liabilities	\$ 183	\$ 173

(1) Included in other assets.

(2) Included in other liabilities.

7. Leases (Continued)

The weighted average remaining lease terms and weighted average discount rates for operating and finance leases, respectively, are 12.9 years and 15.0 years and 4.0% and 4.4%, respectively.

As of December 31, 2021, maturities of lease liabilities are as follows (in millions):

	2022	2023	2024	2025	2026	After 2026	Gross Total	Imputed Discount	Total
Operating leases	\$ 103	\$ 110	\$ 97	\$ 85	\$ 78	\$ 553	\$ 1,026	\$ (241)	\$ 785
Finance leases	22	27	21	15	32	142	259	(76)	183

As of December 31, 2021, Corning had additional operating leases, primarily for new production facilities, that have not yet commenced or been recorded, of approximately \$122 million on an undiscounted basis. These operating leases will commence in fiscal years 2022 and 2023 with lease terms between 10 and 20 years.

8. Income Taxes

Income before income taxes follows (in millions):

	Year ended December 31,		
	2021	2020	2019
U.S. companies	\$ 1,254	\$ (71)	\$ 504
Non-U.S. companies	1,143	694	712
Income before income taxes	\$ 2,397	\$ 623	\$ 1,216

The current and deferred amounts of the provision for income taxes are as follows (in millions):

	Year ended December 31,		
	2021	2020	2019
Current:			
Federal	\$ (172)	\$ 88	\$ (82)
State and municipal	(13)	(16)	(12)
Foreign	(290)	(203)	(354)
Deferred:			
Federal	(97)	7	64
State and municipal	(7)	3	13
Foreign	88	10	115
Provision for income taxes	\$ (491)	\$ (111)	\$ (256)

Amounts are reflected in the preceding tables based on the location of the taxing authorities.

8. Income Taxes (Continued)

Reconciliation of the U.S. statutory income tax rate to the effective tax rate for operations is as follows:

	Year ended December 31,		
	2021	2020	2019
Statutory U.S. income tax rate	21.0%	21.0%	21.0%
State income tax, net of federal effect	1.0	1.4	0.6
Global intangible low-taxed income	0.2	(0.5)	1.2
Foreign derived intangible income	(1.3)		(8.5)
Remeasurement of deferred tax assets and liabilities		(13.4)	(0.6)
Differential arising from foreign earnings (1)	2.0	15.2	5.4
IRS settlements & change in reserve	1.6	12.1	8.5
Valuation allowance	(0.5)	2.5	(3.7)
Tax credits	(2.6)	(29.7)	(2.8)
Stock compensation	(1.5)	(1.7)	(0.6)
Legal entity rationalization		(2.2)	
Intercompany loan adjustment		6.2	(0.5)
Non-deductible expenses	1.4	7.0	2.1
Other items, net	(0.8)	(0.1)	(1.0)
Effective income tax rate	20.5%	17.8%	21.1%

(1) Includes impact of intercompany asset sales.

On September 9, 2020, Corning obtained a 100% controlling interest in HS LLC and an 80.5% controlling interest in HSO LLC. As a result, the deferred tax liability on the outside basis difference between book and tax basis for Corning's investment in HS LLC and HSO LLC was adjusted by approximately \$116 million.

Refer to Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for additional information.

8. Income Taxes (Continued)

During 2021, the Company distributed approximately \$2.3 billion from foreign subsidiaries to their respective U.S. parent companies. As of December 31, 2021, Corning has approximately \$2.4 billion of indefinitely reinvested foreign earnings. It remains impracticable to calculate the tax cost of repatriating unremitted earnings which are considered indefinitely reinvested.

The tax effects of temporary differences and carryforwards that gave rise to significant portions of the deferred tax assets and liabilities are as follows (in millions):

	December 31,	
	2021	2020
Loss and tax credit carryforwards	\$ 375	\$ 637
Other assets	281	269
Asset impairments and restructuring reserves	30	29
Postretirement medical and life benefits	154	171
Other accrued liabilities	354	162
Other employee benefits	329	337
Gross deferred tax assets	1,523	1,605
Valuation allowances	(138)	(167)
Total deferred tax assets	1,385	1,438
Intangible and other assets	(103)	(95)
Fixed assets	(300)	(375)
Finance leases	(174)	(160)
Total deferred tax liabilities	(577)	(630)
Net deferred tax assets	\$ 808	\$ 808

The net deferred tax assets in the consolidated balance sheets are as follows (in millions):

	December 31,	
	2021	2020
Deferred tax assets	\$ 1,066	\$ 1,121
Other liabilities	(258)	(313)
Net deferred tax assets	\$ 808	\$ 808

Details on deferred tax assets for loss and tax credit carryforwards are as follows (in millions):

	Amount	Expiration			
		2022-2026	2027-2031	2032-2041	Indefinite
Net operating losses	\$ 303	\$ 102	\$ 16	\$ 41	\$ 144
Tax credits	72	7	1	59	5
Balance as of December 31, 2021	\$ 375	\$ 109	\$ 17	\$ 100	\$ 149

Details of the deferred tax valuation allowances are as follows (in millions):

	Balance at beginning of period	Additions	Net deductions and other	Balance at end of period
Deferred Tax Valuation Allowance				
Year ended December 31, 2021	\$ 167	\$ 13	\$ 42	\$ 138
Year ended December 31, 2020	\$ 215	\$ 27	\$ 75	\$ 167
Year ended December 31, 2019	\$ 317	\$ 10	\$ 112	\$ 215

8. Income Taxes (Continued)

The following is a tabular reconciliation of the total amount of unrecognized tax benefits (in millions):

	2021	2020	2019
Balance at January 1	\$ 131	\$ 62	\$ 435
Additions based on tax positions related to the current year	54	19	3
Additions for tax positions of prior years	17	53	2
Reductions for tax positions of prior years	(21)		
Settlements and lapse of statute of limitations	(3)	(3)	(378)
Balance at December 31	\$ 178	\$ 131	\$ 62

During 2020, the Internal Revenue Service (“IRS”) opened an audit for tax years 2015-2018. We do not expect additional material exposure for the tax years under audit. However, if upon conclusion of these matters, the ultimate determination of taxes owed is for an amount materially different than our current position, our overall tax expense and effective tax rate could be materially impacted in the period of adjustment.

The additions for tax positions of prior years were primarily due to tax audits, development of tax court cases, and tax law changes in various jurisdictions.

Included in the balance at December 31, 2021, 2020 and 2019 are \$120 million, \$102 million and \$35 million, respectively, of unrecognized tax benefits that would impact the Company’s effective tax rate if recognized.

Accrued interest and penalties associated with uncertain tax positions are recognized as part of tax expense. For the years ended December 31, 2021, 2020 and 2019 the amount recognized in interest expense and accrued for the payment of interest and penalties were not material.

It is possible that the amount of unrecognized tax benefits will change due to one or more of the following events during the next twelve months: audit activity, tax payments, or final decisions in matters that are the subject of controversy in various jurisdictions. Corning believes that adequate tax reserves are provided for these matters. However, if upon conclusion of these matters, the ultimate determination of taxes owed is for an amount materially different than the current reserves, the Company’s overall tax expense and effective tax rate could be materially impacted in the period of adjustment. As of December 31, 2021, the company is not expecting any significant movements in the uncertain tax benefits in the next twelve months.

Corning Incorporated, as the common parent company, and all 80%-or-more-owned of its U.S. subsidiaries join in the filing of consolidated U.S. federal income tax returns. The statute of limitations is closed for all periods ending through December 31, 2012. All returns for periods ended through December 31, 2014, have been audited by and settled with the IRS.

Corning Incorporated and its U.S. subsidiaries file income tax returns on a combined, unitary or stand-alone basis in multiple state and local jurisdictions, which generally have statutes of limitations ranging from 3 to 5 years. Various state income tax returns are currently in the process of examination or administrative appeal. The Company does not expect any material proposed adjustments from any of these audits.

Corning’s foreign subsidiaries file income tax returns in the countries where their operations are located. Generally, these countries have statutes of limitations ranging from 3 to 10 years. The statute of limitations is closed through the following years in these major jurisdictions: China (2008), Japan (2012), Taiwan (2015) and South Korea (2013).

CPM (“Corning Precision Materials”), a South Korean subsidiary, is currently appealing certain tax assessments and tax refund claims for tax years 2010 through 2018. The Company is required to deposit the disputed tax amounts with the South Korean government as a condition of its appeal of any tax assessments. We believe that it is more likely than not that the Company will prevail in the appeal process. The non-current receivable balance was \$350 million and \$365 million as of December 31, 2021 and December 31, 2020, respectively, for the amount on deposit with the South Korean government.

9. Property, Plant and Equipment, Net of Accumulated Depreciation

Property, plant and equipment, net of accumulated depreciation follow (in millions):

	December 31,			
	2021		2020	
Land	\$	441	\$	471
Buildings		6,145		6,453
Equipment		21,208		20,563
Construction in progress		1,979		1,918
Subtotal		29,773		29,405
Accumulated depreciation		(13,969)		(13,663)
Total	\$	15,804	\$	15,742

Approximately \$36 million, \$58 million and \$54 million of interest costs were capitalized as part of property, plant and equipment, net of accumulated depreciation, in 2021, 2020 and 2019, respectively.

Manufacturing equipment includes certain components of production equipment that are constructed of precious metals. At December 31, 2021 and 2020, the recorded value of precious metals totaled \$3.5 billion and \$3.4 billion, respectively. Depletion expense for precious metals in the years ended December 31, 2021, 2020 and 2019 was \$28 million, \$24 million and \$16 million, respectively.

10. Goodwill and Other Intangible Assets

Goodwill

Goodwill is the excess of cost of an acquired entity over the amounts assigned to assets acquired and liabilities assumed in a business combination. Goodwill relates, and is assigned directly, to a specific reporting unit. Reporting units are either operating segments or one level below the operating segment. Impairment testing for goodwill is done at a reporting unit level. Goodwill is reviewed for indicators of impairment quarterly, or if an event occurs or circumstances change that indicate that the carrying amount may be impaired. Corning also performs a detailed quantitative impairment test every three years, even if there are no impairment indicators present. We use this calculation as quantitative validation of the qualitative process; this process does not represent an election to perform the quantitative impairment test in place of the qualitative review.

The qualitative process includes an extensive review of expectations for the long-term growth of our businesses and forecasted future cash flows. If we are required to perform the quantitative impairment analysis, our valuation method is an “income approach” using a discounted cash flow model in which cash flows anticipated over several periods, plus a terminal value at the end of that time horizon, are discounted to their present value using an appropriate rate of return. Our estimates are based upon historical experience, current knowledge from our commercial relationships, and available external information about future trends. If the fair value is less than the carrying value, a loss is recorded to reflect the difference between the fair value and carrying value. The most recent quantitative test was performed in 2020, and the fair value of the Company's reporting units significantly exceeded the respective carrying values.

10. Goodwill and Other Intangible Assets (Continued)

Changes in the carrying amount of goodwill for the twelve months ended December 31, 2021 and 2020, were as follows (in millions):

	Display Technologies	Optical Communications	Specialty Materials	Life Sciences	All Other	Total
Balance at December 31, 2019	\$ 129	\$ 931	\$ 150	\$ 616	\$ 109	\$ 1,935
Acquired goodwill (1)					495	495
Foreign currency translation adjustment and other	3	12		2	13	30
Balance at December 31, 2020	\$ 132	\$ 943	\$ 150	\$ 618	\$ 617	\$ 2,460
Foreign currency translation adjustment and other	(7)	(28)		(2)	(2)	(39)
Balance at December 31, 2021	\$ 125	\$ 915	\$ 150	\$ 616	\$ 615	\$ 2,421

(1) The Company obtained a controlling interest in HSG during the third quarter of 2020. Refer to Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for additional information on this transaction.

Corning's gross goodwill balance and accumulated impairment losses were \$8.9 billion and \$6.5 billion, respectively, for the year ended December 31, 2021. Corning's gross goodwill balance and accumulated impairment losses were \$9.0 billion and \$6.5 billion, respectively, for the year ended December 31, 2020. Accumulated impairment losses were generated primarily through goodwill impairments related to the Optical Communications segment.

Other Intangible Assets

Other intangible assets were as follows (in millions):

	December 31,					
	2021			2020		
	Gross	Accumulated amortization	Net	Gross	Accumulated amortization	Net
Amortized intangible assets:						
Patents, trademarks & trade names	\$ 498	\$ 279	\$ 219	\$ 500	\$ 255	\$ 245
Customer lists and other (1)	1,464	535	929	1,517	454	1,063
Total	\$ 1,962	\$ 814	\$ 1,148	\$ 2,017	\$ 709	\$ 1,308

(1) Other is comprised of intangible assets related to developed technologies and intellectual know-how.

Corning's amortized intangible assets are primarily related to the Optical Communications and Life Sciences segments and "All Other". The net carrying amount of intangible assets decreased during the year, primarily driven by amortization of \$129 million, disposals of \$24 million and foreign currency translation and other adjustments of \$7 million.

Amortization expense related to all intangible assets is expected to be approximately \$120 million annually for years 2022 through 2026.

11. Other Assets and Other Liabilities

Other assets were as follows (in millions):

	December 31,	
	2021	2020
Current assets:		
Derivative instruments (Note 15)	\$ 336	\$ 148
Other current assets	690	613
Other current assets	\$ 1,026	\$ 761
Non-current assets:		
Derivative instruments (Note 15)	\$ 164	\$ 123
South Korean tax deposits	350	365
Operating leases (Note 7)	741	680
Investments (Note 3)	318	435
Other non-current assets	483	537
Other assets	\$ 2,056	\$ 2,140

South Korean tax deposits

CPM is currently appealing certain tax assessments and tax refund claims for tax years 2010 through 2018. The Company is required to deposit the disputed tax amounts with the South Korean government as a condition of its appeal of any tax assessments. Corning believes that it is more likely than not that we will prevail in the appeal process. Refer to Note 8 (Income Taxes) to the consolidated financial statements for additional information.

Other liabilities were as follows (in millions):

	December 31,	
	2021	2020
Current liabilities:		
Wages and employee benefits	\$ 824	\$ 572
Income taxes	196	173
Derivative instruments (Note 15)	144	189
Deferred revenue (Note 5)	148	152
Settlement liability (Note 4)	58	58
Customer deposits (Note 5)	223	211
Share repurchase liability (Note 17)	506	
Short-term leases (Note 7)	94	96
Other current liabilities	946	986
Other accrued liabilities	\$ 3,139	\$ 2,437
Non-current liabilities:		
Defined benefit pension plan liabilities	\$ 707	\$ 887
Derivative instruments (Note 15)	49	155
Deferred revenue (Note 5)	764	872
Settlement liability (Note 4)	58	117
Customer deposits (Note 5)	1,072	1,148
Share repurchase liability (Note 17)	517	
Deferred tax liabilities	258	313
Long-term leases (Note 7)	691	633
Asbestos and other litigation	35	94
Other non-current liabilities	1,041	798
Other liabilities	\$ 5,192	\$ 5,017

12. Debt

(In millions)

	December 31,	
	2021	2020
Current portion of long-term debt	\$ 55	\$ 81
Short-term borrowings		75
Current portion of long-term debt and short-term borrowings	\$ 55	\$ 156
Long-term debt		
Debentures, 8.875%, due 2021		\$ 63
Debentures, 2.90%, due 2022		374
Debentures, 3.70%, due 2023		249
Medium-term notes, average rate 7.66%, due through 2023	\$ 45	45
Debentures, 3.90%, due 2049	395	394
Debentures, 5.45%, due 2079	1,086	1,084
Yen-denominated debentures, 0.698%, due 2024	182	203
Yen-denominated debentures, 0.722%, due 2025	87	96
Yen-denominated debentures, 0.992%, due 2027	407	453
Yen-denominated debentures, 1.043%, due 2028	264	293
Yen-denominated debentures, 1.153%, due 2031	270	301
Yen-denominated debentures, 1.513%, due 2039	51	56
Debentures, 6.85%, due 2029	160	161
Yen-denominated debentures, 1.219%, due 2030	216	239
Debentures, callable, 7.25%, due 2036	249	249
Debentures, 4.70%, due 2037	296	296
Yen-denominated debentures, 1.583%, due 2037	86	96
Debentures, 5.75%, due 2040	396	396
Debentures, 4.75%, due 2042	496	496
Debentures, 5.35%, due 2048	544	543
Debentures, 4.375%, due 2057	743	743
Debentures, 5.85%, due 2068	297	296
Financing Leases, average discount rate 4.4%, due through 2044	183	173
Other, average rate 4.33%, due through 2043	591	598
Total long-term debt, including current portion	7,044	7,897
Less current portion of long-term debt	55	81
Long-term debt	\$ 6,989	\$ 7,816

Based on borrowing rates currently available to us for loans with similar terms and maturities, the fair value of long-term debt was \$8.3 billion and \$9.4 billion at December 31, 2021 and 2020, respectively, compared to recorded book values of \$7.0 billion and \$7.8 billion at December 31, 2021 and December 31, 2020, respectively. The Company measures the fair value of its long-term debt using Level 2 inputs based primarily on current market yields for its existing debt traded in the secondary market.

On a quarterly basis, Corning will recognize the foreign currency translation gains and losses resulting from changes in exchanges rates within accumulated other comprehensive loss in shareholders' equity. Cash proceeds from loans and debt issuances are disclosed as financing activities, and cash payments for interest and bond redemptions are disclosed as operating activities and financing activities, respectively, in the consolidated statements of cash flows.

Corning did not have outstanding commercial paper at December 31, 2021 and 2020.

Corning maintains a revolving credit agreement (the "Revolving Credit Agreement") which provides a committed \$1.5 billion unsecured multi-currency line of credit and expires on August 15, 2023. At December 31, 2021, there were no outstanding amounts under the Revolving Credit Agreement.

12. Debt (Continued)

The following table shows debt maturities by year at December 31, 2021 (in millions) (1):

2022	2023	2024	2025	2026	Thereafter
\$ 55	141	\$ 293	\$ 166	\$ 36	\$ 6,353

(1) Excludes interest rate swap gains, bond discounts and deferred expenses.

Debt Issuances and Repayments

2021

In the third quarter of 2021, Corning redeemed \$250 million of 3.7% debentures due in 2023, paying a premium of \$19 million by exercising our make-whole call. The bond redemption resulted in a \$20 million loss during the same quarter. The total payment of \$269 million is disclosed in financing activities in the consolidated statements of cash flows.

In the second quarter of 2021, Corning redeemed \$375 million of 2.9% debentures due in 2022, paying a premium of \$10 million by exercising our make-whole call. The bond redemption resulted in an \$11 million loss during the same quarter. The total payment of \$385 million is disclosed in financing activities in the consolidated statements of cash flows.

Losses on bond redemption have been recorded in other income (expense), net on the consolidated statements of income during the quarter in which they occurred.

Borrowings under the three unsecured variable rate loan facilities for the year ended December 31, 2021, totaled 1,764 million Chinese yuan, or approximately \$277 million.

As of December 31, 2021, the 25 billion Japanese yen facility, equivalent to \$217 million, has not been drawn upon.

2020

During the fourth quarter of 2020, Corning redeemed \$100 million of 7.0% debentures due in 2024 with a carrying amount of \$99 million, paying a \$21 million make-whole call premium. The total payment of \$121 million is disclosed in financing activities in the consolidated statements of cash flows. The redemption resulted in a loss of \$22 million.

In conjunction with the change in control of HSG on September 9, 2020, a variable interest rate loan of \$175 million, maturing on September 8, 2021, was made to DC HSC Holdings, LLC, now a consolidated subsidiary of Corning. As of December 31, 2021, the third-party debt has been fully repaid. Refer to Note 3 (Investments) to the consolidated financial statements for additional information.

During the second quarter of 2020, Corning established an incremental liquidity facility for 25 billion Japanese yen, equivalent to \$232 million with a maturity of three years. As of December 31, 2020, the facility has not been drawn upon.

In the first quarter of 2020, Corning established two unsecured variable rate loan facilities for 1,050 million Chinese yuan, equivalent to \$150 million, and 749 million Chinese yuan, equivalent to \$105 million, each with a maturity of five years. In the fourth quarter of 2020, Corning established a third unsecured variable rate loan facility for 546 million Chinese yuan, equivalent to \$84 million, with a maturity of five years. Borrowings under these loan facilities for the year ended December 31, 2020, totaled 1,691 million Chinese yuan, or approximately \$243 million. These Chinese yuan-denominated proceeds will not be converted into USD and will be used for capital projects. Payments of principal and interest on the Notes will be in Chinese yuan, or should yuan be unavailable due to circumstances beyond Corning's control, a USD equivalent. These loans are the sole obligations of the subsidiary borrowers and are not guaranteed by any other Corning entity.

13. Employee Retirement Plans

Defined Benefit Plans

Corning has defined benefit pension plans covering certain domestic and international employees. The Company's funding policy has been to contribute, as necessary, an amount exceeding the minimum requirements to achieve the Company's long-term funding targets. In 2021, no voluntary cash contributions were made to domestic defined benefit pension plans. Voluntary cash contributions of \$24 million were made to international pension plans. In 2020, voluntary cash contributions were made to domestic defined benefit pension plans and international pension plans in the amount of \$180 million and \$41 million, respectively. During 2022, the Company plans to make cash contributions of \$29 million to international pension plans.

Corning offers postretirement plans that provide health care and life insurance benefits for retirees and eligible dependents. Certain employees may become eligible for such postretirement benefits upon reaching retirement age and service requirements. In 2021, no voluntary cash contributions were made to domestic postretirement plans. Voluntary cash contributions of \$30 million were made to domestic postretirement plans in 2020. For current retirees (including surviving spouses) and active employees eligible for the salaried retiree medical program, Corning has placed a "cap" on the amount to be contributed toward retiree medical coverage in the future. The cap is equal to 120% of the 2005 contributions toward retiree medical benefits. Once contributions toward salaried retiree medical costs reach this cap, impacted retirees will have to pay the excess amount in addition to their regular contributions for coverage. This cap was attained for post-65 retirees in 2008 and attained for pre-65 retirees in 2010. Furthermore, employees hired or rehired on or after January 1, 2007 will be eligible for Corning retiree medical benefits upon retirement; however, these employees will pay 100% of the cost.

13. Employee Retirement Plans (Continued)

Obligations and Funded Status

The change in benefit obligation and funded status of our defined benefit pension and post-retirement benefit plans are as follows (in millions):

December 31,	Domestic pension benefits		International pension benefits		Postretirement benefits	
	2021	2020	2021	2020	2021	2020
Change in benefit obligation						
Benefit obligation at beginning of year	\$ 4,203	\$ 3,856	\$ 778	\$ 725	\$ 764	\$ 705
Service cost	102	92	25	26	10	9
Interest cost	78	110	10	12	15	20
Plan participants' contributions		1			7	8
Plan amendments		1				
Actuarial (gain) loss	(107)	329	(17)	29	(105)	58
Other		8	(2)	(37)		2
Benefits paid	(201)	(194)	(26)	(19)	(37)	(38)
Foreign currency translation			(32)	42		
Benefit obligation at end of year	\$ 4,075	\$ 4,203	\$ 736	\$ 778	\$ 654	\$ 764
Change in plan assets						
Fair value of plan assets at beginning of year	\$ 3,575	\$ 3,153	\$ 598	\$ 518	\$ 30	
Actual gain (loss) on plan assets	208	420	(2)	49		
Employer contributions	16	195	31	50	9	\$ 60
Plan participants' contributions		1			7	8
Benefits paid	(201)	(194)	(26)	(44)	(37)	(38)
Foreign currency translation			(17)	25		
Fair value of plan assets at end of year	\$ 3,598	\$ 3,575	\$ 584	\$ 598	\$ 9	\$ 30
Funded status at end of year						
Fair value of plan assets	\$ 3,598	\$ 3,575	\$ 584	\$ 598	\$ 9	\$ 30
Benefit obligations	(4,075)	(4,203)	(736)	(778)	(654)	(764)
Funded status of plans	\$ (477)	\$ (628)	\$ (152)	\$ (180)	\$ (645)	\$ (734)
Amounts recognized in the consolidated balance sheets consist of:						
Noncurrent asset			\$ 100	\$ 99		
Current liability	\$ (15)	\$ (13)	(7)	(7)	\$ (23)	\$ (7)
Noncurrent liability	(462)	(615)	(245)	(272)	(622)	(727)
Recognized liability	\$ (477)	\$ (628)	\$ (152)	\$ (180)	\$ (645)	\$ (734)
Amounts recognized in accumulated other comprehensive loss consist of:						
Net actuarial loss (gain)	\$ 272	\$ 387	\$ (3)	\$ 7	\$ (22)	\$ 86
Prior service cost (credit)	22	26	1	1	(20)	(26)
Amounts recognized at end of year	\$ 294	\$ 413	\$ (2)	\$ 8	\$ (42)	\$ 60

13. Employee Retirement Plans (Continued)

Across total pension benefits, an actuarial gain of \$124 million was recognized in 2021 primarily due to increases in bond yields during the year, leading to domestic and international plan weighted-average discount rates that were 37 and 18 basis points higher, respectively, than the prior year. In 2020, an actuarial loss of \$358 million was recognized primarily due to decreases in bond yields during the year, leading to a domestic plan weighted-average discount rate that was 78 basis points lower than the prior year. The accumulated benefit obligation for defined benefit pension plans was \$4.5 billion and \$4.7 billion at December 31, 2021 and 2020, respectively.

For postretirement benefits, an actuarial gain of \$105 million was recognized in 2021 due to current year increases in bond yields, leading to a weighted-average discount rate that was 30 basis points higher than the prior year. In 2020, an actuarial loss of \$58 million was recognized due to current year decreases in bond yields, leading to a weighted-average discount rate that was 72 basis points lower than the prior year.

The following information is presented for pension plans where the projected benefit obligation or the accumulated benefit obligation exceeded the fair value of plan assets (in millions):

	December 31,			
	2021		2020	
Projected benefit obligation	\$	4,358	\$	4,665
Fair value of plan assets	\$	3,627	\$	3,758
Accumulated benefit obligation	\$	4,110	\$	4,247
Fair value of plan assets	\$	3,627	\$	3,603

The components of net periodic benefit (income) expense for employee retirement plans are presented in the following tables (in millions):

December 31,	Domestic pension benefits			International pension benefits			Postretirement benefits		
	2021	2020	2019	2021	2020	2019	2021	2020	2019
Service cost	\$ 102	\$ 92	\$ 76	\$ 25	\$ 26	\$ 25	\$ 10	\$ 9	\$ 9
Interest cost	78	110	133	10	12	15	15	20	27
Expected return on plan assets	(209)	(186)	(161)	(7)	(9)	(10)	(6)	(5)	(7)
Amortization of prior service cost (credit)	4	6	7	(1)	(1)	(1)	(6)	(5)	(7)
Amortization of actuarial loss (gain)							2	1	(1)
Recognition of actuarial loss	10	12	66	1	10	24			
Total net periodic benefit (income) expense	\$ (15)	\$ 34	\$ 121	\$ 28	\$ 38	\$ 53	\$ 21	\$ 25	\$ 28
Special termination benefit charge		8	6					1	1
Total (income) expense	\$ (15)	\$ 42	\$ 127	\$ 28	\$ 38	\$ 53	\$ 21	\$ 26	\$ 29
Other changes in plan assets and benefit obligations recognized in other comprehensive (loss) income:									
Curtailment effects					(4)				
Current year actuarial (gain) loss	\$ (105)	\$ 94	\$ 47	\$ (7)	(11)	41	\$ (105)	\$ 58	\$ 6
Amortization of actuarial (loss) gain							(2)	(1)	1
Recognition of actuarial loss	(10)	(12)	(66)	(1)	(10)	(24)			
Current year prior service cost		1							5
Amortization of prior service (cost) credit	(4)	(6)	(7)	1	1	1	6	5	7
Total recognized in other comprehensive (loss) income	\$ (119)	\$ 77	\$ (26)	\$ (7)	(24)	18	\$ (101)	\$ 62	\$ 19

The components of net periodic benefit (income) expense, other than the service cost component, are included in the line item other income (expense), net, in the consolidated statements of income.

13. Employee Retirement Plans (Continued)

Corning uses a hypothetical yield curve and associated spot rate curve to discount the plan's projected benefit payments. Once the present value of projected benefit payments is calculated, the suggested discount rate is equal to the level rate that results in the same present value. The yield curve is based on actual high-quality corporate bonds across the full maturity spectrum, which also includes private placements and eurobonds that are denominated in U.S. currency. The curve is developed from yields on hundreds of bonds from four grading sources, Moody's, S&P, Fitch and the Dominion Bond Rating Service. A bond will be included if at least half of the grades from these sources are Aa, non-callable bonds. The very highest 10% yields and the lowest 40% yields are excluded from the curve to eliminate outliers in the bond population.

Mortality is one of the key assumptions used in valuing liabilities of retirement plans. It is used to assign a probability of payment for benefits that are contingent upon participants' survival. To make this assumption, benefit plan sponsors typically use a base mortality table and an improvement scale to mortality rates for future anticipated changes to historical death rates.

As of December 31, 2021, Corning updated the adjustment factors applied to its base mortality assumption (PRI-2012 white collar table and PRI-2012 blue collar table for non-union and union participants, respectively) to value its U.S. benefit plan obligation. In addition, Corning also updated to the MP-2020 projection scale and the mortality assumption applied to disabled participants (PRI-2012 disabled mortality base table with future improvements using MP-2020) for the year ended December 31, 2020, with no change in 2021. As the Society of Actuaries publishes additional mortality improvement scales and base mortality tables, Corning considers these revised schedules in setting its mortality assumptions.

Measurement of postretirement benefit expense is based on assumptions used to value the postretirement benefit obligation at the beginning of the year.

The weighted-average assumptions used to determine benefit obligations were as follows:

	Pension benefits						Postretirement benefits		
	Domestic			International					
	2021	2020	2019	2021	2020	2019	2021	2020	2019
Discount rate	2.87%	2.50%	3.28%	1.20%	1.02%	1.34%	2.99%	2.69%	3.41%
Rate of compensation increase	3.50%	4.16%	3.50%	3.63%	3.55%	2.96%			
Cash balance crediting rate	3.86%	3.84%	3.94%	0.91%	0.94%	0.97%			
Employee contributions crediting rate	1.57%	0.62%	2.03%						

The weighted-average assumptions used to determine net periodic benefit (income) expense were as follows:

	Pension benefits						Postretirement benefits		
	Domestic			International					
	2021	2020	2019	2021	2020	2019	2021	2020	2019
Discount rate	2.50%	3.28%	4.28%	1.02%	1.34%	1.96%	2.69%	3.41%	4.33%
Expected return on plan assets	6.00%	6.00%	6.00%	1.26%	1.71%	2.01%			
Rate of compensation increase	4.16%	3.50%	3.50%	3.55%	2.96%	2.96%			
Cash balance crediting rate	3.84%	3.94%	3.94%	0.94%	0.97%	0.97%			
Employee contributions crediting rate	0.62%	2.03%	3.47%						

Assumed health care trend rates are as follows:

Assumed health care trend rates at December 31	2021	2020
Health care cost trend rate assumed for next year	6.25%	6.50%
Rate that the cost trend rate gradually declines to	5%	5%
Year that the rate reaches the ultimate trend rate	2027	2027

Plan Assets

The Company's primary objective is to ensure the plan has sufficient return on assets to fund the plan's current and future obligations as they become due. Investments are primarily made in public securities to ensure adequate liquidity to support benefit payments. Domestic and international stocks provide diversification to the portfolio. The target allocation range equity investment is 40% which includes large, mid and small-cap companies and investments in both developed and emerging markets. The target allocation for bond investments is 60%, which predominately includes corporate bonds. Long-duration fixed income assets are utilized to mitigate the sensitivity of funding ratios to changes in interest rates.

13. Employee Retirement Plans (Continued)

The following tables provide fair value measurement information for the Company's major categories; Level 1 (quoted market prices in active markets for identical assets), Level 2 (significant other observable inputs) and Level 3 (significant unobservable inputs) of domestic defined benefit plan assets:

(in millions)	December 31, 2021				December 31, 2020			
	Total	(Level 1)	(Level 2)	(Level 3)	Total	(Level 1)	(Level 2)	(Level 3)
Equity securities:								
U.S. companies	\$ 977	\$ 20	\$ 957		\$ 781	\$ 1	\$ 780	
International companies	234		234		441		441	
Fixed income:								
U.S. treasury bonds	256	256			147	147		
U.S. corporate bonds	1,770		1,770		1,951		1,951	
Preferred securities	11		11		11		11	
Private equity (1)	41			\$ 41	51			\$ 51
Real estate (2)	10			10	140			140
Cash equivalents	308	308			83	83		
Total	\$ 3,607	\$ 584	\$ 2,972	\$ 51	\$ 3,605	\$ 231	\$ 3,183	\$ 191

- (1) This category includes venture capital, leverage buyouts and distressed debt limited partnerships invested primarily in U.S. companies. The inputs are valued by discounted cash flow analysis and comparable sale analysis.
- (2) This category includes industrial, office, apartments, hotels, infrastructure and retail investments which are limited partnerships predominately in the U.S. The inputs are valued by discounted cash flow analysis; comparable sale analysis and periodic external appraisals.

The following tables provide fair value measurement information for the Company's major categories; Level 1 (quoted market prices in active markets for identical assets), Level 2 (significant other observable inputs) and Level 3 (significant unobservable inputs) of international defined benefit plan assets:

(in millions)	December 31, 2021				December 31, 2020			
	Total	(Level 1)	(Level 2)	(Level 3)	Total	(Level 1)	(Level 2)	(Level 3)
Fixed income:								
International fixed income	\$ 500	\$ 416	\$ 84		\$ 519	\$ 426	\$ 93	
Insurance contracts	2			\$ 2	3			\$ 3
Mortgages	22			22	20			20
Cash equivalents	60	60			56	56		
Total	\$ 584	\$ 476	\$ 84	\$ 24	\$ 598	\$ 482	\$ 93	\$ 23

The following table sets forth a summary of changes in the fair value of the defined benefit plans Level 3 assets:

(in millions)	Level 3 assets – domestic		Level 3 assets – international	
	Private equity	Real estate	Mortgages	Insurance contracts
Balance at December 31, 2019	\$ 64	\$ 145	\$ 21	\$ 2
Actual return on plan assets relating to assets still held at the reporting date	4			
Asset (sales) purchases	(17)	(5)	(1)	1
Balance at December 31, 2020	\$ 51	\$ 140	\$ 20	\$ 3
Actual return on plan assets relating to assets still held at the reporting date	21	1	2	
Actual return on plan assets relating to assets sold during the reporting period		4		
Asset sales	(31)	(135)		(1)
Balance at December 31, 2021	\$ 41	\$ 10	\$ 22	\$ 2

13. Employee Retirement Plans (Continued)

Credit Risk

56% of domestic plan assets are invested in long duration bonds. The average rating for these bonds is A. These bonds are subject to both credit and default risk and changes in the risk could lead to a decline in the value of these bonds.

Currency Risk

6% of domestic assets are valued in non-U.S. dollar denominated investments that are subject to currency fluctuations. The value of these securities will decline if the U.S. dollar increases in value relative to the value of the currencies in which these investments are denominated.

Liquidity Risk

1% of the domestic securities are invested in Level 3 securities. These are long-term investments in private equity and private real estate investments that may not mature or be sellable in the near-term without significant loss.

At December 31, 2021 and 2020, the amount of Corning common stock included in equity securities was not significant.

Cash Flow Data

The following reflects the gross benefit payments that are expected to be paid for domestic and international defined benefit pension plans and the postretirement medical and life plans (in millions):

	Expected benefit payments				
	Domestic pension benefits		International pension benefits		Postretirement benefits
2022	\$	232	\$	28	\$ 33
2023	\$	233	\$	34	\$ 33
2024	\$	242	\$	33	\$ 33
2025	\$	251	\$	36	\$ 33
2026	\$	254	\$	40	\$ 33
2027-2031	\$	1,333	\$	221	\$ 166

Other Benefit Plans

Corning offers defined contribution plans covering employees meeting certain eligibility requirements. Total consolidated defined contribution plan expense was \$98 million, \$76 million and \$108 million for the years ended December 31, 2021, 2020 and 2019, respectively.

14. Commitments, Contingencies and Guarantees

The amounts of obligations are as follows (in millions):

	Total	Amount of commitment and contingency expiration per period			
		Less than 1 year	1 to 3 years	3 to 5 years	5 years and thereafter
Performance bonds and guarantees	\$ 215	\$ 41	\$ 77	\$ 3	\$ 94
Stand-by letters of credit ⁽¹⁾	69	43	17		9
Subtotal of commitment expirations per period	\$ 284	\$ 84	\$ 94	\$ 3	\$ 103
Purchase obligations ⁽²⁾	\$ 994	\$ 232	\$ 219	\$ 111	\$ 432
Capital expenditure obligations ⁽³⁾	357	357			
Debentures ⁽⁴⁾	6,315		227	87	6,001
Finance leases and financing obligations	729	55	207	115	352
Interest on debentures ⁽⁵⁾	8,306	265	523	519	6,999
Imputed interest on finance leases and financing obligations	271	32	53	39	147
Operating lease obligations	1,026	103	207	163	553
Uncertain tax positions ⁽⁶⁾	80	9	12	51	8
Subtotal of contractual obligation payments due by period	\$ 18,078	\$ 1,053	\$ 1,448	\$ 1,085	\$ 14,492
Total commitments and contingencies	\$ 18,362	\$ 1,137	\$ 1,542	\$ 1,088	\$ 14,595

(1) At December 31, 2021, the Company had stand-by letters of credit commitments of \$108 million; \$39 million was included in other accrued liabilities on the consolidated balance sheets.

(2) Purchase obligations are enforceable and legally binding obligations which primarily consist of raw material and energy-related take-or-pay contracts.

(3) Capital expenditure obligations primarily reflect amounts associated with capital expansion activities.

(4) Debentures are stated at maturity value and excludes interest rate swap gains or losses and bond discounts.

(5) The estimate of interest payments assumes interest is paid through the date of maturity or expiration of the related debt, based upon stated rates in the respective debt instruments.

(6) At December 31, 2021, \$80 million was included on the consolidated balance sheets related to uncertain tax positions.

The Company is required, at the time a guarantee is issued, to recognize a liability for the fair value or market value of the obligation it assumes. In the normal course of business, the Company does not routinely provide significant third-party guarantees. Generally, third-party guarantees provided by Corning are limited to certain financial guarantees, including stand-by letters of credit and performance bonds, and the incurrence of contingent liabilities in the form of purchase price adjustments related to attainment of milestones. These guarantees have various terms, and none of these guarantees are individually significant. The Company believes a significant majority of these guarantees and contingent liabilities will expire without being funded.

Product warranty liability accruals at December 31, 2021 and 2020 were insignificant.

The ability of certain subsidiaries and affiliated companies to transfer funds is limited by provisions of foreign government regulations, affiliate agreements and certain loan agreements. At December 31, 2021, the amount of equity subject to such restrictions for consolidated subsidiaries and affiliated companies was not significant. While this amount is legally restricted, it does not result in operational difficulties since the Company has generally permitted subsidiaries to retain a majority of equity to support growth programs.

Corning is a defendant in various lawsuits and is subject to various claims that arise in the normal course of business, the most significant of which are summarized below. In the opinion of management, the likelihood that the ultimate disposition of these matters will have a material adverse effect on Corning's consolidated financial position, liquidity, or results of operations, is remote.

14. Commitments, Contingencies and Guarantees (Continued)

Dow Corning Chapter 11 Related Matters

Until June 1, 2016, Corning and The Dow Chemical Company (“Dow”) each owned 50% of the common stock of Dow Corning Corporation (“Dow Corning”). On May 31, 2016, Corning and Dow realigned their ownership interest in Dow Corning. Following the realignment, Corning no longer owned any interest in Dow Corning. With the realignment, Corning agreed to indemnify Dow for 50% of Dow Corning’s non-ordinary course, pre-closing liabilities to the extent such liabilities exceed the amounts reserved for them by Dow Corning as of May 31, 2016, subject to certain conditions and limits.

Dow Corning Breast Implant Litigation

In May 1995, Dow Corning filed for bankruptcy protection to address pending and claimed liabilities arising from many thousands of breast implant product lawsuits. On June 1, 2004, Dow Corning emerged from Chapter 11 with a Plan of Reorganization (the “Plan”) which provided for the settlement or other resolution of implant claims. The Plan includes releases for Corning and Dow as shareholders in exchange for contributions to the Plan.

Under the terms of the Plan, Dow Corning has established and funded a Settlement Trust and a Litigation Facility, referred to above, to provide a means for tort claimants to settle or litigate their claims. Inclusive of insurance, Dow Corning has paid approximately \$1.8 billion to the Settlement Trust. As of May 31, 2016, Dow Corning had recorded a reserve for breast implant litigation of \$290 million. In the event Dow Corning’s total liability for these claims exceeds such amount, Corning may be required to indemnify Dow for up to 50% of the excess liability, subject to certain conditions and limits. As of December 31, 2021, Dow Corning had recorded a reserve for breast implant litigation of \$130 million. As a result, Corning does not believe its indemnity obligation for Dow Corning’s breast implant litigation liability, if any, will be material.

Dow Corning Bankruptcy Pendency Interest Claims

As a separate matter arising from the bankruptcy proceedings, Dow Corning has been defending claims asserted by commercial creditors who claimed additional compounded interest at default and state statutory judgment rates as well as attorneys’ fees and other enforcement costs, during the period from May 1995 through June 2004. As of May 31, 2016, Dow Corning had recorded a reserve for these claims of \$107 million. Dow Corning settled those claims as of September 30, 2019 and received approval of the settlement from the bankruptcy court. Corning does not believe its indemnity obligation, if any, for Dow Corning’s liability to be material.

Dow Corning Environmental Claims

In September 2019, Dow formally notified Corning of certain environmental matters for which Dow asserts that it has or will experience losses arising from remediation and response at a number of sites. In the event Dow is liable for these claims, Corning may be required to indemnify Dow for up to 50% of that liability, subject to certain conditions and limits. As of December 31, 2021, Corning has determined a potential liability for these environmental matters is probable, and the amount reserved was not material.

Environmental Litigation

Corning has been named by the Environmental Protection Agency (the “Agency”) under the Superfund Act, or by state governments under similar state laws, as a potentially responsible party for 15 active hazardous waste sites. Under the Superfund Act, all parties who may have contributed any waste to a hazardous waste site, identified by the Agency, are jointly and severally liable for the cost of cleanup unless the Agency agrees otherwise. It is Corning’s policy to accrue for its estimated liability related to Superfund sites and other environmental liabilities related to property owned by Corning based on expert analysis and continual monitoring by both internal and external consultants. At December 31, 2021 and 2020, Corning had accrued approximately \$55 million and \$68 million, respectively, for the undiscounted estimated liability for environmental cleanup and related litigation. Based upon the information developed to date, management believes that the accrued reserve is a reasonable estimate of the Company’s liability and that the risk of an additional loss in an amount materially higher than accrued is remote.

15. Hedging Activities

Corning is primarily exposed to foreign currency risks due to fluctuations in exchange rates. These fluctuations affect the Company's financial instruments and transactions denominated in foreign currencies, which impact earnings.

The most significant foreign currency exposures relate to the Japanese yen, South Korean won, new Taiwan dollar, Chinese yuan, the euro and British pound. Corning seeks to mitigate the impact of exchange rate movements in our income statement by using over-the-counter ("OTC") derivative instruments including foreign exchange forward and option contracts. In general, the expirations of these contracts coincide with the timing of the underlying foreign currency commitments and transactions.

Corning is exposed to potential losses in the event of non-performance by counterparties to these derivative contracts. However, this risk is minimized by maintaining a portfolio with a diverse group of highly-rated major financial institutions. The Company does not expect to record any losses due to counterparty default. Neither the Company nor its counterparties are required to post collateral for these financial instruments. The Company qualified for and elected the end-user exception to the mandatory swap clearing requirement of the Dodd-Frank Act.

Designated Hedges

Corning uses OTC foreign exchange forward contracts designated as cash flow hedges to reduce the risk that movements in exchange rates will adversely affect the net cash flows resulting from the sale of products to customers and purchases from suppliers. The total gross notional values for foreign currency cash flow hedges are \$780 million and \$1.1 billion at December 31, 2021 and 2020, respectively, with maturities spanning the years 2022 through 2023. Corning defers gains and losses related to the cash flow hedges into accumulated other comprehensive loss on the consolidated balance sheets until the hedged item impacts earnings. At December 31, 2021, the amount expected to be reclassified into earnings within the next 12 months is a pre-tax gain of \$47 million.

In 2021, Corning entered into leases of precious metals, with maturities through 2025. To offset the risk of changes in the fair value of the Company's separate accounting pool of leased precious metals due to adverse changes in the respective market prices, Corning designated the bifurcated embedded derivatives included in these leases as fair value hedges. The gain or loss on the derivatives, as well as the offsetting loss or gain on the hedged item attributable to the hedged risk, are recognized in current earnings. The amounts representing the time value component of the derivatives are excluded from the assessment of effectiveness and amortized in earnings. The impact of the excluded component on Corning's other comprehensive income and earnings is not material. The carrying amount of the leased precious metals pool, which is included in the property, plant and equipment, net of accumulated depreciation line of the consolidated balance sheets, is \$107 million at December 31, 2021. The cumulative amount of fair value changes included in the carrying amount of the leased precious metals pool is not material.

Corning uses regression analysis or the critical term match method to assess initial hedge effectiveness. Following the inception of a hedging relationship, hedge effectiveness is assessed quarterly based on qualitative factors.

Undesignated Hedges

Corning uses OTC foreign exchange forward and option contracts not designated as hedging instruments for accounting purposes to offset economic currency risks. The undesignated hedges limit exposure to foreign functional currency fluctuations related to certain subsidiaries' monetary assets, monetary liabilities and net earnings in foreign currencies.

A significant portion of the Company's non-U.S. revenue and expenses are denominated in Japanese yen, South Korean won, new Taiwan dollar, Chinese yuan, and euro. When this revenue and these expenses are translated back to U.S. dollars, the Company is exposed to foreign exchange rate movements. To protect translated earnings against movements in these currencies, the Company has entered into a series of average rate forwards and option contracts. Most of these contracts hedge a significant portion of the Company's exposure to the Japanese yen with maturities spanning years 2022 through 2024.

15. Hedging Activities (Continued)

The following table summarizes the total gross notional value for translated earnings contracts at December 31, 2021 and 2020 (in billions):

	Year ended December 31,	
	2021	2020
Average rate forward contracts:		
Japanese yen-denominated	\$ 2.9	\$ 4.5
South Korean won-denominated	1.2	0.4
Euro-denominated	0.2	0.5
Other foreign currencies (1)	0.1	0.1
Option contracts:		
Japanese yen-denominated (2)	3.6	2.0
Other foreign currencies (3)	0.9	
Total gross notional value outstanding	\$ 8.9	\$ 7.5

(1) Denominated currencies for average rate forward contracts include the Chinese yuan and British pound.

(2) Japanese yen-denominated option contracts include zero-cost collars, purchased put and call options. With respect to zero-cost collars, the gross notional amount includes the value of the put and call options. However, due to the nature of zero-cost collars, only the put or the call option can be exercised at maturity.

(3) Other foreign currencies option contracts are purchased basket options that include a basket of underlying currencies, including the Japanese yen, South Korean won, Chinese yuan, euro, and British pound, and each basket option will be settled against USD.

The fair values of these derivative contracts are recorded as either assets (gain position) or liabilities (loss position) on the consolidated balance sheets. Changes in the fair value of the derivative contracts are recorded currently in earnings in the translated earnings contract gain (loss), net line of the consolidated statements of income.

The following table summarizes the notional amounts and respective fair values of Corning's derivative financial instruments on a gross basis for December 31, 2021 and 2020 (in millions):

	Notional amount		Asset derivatives				Liability derivatives			
			Balance sheet location	Fair value			Balance sheet location	Fair value		
	2021	2020		2021	2020			2021	2020	
Derivatives designated as hedging instruments (1)										
Foreign exchange contracts and other	\$ 780	\$ 1,143	Other current assets	\$ 49	\$ 37	Other accrued liabilities	\$ (2)	\$ (3)		
			Other assets	10	21	Other liabilities	(9)	(1)		
Derivatives not designated as hedging instruments										
Foreign exchange contracts	3,864	6,144	Other current assets	91	45	Other accrued liabilities	(95)	(76)		
			Other assets		41	Other liabilities		(59)		
Translated earnings contracts	8,899	7,453	Other current assets	196	66	Other accrued liabilities	(47)	(110)		
			Other assets	154	61	Other liabilities	(40)	(95)		
Total derivatives	\$ 13,543	\$ 14,740		\$ 500	\$ 271		\$ (193)	\$ (344)		

(1) At December 31, 2021, derivatives designated as hedging instruments include foreign exchange cash flow hedges with gross notional amounts of \$780 million and fair value hedges of leased precious metals with a gross notional amount of 7,559 troy ounces. At December 31, 2020, derivatives designated as hedging instruments include foreign currency contracts with notional amounts of \$892 million and \$251 million, respectively, for cash flow hedges and net investment hedges.

15. Hedging Activities (Continued)

The following tables summarize the effect on the consolidated statements of income relating to Corning's derivative financial instruments (in millions). The accumulated derivative gain included in accumulated other comprehensive loss on the consolidated balance sheets at December 31, 2021 and 2020 is \$52 million and \$60 million, respectively.

Derivatives in hedging relationships for cash flow and fair value hedges	Gain (loss) recognized in other comprehensive income (OCI)			Location of gain (loss) reclassified from accumulated OCI into income effective (ineffective)	Gain (loss) reclassified from accumulated OCI into income		
	2021	2020	2019		2021	2020	2019
				Net sales	\$ 14	\$ (6)	
				Cost of sales	39	13	11
Foreign exchange contracts and other	\$ 47	\$ (19)	72	Other expense, net ⁽¹⁾		(14)	
Total cash flow and fair value hedges	\$ 47	\$ (19)	72		\$ 53	\$ (7)	11

Undesignated derivatives	Location of gain (loss) recognized in income	Gain (loss) recognized in income		
		2021	2020	2019
Foreign exchange contracts	Other income (expense), net ⁽¹⁾	\$ 38	\$ (93)	21
Translated earnings contracts	Translated earnings contract gain (loss), net	354	(38)	248
Total undesignated		\$ 392	\$ (131)	269

(1) A loss of \$14 million was reclassified from accumulated other comprehensive loss into other expense, net, resulting from the de-designation of certain cash flow hedges during the year ended December 31, 2020.

16. Fair Value Measurements

Fair value standards under U.S. GAAP define fair value, establish a framework for measuring fair value in applying generally accepted accounting principles, and require disclosures about fair value measurements. The standards also identify two kinds of inputs that are used to determine the fair value of assets and liabilities: observable and unobservable. Observable inputs are based on market data or independent sources while unobservable inputs are based on the Company's own market assumptions. Once inputs have been characterized, the inputs are prioritized into one of three broad levels (provided in the table below) used to measure fair value. Fair value standards apply whenever an entity is measuring fair value under other accounting pronouncements that require or permit fair value measurement and require the use of observable market data when available.

The following tables provide fair value measurement information for the Company's major categories of financial assets and liabilities measured on a recurring basis; Level 1, quoted market prices in active markets for identical assets, Level 2, significant other observable inputs, and Level 3, significant unobservable inputs (in millions):

(in millions)	December 31, 2021	Fair value measurements at reporting date			December 31, 2020	Fair value measurements at reporting date		
		(Level 1)	(Level 2)	(Level 3)		(Level 1)	(Level 2)	(Level 3)
Current assets:								
Other current assets (1)(2)	\$ 352	\$ 10	\$ 336	\$ 6	\$ 152		\$ 148	\$ 4
Non-current assets:								
Investments (3)					\$ 137	\$ 137		
Other assets (1)	\$ 175		\$ 164	\$ 11	\$ 139		\$ 123	\$ 16
Current liabilities:								
Other accrued liabilities (1)	\$ 144		\$ 144		\$ 189		\$ 189	
Non-current liabilities:								
Other liabilities (1)(4)	\$ 66		\$ 66		\$ 155		\$ 155	

- (1) Derivative assets and liabilities include foreign exchange contracts which are measured using observable inputs for similar assets and liabilities.
- (2) Equity securities with readily available fair values that were measured using Level 1 inputs were reclassified from investments to other current assets and subsequently sold for \$84 million during the year ended December 31, 2021.
- (3) Included in investments as of December 31, 2020 were equity securities with readily available fair values that were measured using Level 1 inputs. A pre-tax gain of \$107 million was recorded from the initial public offering of an investment for the year ended December 31, 2020.
- (4) Other liabilities as of December 31, 2021 include a \$17 million put option pursuant to the Share Repurchase Agreement with SDC, which was measured using significant other observable (Level 2) inputs. Refer to Note 17 (Shareholders' Equity) to the consolidated financial statements for additional information

Assets and Liabilities Measured on a Non-Recurring Basis

For the year ended December 31, 2020, Corning incurred a long-lived asset impairment and disposal loss for an asset group related to the reassessment of research and development programs within "All Other". Given the economic environment and market opportunities, Corning discontinued its investment in these research and development programs. The impairment analysis and disposition of certain assets resulted in a total pre-tax charge of \$217 million, which was substantially all the carrying value, inclusive of an insignificant amount of goodwill. The fair value of the asset group for the impairment analysis was measured using unobservable (Level 3) inputs.

Refer to Note 2 (Restructuring, Impairment and Other Charges and Credits) to the consolidated financial statements for additional information about this impairment.

Fair value measurements (Level 3) related to the Redemption are disclosed in Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements. There were no other significant financial assets and liabilities measured on a nonrecurring basis as of December 31, 2021 and 2020.

17. Shareholders' Equity

Common Stock Dividends

On February 2, 2022, Corning's Board of Directors declared a 13% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.24 to \$0.27 per share of common stock, beginning with the dividend paid in the first quarter of 2022. This increase marks the eleventh dividend increase since October 2011.

On February 3, 2021, Corning's Board of Directors declared a 9% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.22 to \$0.24 per share of common stock, beginning with the dividend paid in the first quarter of 2021.

On February 5, 2020, Corning's Board of Directors declared a 10% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.20 to \$0.22 per share of common stock, beginning with the dividend paid in the first quarter of 2020.

Fixed Rate Cumulative Convertible Preferred Stock, Series A

As of December 31, 2020, Corning had 2,300 outstanding shares of Preferred Stock.

On January 16, 2021, the Preferred Stock became convertible into 115 million Common Shares, in whole or in part, at the option of Samsung Display Co., Ltd. ("SDC"). On April 5, 2021, Corning and SDC executed the Share Repurchase Agreement ("SRA").

Pursuant to the SRA, on the Initial Closing Date, the Preferred Stock was fully converted. Immediately following the conversion, Corning repurchased and retired 35 million of the Common Shares held by SDC for an aggregate purchase price of approximately \$1.5 billion, of which approximately \$507 million was paid on the Initial Closing Date. Subsequent payments of approximately \$507 million will be paid on each of the first and second anniversaries of the Initial Closing Date.

- The 35 million Common Shares repurchased by Corning were excluded from the weighted-average common shares outstanding for the calculation of the Company's basic and diluted earnings per share starting on the Initial Closing Date.
- The Common Shares repurchased were accounted for as a redemption of Preferred Stock. The excess of the \$1.5 billion consideration paid over the carrying value of the Preferred Stock reduced the net income available to common shareholders by \$803 million.

The remaining 80 million Common Shares were accounted for as a conversion of Preferred Stock and resulted in an increase of common stock and additional paid-in-capital based on the carrying value of the Preferred Stock and were included in the weighted-average common shares outstanding for the calculation of the Company's basic and diluted earnings per share.

Pursuant to the SRA, with respect to the 80 million Common Shares outstanding held by SDC:

- SDC has the option to sell an additional 22 million Common Shares to Corning in specified tranches from time to time in calendar years 2024 through 2027. Corning may, at its sole discretion, elect to repurchase such Common Shares. If Corning elects not to repurchase the Common Shares and SDC sells the Common Shares on the open market, Corning will be required to pay SDC a make-whole payment, subject to a 5% cap of the repurchase proceeds that otherwise would have been paid by Corning. As of December 31, 2021, the fair value of the option was \$17 million when measured using significant other observable inputs.
- The remaining 58 million shares of Common Shares are subject to a seven-year lock-up period expiring in 2027.

Refer to Note 16 (Fair Value Measurements) to the consolidated financial statements for additional information

17. Shareholders' Equity (Continued)

Share Repurchases

2021 Share Repurchases

For the year ended December 31, 2021, the Company repurchased 7.3 million shares of common stock on the open market for approximately \$274 million, as part of its 2019 Repurchase Program.

On April 8, 2021, the Company repurchased 35 million shares of common stock, under the 2018 and 2019 Repurchase Programs, for an aggregate purchase price of approximately \$1.5 billion, of which approximately \$507 million was paid on the Initial Closing Date. Subsequent payments of approximately \$507 million will be paid on each of the first and second anniversaries of the Initial Closing Date. These shares were repurchased immediately following the conversion of the Preferred Stock, as discussed above.

2020 Share Repurchases

For the year ended December 31, 2020, the Company repurchased 4.1 million shares of common stock on the open market for approximately \$105 million, as part of its 2018 Repurchase Program.

2019 Share Repurchases

On April 26, 2018, Corning's Board of Directors approved a \$2 billion share repurchase program with no expiration date (the "2018 Repurchase Program"). On July 17, 2019, Corning's Board of Directors authorized \$5 billion in share repurchases with no expiration date (the "2019 Repurchase Program"). During the year ended December 31, 2019, the Company repurchased 31.0 million shares of common stock on the open market for approximately \$925 million as part of its 2018 Repurchase Program.

The following table presents changes in capital stock (in millions):

	Common stock		Treasury stock	
	Shares	Par value	Shares	Cost
Balance at December 31, 2018	1,713	\$ 857	(925)	\$ (18,870)
Shares issued to benefit plans and for option exercises	5	2		
Shares purchased for treasury			(31)	(925)
Other, net ⁽¹⁾				(17)
Balance at December 31, 2019	1,718	\$ 859	(956)	\$ (19,812)
Shares issued to benefit plans and for option exercises	8	4		
Shares purchased for treasury			(4)	(105)
Other, net ⁽¹⁾			(1)	(11)
Balance at December 31, 2020	1,726	\$ 863	(961)	\$ (19,928)
Shares issued to benefit plans and for option exercises	9	4		
Shares purchased for treasury			(7)	(274)
Conversion of preferred stock to common stock	115	58		
Repurchase of converted common stock	(35)	(18)		
Other, net ⁽¹⁾			(2)	(61)
Balance at December 31, 2021	1,815	\$ 907	(970)	\$ (20,263)

(1) Consists of tax withholdings on share repurchases.

17. Shareholders' Equity (Continued)

Accumulated Other Comprehensive Loss

A summary of changes in the components of accumulated other comprehensive loss, including the proportionate share of equity method investee's accumulated other comprehensive loss, is as follows (in millions) (1):

	Foreign currency translation adjustments and other	Unamortized actuarial gains (losses) and prior service (costs) credits	Net unrealized gains (losses) on investments	Net unrealized gains (losses) on designated hedges	Accumulated other comprehensive loss
Balance at December 31, 2018	\$ (714)	\$ (298)	\$ (4)	\$ 6	\$ (1,010)
Other comprehensive (loss) income before reclassifications (2)	\$ (129)	\$ (79)	\$ 1	\$ 54	\$ (153)
Amounts reclassified from accumulated other comprehensive income (loss) (5)		15		(9)	6
Equity method affiliates (6)	(14)				(14)
Net current-period other comprehensive (loss) income	(143)	(64)	1	45	(161)
Balance at December 31, 2019	\$ (857)	\$ (362)	\$ (3)	\$ 51	\$ (1,171)
Other comprehensive income (loss) before reclassifications (3)	\$ 511	\$ (106)		\$ (14)	\$ 391
Amounts reclassified from accumulated other comprehensive income (loss) (5)		18		5	23
Equity method affiliates (6)	17				17
Net current-period other comprehensive income (loss)	528	(88)		(9)	431
Balance at December 31, 2020	\$ (329)	\$ (450)	\$ (3)	\$ 42	\$ (740)
Other comprehensive (loss) income before reclassifications (4)	\$ (582)	\$ 178		\$ 43	\$ (361)
Amounts reclassified from accumulated other comprehensive (loss) income (5)				(52)	(52)
Equity method affiliates (6)	(22)				(22)
Net current-period other comprehensive (loss) income	(604)	178		(9)	(435)
Balance at December 31, 2021	\$ (933)	\$ (272)	\$ (3)	\$ 33	\$ (1,175)

(1) All amounts are after tax. Amounts in parentheses indicate debits to accumulated other comprehensive loss.

(2) Amounts are net of total tax benefit of \$8 million, primarily driven by \$7 million related to foreign currency translation adjustments; embedded in this number is the negative impact of \$18 million related to the hedging component, offset by the positive impact of \$19 million related to retirement plans.

(3) Amounts are net of total tax expense of \$22 million, primarily driven by \$55 million related to foreign currency translation adjustments; embedded in this number are positive impacts of \$5 million related to the hedging component and \$28 million related to retirement plans.

(4) Amounts are net of total tax expense of \$4 million, primarily driven by \$51 million related to retirement plans, offset by positive impacts of \$44 million and \$3 million related to foreign currency translation adjustments and the hedging component, respectively.

(5) Tax effect of reclassifications are disclosed separately within the footnote.

(6) Tax effects related to equity method affiliates are not significant in the reported periods.

17. Shareholders' Equity (Continued)

(In millions)

Reclassifications Out of Accumulated Other Comprehensive Income ("AOCI") by Component (1)				
Details about AOCI Components	Amount reclassified from AOCI			Affected line item in the consolidated statements of income
	Year ended December 31,			
	2021	2020	2019	
Amortization of net actuarial loss	\$ (3)	\$ (23)	\$ (89)	(2)
Amortization of prior service credit (cost)	3		1	(2)
		(23)	(88)	Total before tax
		5	73	Tax benefit (3)
	\$ —	\$ (18)	\$ (15)	Net of tax
Realized gains (losses) on designated hedges	\$ 14	\$ (6)		Sales
	39	13	11	Cost of sales
		(14)		Other expense, net
	53	(7)	11	Total before tax
	(1)	2	(2)	Tax benefit (expense)
	\$ 52	\$ (5)	\$ 9	Net of tax
Total reclassifications for the period	\$ 52	\$ (23)	\$ (6)	Net of tax

(1) Amounts in parentheses indicate debits to the statement of income.

(2) These accumulated other comprehensive loss components are included in net periodic pension cost. Refer to Note 13 (Employee Retirement Plans) to the consolidated financial statements for additional details.

(3) Includes \$52 million that was recognized during the first quarter of 2019 due to adoption of the new standard related to Income Statement - Reporting Comprehensive Income, which allows for reclassification from accumulated other comprehensive loss to retained earnings for stranded tax effects.

18. Earnings Per Common Share

Basic earnings per common share are computed by dividing income available to common shareholders by the weighted-average number of common shares outstanding for the period. Diluted earnings per common share assumes the issuance of common shares for all potentially dilutive securities outstanding.

The reconciliation of the amounts used to compute basic and diluted earnings per common share from operations is as follows (in millions, except per share amounts):

	Year ended December 31,		
	2021	2020	2019
Net income attributable to Corning Incorporated	\$ 1,906	\$ 512	\$ 960
Less: Series A convertible preferred stock dividend	24	98	98
Less: Excess consideration paid for redemption of preferred stock	803		
Net income available to common shareholders - basic	1,079	414	862
Plus: Series A convertible preferred stock dividend			98
Net income available to common shareholders - diluted	\$ 1,079	\$ 414	\$ 960
Weighted-average common shares outstanding - basic	828	761	776
Effect of dilutive securities:			
Stock options and other dilutive securities	16	11	8
Series A convertible preferred stock (1)			115
Weighted-average common shares outstanding - diluted	844	772	899
Basic earnings per common share	\$ 1.30	\$ 0.54	\$ 1.11
Diluted earnings per common share	\$ 1.28	\$ 0.54	\$ 1.07
Anti-dilutive potential shares excluded from diluted earnings per common share:			
Series A convertible preferred stock dividend (1)	31	115	
Employee stock options and awards		2	2
Total	31	117	2

(1) For the years ended December 31, 2021 and 2020, the Preferred Stock was anti-dilutive and therefore excluded from the calculation of diluted earnings per share.

Fixed Rate Cumulative Convertible Preferred Stock, Series A

As of December 31, 2020, Corning had 2,300 outstanding shares of Fixed Rate Cumulative Convertible Preferred Stock, Series A.

On January 16, 2021, the Preferred Stock became convertible into 115 million Common Shares, in whole or in part, at the option of the holder, SDC. On April 5, 2021, Corning and SDC executed an SRA.

Pursuant to the SRA, on the Initial Closing Date, the Preferred Stock was fully converted into 115 million Common Shares. The Company repurchased 35 million of the converted Common Shares pursuant to the SRA and excluded them from the weighted-average common shares outstanding for the calculation of the Company's basic and diluted earnings per share. The redemption of these Common Shares resulted in a reduction of retained earnings of \$803 million which reduced the net income available to common shareholders.

The remaining 80 million Common Shares are outstanding and are included in the weighted-average common shares outstanding for the calculation of the Company's basic and diluted earnings per share.

Refer to Note 17 (Shareholders' Equity) to the consolidated financial statements for more information.

19. Share-Based Compensation

Corning maintains long-term incentive plans (the “Plans”) for key employees and non-employee members of its Board of Directors. The Plans allow us to grant equity-based compensation awards, including stock options, stock appreciation rights, performance share units, restricted stock units, restricted stock awards or a combination of awards (collectively, share-based awards). At December 31, 2021, there were approximately 39 million unissued common shares available for future grants authorized under the Plans.

Share-based compensation cost is allocated to the selling, general and administrative, research, development and engineering, and cost of sales expense lines in the consolidated statements of income.

Stock Compensation Plans

The Company measures and recognizes compensation cost for all share-based payment awards made to employees and directors based on estimated fair values.

The fair value of awards granted that are expected to ultimately vest is recognized as expense over the requisite service periods. The number of options expected to vest equals the total options granted less an estimation of the number of forfeitures expected to occur prior to vesting. The forfeiture rate is calculated based on 15 years of historical data and is adjusted if actual forfeitures differ significantly from the original estimates. The effect of any change in estimated forfeitures would be recognized through a cumulative adjustment that would be included in compensation cost in the period of the change in estimate.

Total share-based compensation cost was approximately \$190 million, \$207 million and \$56 million, respectively, for the years ended December 31, 2021, 2020 and 2019.

The income tax benefit realized from share-based compensation was \$37 million, \$12 million and \$9 million, respectively, for the years ended December 31, 2021, 2020 and 2019. Refer to Note 8 (Income Taxes) to the consolidated financial statements for additional information.

Stock Options

Corning’s stock option plans provide non-qualified and incentive stock options to purchase authorized but unissued common shares, or treasury shares, at the market price on the grant date and generally become exercisable in installments from one year to five years from the grant date. The maximum term of non-qualified and incentive stock options is 10 years from the grant date. An award is considered vested when the employee’s retention of the award is no longer contingent on providing subsequent service (the “non-substantive vesting period approach”).

The following table summarizes information concerning stock options outstanding, including the related transactions under the stock option plans for the year ended December 31, 2021:

	Number of shares (in thousands)	Weighted-average exercise price	Weighted-average remaining contractual term in years	Aggregate intrinsic value (in thousands)
Options Outstanding as of December 31, 2020	17,095	\$ 21.60		
Exercised	(4,818)	19.85		
Forfeited and expired	(373)	21.40		
Options outstanding as of December 31, 2021	11,904	22.31	6.59	\$ 177,634
Options expected to vest as of December 31, 2021	11,830	22.32	6.57	176,328
Options exercisable as of December 31, 2021	6,573	21.19	5.42	105,412

19. Share-Based Compensation (Continued)

The aggregate intrinsic value (market value of stock less option exercise price) in the preceding table represents the total pretax intrinsic value, based on the Company's closing stock price on December 31, 2021, which would have been received by the option holders had all option holders exercised their "in-the-money" options as of that date. There were approximately 7 million "in-the-money" options exercisable on December 31, 2021.

There were no options granted in 2021. The weighted-average grant-date fair value for options granted for the years ended December 31, 2020 and 2019 was \$3.67 and \$8.78, respectively. The total fair value of options that vested during the years ended December 31, 2021, 2020 and 2019 was approximately \$16 million, \$31 million and \$10 million, respectively. Compensation cost related to stock options for the years ended December 31, 2021, 2020 and 2019, was approximately \$9 million, \$23 million and \$13 million, respectively.

As of December 31, 2021, there was approximately \$10 million of unrecognized compensation cost related to stock options granted under the Plans. The cost is expected to be recognized over a weighted-average period of 1.3 years.

Proceeds received from the exercise of stock options were \$97 million, with a corresponding realized tax benefit of \$15 million, for the year ended December 31, 2021. The total intrinsic value of options exercised for the years ended December 31, 2021, 2020 and 2019 was approximately \$100 million, \$99 million and \$47 million, respectively.

Corning uses a multiple-point Black-Scholes valuation model to estimate the fair value of stock option grants. Corning utilizes a blended approach for calculating the volatility assumption used in the multiple-point Black-Scholes valuation model defined as the weighted average of the short-term implied volatility, the most recent volatility for the period equal to the expected term, and the most recent 15-year historical volatility. The expected term is the period the options are expected to be outstanding and is calculated using a combination of historical exercise experience adjusted to reflect the current vesting period of options being valued, and partial life cycles of outstanding options. The risk-free rates used in the multiple-point Black-Scholes valuation model are the implied rates for a zero-coupon U.S. Treasury bond with a term equal to the option's expected term. The ranges given below reflect results from separate groups of employees exhibiting different exercise behavior.

The following inputs were used for the valuation of option grants under the stock option plans awarded during 2020 and 2019:

	2020	2019		
Expected volatility	32.9%	29.5	-	29.9%
Weighted-average volatility	32.9%	29.5	-	29.9%
Expected dividends	4.48%	2.36	-	2.95%
Risk-free rate	0.5%	1.5	-	2.4%
Average risk-free rate	0.5%	1.5	-	2.4%
Expected term (in years)	7.4	7.4		
Pre-vesting executive departure rate	0.6%	0.6%		
Pre-vesting non-executive departure rate	2.5%			

Incentive Stock Plans

The Corning Incentive Stock Plan permits restricted stock and restricted stock unit grants, either determined by specific performance goals or issued directly, in most instances, subject to the possibility of forfeiture and without cash consideration. Restricted stock and restricted stock units under the Incentive Stock Plan are granted at the closing market price on the grant date, contingently vest over a period of generally one year to ten years, and generally have contractual lives of one year to ten years. The fair value of each restricted stock grant or restricted stock unit awarded under the Incentive Stock Plan is based on the grant date closing price of the Company's stock.

Time-Based Restricted Stock and Restricted Stock Units

Time-based restricted stock and restricted stock units are issued by the Company on a discretionary basis, and are payable in shares of the Company's common stock upon vesting. The fair value is based on the closing market price of the Company's stock on the grant date. Compensation cost is recognized over the requisite vesting period and adjusted for actual forfeitures before vesting.

19. Share-Based Compensation (Continued)

The following table represents a summary of the status of the Company's non-vested time-based restricted stock and restricted stock units as of December 31, 2020 and changes which occurred during the year ended December 31, 2021:

	Number of shares (in thousands)	Weighted-average grant-date fair value
Non-vested shares and share units at December 31, 2020	12,943	\$ 22.87
Granted	1,890	40.77
Vested	(3,774)	23.40
Forfeited	(465)	23.74
Non-vested shares and share units at December 31, 2021	10,594	\$ 25.83

As of December 31, 2021, there was approximately \$117 million of unrecognized compensation cost related to non-vested time-based restricted stock and restricted stock unit compensation arrangements granted under the Plan. The cost is expected to be recognized over a weighted-average period of 2.1 years. The total fair value of time-based restricted stock and restricted stock units that vested during the years ended December 31, 2021, 2020 and 2019 was approximately \$88 million, \$38 million and \$33 million, respectively. Compensation cost related to time-based restricted stock and restricted stock units was approximately \$94 million, \$95 million and \$43 million for the years ended December 31, 2021, 2020 and 2019, respectively.

Performance-Based Restricted Stock Units

Performance-based restricted stock units are earned upon the achievement of certain targets, and are payable in shares of the Company's common stock upon vesting typically over a three year period. The weighted-average grant date fair value is based on the market price of the Company's stock on the grant date and assumes that the target payout level will be achieved. Compensation cost is recognized over the requisite vesting period and adjusted for actual forfeitures before vesting. During the performance period, compensation cost may be adjusted based on changes in the expected outcome of the performance-related target.

19. Share-Based Compensation (Continued)

The following table summarizes information concerning the Company's non-vested performance-based restricted stock units, including the related transactions under the performance-based restricted stock units plan for the year ended December 31, 2021:

	Number of shares (in thousands)	Weighted-average grant-date fair value
Non-vested share units at December 31, 2020	1,765	\$ 28.06
Granted	1,222	38.82
Vested	(119)	28.06
Performance adjustments	917	38.82
Forfeited	(101)	33.25
Non-vested share units at December 31, 2021	3,684	\$ 34.17

As of December 31, 2021, there was approximately \$30 million of unrecognized compensation cost related to non-vested performance-based restricted stock unit compensation arrangements granted under the Plan. The cost is expected to be recognized over a weighted-average period of 1.4 years. Compensation cost related to performance-based restricted stock units for the years ended December 31, 2021 and 2020 was approximately \$79 million and \$81 million, respectively, largely driven by retirement-eligible employees.

20. Reportable Segments

Reportable segments are as follows:

- Display Technologies – manufactures glass substrates for flat panel liquid crystal displays and other high-performance display panels.
- Optical Communications – manufactures carrier network and enterprise network components for the telecommunications industry.
- Specialty Materials – manufactures products that provide more than 150 material formulations for glass, glass ceramics and fluoride crystals to meet demand for unique customer needs.
- Environmental Technologies – manufactures ceramic substrates and filters for automotive and diesel applications.
- Life Sciences – manufactures glass and plastic labware, equipment, media, serum and reagents enabling workflow solutions for drug discovery and bioproduction.

All other businesses that do not meet the quantitative threshold for separate reporting have been grouped as “All Other.” This group is primarily comprised of the results of HSG, pharmaceutical technologies, auto glass, new product lines and development projects, as well as other businesses and certain corporate investments.

The Company obtained a controlling interest in HSG during the third quarter of 2020 and has consolidated results in “All Other” since September 9, 2020. Refer to Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for additional information on this transaction.

Financial results for the reportable segments are prepared on a basis consistent with the internal disaggregation of financial information to assist the CODM in making internal operating decisions. The impact of changes in the Japanese yen, South Korean won, Chinese yuan and new Taiwan dollar are excluded from segment sales and segment net income for the Display Technologies and Specialty Materials segments. The impact of changes in the euro and Chinese yuan are excluded from segment sales and segment net income for the Environment Technologies segment. The impact of changes in the euro, Chinese yuan and Japanese yen are excluded from segment sales and segment net income for the Life Sciences segment. Certain income and expenses are included in the unallocated amounts in the reconciliation of reportable segment net income (loss) to consolidated net income. These include items that are not used by the CODM in evaluating the results of or in allocating resources to the segments and include the following items: the impact of the translated earnings contracts; acquisition-related costs; discrete tax items and other tax-related adjustments; certain litigation, regulatory and other legal matters; restructuring, impairment losses and other charges and credits; adjustments relating to acquisitions; and other non-recurring non-operational items. Although these amounts are excluded from segment results, they are included in reported consolidated results.

20. Reportable Segments (Continued)

Earnings of equity affiliates that are closely associated with the reportable segments are included in the respective segment's net income (loss). Certain common expenses among reportable segments have been allocated differently than they would for stand-alone financial information. Segment net income (loss) may not be consistent with measures used by other companies.

The following provides historical segment information as described above:

Segment Information (in millions)

	Display Technologies	Optical Communications	Specialty Materials	Environmental Technologies	Life Sciences	All Other	Total
For the year ended December 31, 2021							
Segment net sales	\$ 3,700	\$ 4,349	\$ 2,008	\$ 1,586	\$ 1,234	\$ 1,243	\$ 14,120
Depreciation ⁽¹⁾	\$ 605	\$ 224	\$ 161	\$ 139	\$ 52	\$ 134	\$ 1,315
Research, development and engineering expenses ⁽²⁾	\$ 110	\$ 216	\$ 208	\$ 111	\$ 33	\$ 160	\$ 838
Income tax (provision) benefit ⁽³⁾	\$ (249)	\$ (152)	\$ (99)	\$ (72)	\$ (51)	\$ 11	\$ (612)
Net income (loss) ⁽⁴⁾	\$ 960	\$ 553	\$ 371	\$ 269	\$ 194	\$ (51)	\$ 2,296
Investment in affiliated companies, at equity	\$ 109	\$ 3	\$ 6	\$	\$ 4	\$ 142	\$ 264
Segment assets ⁽⁵⁾	\$ 8,498	\$ 3,183	\$ 2,308	\$ 2,150	\$ 791	\$ 2,024	\$ 18,954
Capital expenditures	\$ 710	\$ 301	\$ 183	\$ 228	\$ 128	\$ 149	\$ 1,699
For the year ended December 31, 2020							
Segment net sales	\$ 3,172	\$ 3,563	\$ 1,884	\$ 1,370	\$ 998	\$ 465	\$ 11,452
Depreciation ⁽¹⁾	\$ 548	\$ 242	\$ 162	\$ 132	\$ 50	\$ 81	\$ 1,215
Research, development and engineering expenses ⁽²⁾	\$ 99	\$ 204	\$ 155	\$ 100	\$ 26	\$ 170	\$ 754
Income tax (provision) benefit ⁽³⁾	\$ (190)	\$ (101)	\$ (113)	\$ (52)	\$ (37)	\$ 58	\$ (435)
Net income (loss) ⁽⁴⁾	\$ 717	\$ 366	\$ 423	\$ 197	\$ 139	\$ (214)	\$ 1,628
Investment in affiliated companies, at equity	\$ 107	\$ 3	\$ 4	\$	\$ 2	\$ 142	\$ 258
Segment assets ⁽⁵⁾	\$ 8,777	\$ 2,868	\$ 2,551	\$ 1,986	\$ 683	\$ 2,157	\$ 19,022
Capital expenditures	\$ 311	\$ 127	\$ 125	\$ 159	\$ 83	\$ 123	\$ 928
For the year ended December 31, 2019							
Segment net sales	\$ 3,254	\$ 4,064	\$ 1,594	\$ 1,499	\$ 1,015	\$ 230	\$ 11,656
Depreciation ⁽¹⁾	\$ 583	\$ 237	\$ 145	\$ 128	\$ 49	\$ 50	\$ 1,192
Research, development and engineering expenses ⁽²⁾	\$ 119	\$ 218	\$ 154	\$ 118	\$ 21	\$ 237	\$ 867
Income tax (provision) benefit ⁽³⁾	\$ (206)	\$ (134)	\$ (81)	\$ (70)	\$ (40)	\$ 80	\$ (451)
Net income (loss) ⁽⁴⁾	\$ 786	\$ 489	\$ 302	\$ 263	\$ 150	\$ (289)	\$ 1,701
Investment in affiliated companies, at equity	\$ 145	\$ 3	\$ 3	\$	\$ 3	\$ 137	\$ 291
Segment assets ⁽⁵⁾	\$ 9,022	\$ 3,004	\$ 2,433	\$ 1,912	\$ 627	\$ 1,028	\$ 18,026
Capital expenditures	\$ 872	\$ 329	\$ 176	\$ 287	\$ 80	\$ 155	\$ 1,899

(1) Depreciation expense for Corning's reportable segments includes an allocation of depreciation of corporate property not specifically identifiable to a segment.

(2) Research, development and engineering expenses include direct project spending that is identifiable to a segment.

(3) Income tax (provision) benefit reflects a tax rate of 21%.

(4) Many of Corning's administrative and staff functions are performed on a centralized basis. Where practicable, Corning charges these expenses to segments based upon the extent to which each business uses a centralized function. Other staff functions, such as corporate finance, human resources and legal, are allocated to segments, primarily as a percentage of sales. Expenses that are not allocated to the segments are included in the reconciliation of reportable segment net income (loss) to consolidated net income.

(5) Segment assets include inventory, accounts receivable, property, plant and equipment, net of accumulated depreciation, and associated equity companies. HSG assets are included as of December 31, 2021 and 2020.

20. Reportable Segments (Continued)

A reconciliation of reportable segments and “All Other” net sales to consolidated net sales is as follows (in millions):

	Year ended December 31,		
	2021	2020	2019
Net sales of reportable segments and All Other	\$ 14,120	\$ 11,452	\$ 11,656
Impact of foreign currency movements (1)	(38)	(44)	(153)
Cumulative adjustment related to customer contract (2)		(105)	
Consolidated net sales	\$ 14,082	\$ 11,303	\$ 11,503

(1) This amount primarily represents the impact of foreign currency adjustments in the Display Technologies segment.

(2) Amount represents the negative impact of a cumulative adjustment recorded during the first quarter of 2020 to reduce revenue in the amount of \$105 million. The adjustment was associated with a previously recorded commercial benefit asset, reflected as a prepayment, to a customer with a long-term supply agreement that substantially exited its production of LCD panels. Refer to Note 5 (Revenue) to the consolidated financial statements for additional information.

A reconciliation of reportable segment net income (loss) to consolidated net income follows (in millions):

	Year ended December 31,		
	2021	2020	2019
Net income of reportable segments	\$ 2,347	\$ 1,842	\$ 1,990
Net loss of All Other (1)	(51)	(214)	(289)
Unallocated amounts:			
Impact of foreign currency movements not included in segment net loss	(87)	(22)	(115)
Gain (loss) on foreign currency hedges related to translated earnings	354	(46)	245
Translation gain (loss) on Japanese yen-denominated debt	180	(86)	(3)
Litigation, regulatory and other legal matters	(16)	(144)	17
Research, development, and engineering expense (2)(3)	(149)	(153)	(134)
Transaction-related gain, net (4)		498	
Equity in earnings (losses) of affiliated companies (5)	5	(24)	15
Amortization of intangibles	(129)	(121)	(113)
Interest expense, net	(265)	(261)	(200)
Income tax benefit	120	324	195
Pension mark-to-market	(32)	(31)	(95)
Cumulative adjustment related to customer contract (6)		(105)	
Severance charges (3)	13	(148)	(63)
Asset impairment (3)		(217)	
Capacity realignment and other charges and credits (3)	(123)	(462)	(376)
Bond redemption loss (7)	(31)	(22)	
(Loss) gain on investment (8)	(23)	107	
Gain on sale of business	54		
Other corporate items	(261)	(203)	(114)
Net income	\$ 1,906	\$ 512	\$ 960

(1) The Company obtained a controlling interest in HSG during the third quarter of 2020 and has consolidated results in “All Other” since September 9, 2020.

(2) Amount does not include research, development, and engineering expense related to restructuring, impairment and other charges and credits.

(3) Refer to Note 2 (Restructuring, Impairment and Other Charges and Credits) to the consolidated financial statements for additional information on restructuring activities and impairment.

(4) Amount represents the pre-tax gain recorded on Corning’s previously held equity investment in HSG recorded in 2020. Refer to Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for additional information on this transaction.

(5) Primarily represents the equity earnings of HSG prior to September 9, 2020. Refer to Note 3 (Investments) and Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for more information.

(6) Amount represents the negative impact of a cumulative adjustment to reduce revenue in the amount of \$105 million recorded during the first quarter of 2020. The adjustment was associated with a previously recorded commercial benefit asset, reflected as a prepayment, to a customer with a long-term supply agreement that substantially exited its production of LCD panels. Refer to Note 5 (Revenue) to the consolidated financial statements for additional information.

(7) Refer to Note 12 (Debt) to the consolidated financial statements for additional information on the bond redemption loss.

(8) Primarily represents the gain recognized from the initial public offering of an investment in the fourth quarter of 2020.

20. Reportable Segments (Continued)

A reconciliation of reportable segment assets to consolidated total assets follows (in millions):

	December 31,			
	2021		2020	
Total assets of reportable segments	\$	16,930	\$	16,865
Total assets of All Other		2,024		2,157
Unallocated amounts:				
Current assets (1)		3,163		3,434
Investments (2)		54		177
Property, plant and equipment, net (3)		1,620		1,548
Other non-current assets (4)		6,363		6,594
Total assets	\$	30,154	\$	30,775

(1) Includes current corporate assets, including cash, other receivables, prepaid expenses and current portion of long-term derivative assets.

(2) Represents other corporate investments. Asset balance does not include equity method affiliate liability balance of \$270 million for HSG in 2019. HSG became a fully consolidated subsidiary of Corning on September 9, 2020.

(3) Represents corporate property not specifically identifiable to an operating segment.

(4) Includes non-current corporate assets, including goodwill, other intangible assets, pension assets, long-term derivative assets, operating leases and deferred income taxes.

20. Reportable Segments (Continued)

Selected financial information concerning the Company's product lines and reportable segments follow (in millions):

Revenue from external customers	Year ended December 31,		
	2021	2020	2019
Display Technologies	\$ 3,700	\$ 3,172	\$ 3,254
Optical Communications			
Carrier network	3,200	2,612	2,885
Enterprise network	1,149	951	1,179
Total Optical Communications	4,349	3,563	4,064
Specialty Materials			
Corning® Gorilla® Glass	1,403	1,420	1,180
Advanced optics and other specialty glass	605	464	414
Total Specialty Materials	2,008	1,884	1,594
Environmental Technologies			
Automotive and other	936	883	907
Diesel	650	487	592
Total Environmental Technologies	1,586	1,370	1,499
Life Sciences			
Labware	671	552	550
Cell culture products	563	446	465
Total Life Science	1,234	998	1,015
All Other			
Polycrystalline Silicon	892	194	
Other	351	271	230
Total All Other	1,243	465	230
Net sales of reportable segments and All Other	14,120	11,452	11,656
Impact of foreign currency movements (1)	(38)	(44)	(153)
Cumulative adjustment related to customer contract (2)		(105)	
Consolidated net sales	\$ 14,082	\$ 11,303	\$ 11,503

(1) This amount primarily represents the impact of foreign currency adjustments in the Display Technologies segment.

(2) Amount represents the negative impact of a cumulative adjustment recorded during the first quarter of 2020 to reduce revenue in the amount of \$105 million. The adjustment was associated with a previously recorded commercial benefit asset, reflected as a prepayment, to a customer with a long-term supply agreement that is exiting its production of LCD panels. Refer to Note 5 (Revenue) to the consolidated financial statements for additional information.

20. Reportable Segments (Continued)

Information concerning principal geographic areas for reportable segments and "All Other" was as follows (in millions):

	2021		2020		2019	
	Net sales (1)(3)	Long-lived assets (2)(3)	Net sales (1)(3)	Long-lived assets (2)(3)	Net sales (1)	Long-lived assets (2)
North America:						
United States	\$ 4,539	\$ 8,600	\$ 3,412	\$ 8,718	\$ 3,760	\$ 7,654
Canada	472	114	274	121	277	126
Mexico	93	289	75	239	55	267
Total North America	5,104	9,003	3,761	9,078	4,092	8,047
Asia Pacific:						
Japan	780	496	505	583	441	893
Taiwan	983	1,923	887	2,247	880	2,280
China	4,495	4,966	3,734	4,469	3,096	3,816
Korea	640	3,479	748	3,597	1,051	3,625
Other	459	84	340	83	401	86
Total Asia Pacific	7,357	10,948	6,214	10,979	5,869	10,700
Europe:						
Germany	462	500	378	579	435	546
Other	925	910	838	931	886	914
Total Europe	1,387	1,410	1,216	1,510	1,321	1,460
All Other						
	272	68	261	83	374	71
Total	\$ 14,120	\$ 21,429	\$ 11,452	\$ 21,650	\$ 11,656	\$ 20,278

(1) Net sales are attributed to countries based on location of customer.

(2) Long-lived assets primarily include investments, plant and equipment, goodwill and other intangible assets.

(3) Includes HSG's net sales and long-lived assets as of December 31, 2021 and on and after September 9, 2020. Refer to Note 3 (Investments) and Note 4 (HSG Transactions and Acquisitions) to the consolidated financial statements for more information.

Corning Incorporated and Subsidiary Companies

Subsidiaries of the Registrant as of December 31, 2021 are listed below:

Alliance Fiber Optic Products, Inc.	Delaware
Axygen Bioscience, Inc.	Delaware
Axygen Holdings Corporation	Delaware
Axygen, Inc.	California
Corning (Hainan) Optical Communications Co., Ltd.	China
Corning (Shanghai) Co., Ltd.	China
Corning Automotive Glass Solutions (Hefei) Co., Ltd.	China
Corning B.V.	Netherlands
Corning China (Shanghai) Regional Headquarter	China
Corning Display Technologies (China) Co., Ltd.	China
Corning Display Technologies (Chongqing) Co., Ltd.	China
Corning Display Technologies (Guangzhou) Co., Ltd.	China
Corning Display Technologies (Hefei) Co., Ltd.	China
Corning Display Technologies (Wuhan) Co., Ltd.	China
Corning Display Technologies Materials (Chongqing) Co., Ltd.	China
Corning Display Technologies Taiwan Co., Ltd.	Taiwan
Corning Environmental Technologies (Hefei) Co., Ltd.	China
Corning Finance B.V.	Netherlands
Corning Finance Luxembourg S.à.r.l.	Luxembourg
Corning GmbH	Germany
Corning Holding GmbH	Germany
Corning Hungary Data Services Limited Liability Company	Hungary
Corning Incorporated	New York
Corning International Corporation	Delaware
Corning Japan K.K.	Japan
Corning Life Sciences (Wujiang) Co., Ltd.	China
Corning Luxembourg S.à.r.l.	Luxembourg
Corning Netoptix, Inc.	Delaware
Corning Oak Holding LLC	Delaware
Corning Optical Communications GmbH & Co. KG	Germany
Corning Optical Communications LLC	North Carolina
Corning Optical Communications Polska Sp. z o. o.	Poland
Corning Optical Communications RF LLC	Delaware
Corning Optical Communications S. de R.L. de C.V.	Mexico
Corning Optical Communications Vermoegensverwaltungs GmbH	Germany
Corning Pharmaceutical Glass, LLC	Delaware
Corning Precision Materials Co., Ltd.	Korea
Corning Property Management Corporation	Delaware
Corning Research & Development Corporation	Delaware
Corning SAS	France
Corning Singapore Holdings Pte Ltd	Indonesia
Corning SK Luxembourg S.à.r.l.	Luxembourg
Corning Specialty Materials, Inc.	Delaware
Corning Technologies (H.K.) Limited	Hong Kong
Corning Technologies SARL	Luxembourg
Corning Telecommunications Luxembourg S.à.r.l.	Luxembourg
Corning Tropel Corporation	Delaware
Corning Ventures France SAS	France

DC HSC Holdings LLC	Delaware
Discovery Labware, Inc.	Delaware
Hemlock Holdings LLC	Delaware
Hemlock Semiconductor Operations LLC	Michigan
Hemlock Semiconductor, L.L.C.	Delaware
HSC Holdings LLC	Delaware
Mediatech, Inc.	Virginia
TR Manufacturing, LLC	Delaware

Companies accounted for under the equity method as of December 31, 2021 are listed below:

Chengdu Honing Display Glass Co., Ltd.	China
China Renewable Energy Fund, LP	Singapore
Eurokera (Thailand) Limited	Thailand
Eurokera Guangzhou Co., Ltd.	China
Eurokera North America, Inc.	Delaware
Eurokera S.N.C.	France
Keraglass S.N.C.	France
Phoenix Venture Partners II LP	Delaware
Samsung Corning Advanced Glass LLC	Korea
Xianyang Honing Display Glass Co., Ltd.	China

Summary financial information on Corning's equity basis companies is included in Note 3 (Investments) to the Consolidated Financial Statements in this Annual Report on Form 10-K. Certain subsidiaries, which considered in the aggregate as a single subsidiary, that would not constitute a significant subsidiary, per Regulation S-X, Article 1, as of December 31, 2021, have been omitted from this exhibit.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-251135) and Form S-8 (Nos. 333-255652, 333-231238, 333-181075, 333-26049, 333-91879, 333-82926, 333-106265, and 333-166642) of Corning Incorporated of our report dated February 14, 2022 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
New York, New York
February 14, 2022

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CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO SECTION 302(a) OF THE
SARBANES-OXLEY ACT OF 2002

I, Wendell P. Weeks, certify that:

1. I have reviewed this Annual Report on Form 10-K of Corning Incorporated;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 14, 2022

/s/ Wendell P. Weeks

Wendell P. Weeks
Chairman and Chief Executive Officer
(Principal Executive Officer)

CERTIFICATION OF CHIEF FINANCIAL OFFICER PURSUANT TO SECTION 302(a) OF THE
SARBANES-OXLEY ACT OF 2002

I, R. Tony Tripeny, certify that:

1. I have reviewed this annual report on Form 10-K of Corning Incorporated;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 14, 2022

/s/ R. Tony Tripeny

R. Tony Tripeny

Executive Vice President and Chief Financial Officer

(Principal Financial Officer)

CERTIFICATION OF CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER
PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

The undersigned, Wendell P. Weeks, Chairman and Chief Executive Officer of Corning Incorporated (the “Company”) and R. Tony Tripeny, Executive Vice President and Chief Financial Officer, certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that:

- (1) the Annual Report of the Company on Form 10-K for the annual period ended December 31, 2021 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
- (2) that information contained in such Form 10-K fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 14, 2022

/s/ Wendell P. Weeks

Wendell P. Weeks
Chairman and Chief Executive Officer

/s/ R. Tony Tripeny

R. Tony Tripeny
Executive Vice President and Chief Financial Officer