



CORNING

2020

Proxy Statement

&
Annual Report
2019

Financial Highlights:

In millions, except per share amounts

	As reported — GAAP			Core performance*		
	2019	2018	2017	2019	2018	2017
Net sales	\$11,503	\$11,290	\$10,116	\$11,656	\$11,398	\$10,258
Net income (loss) attributable to Corning Incorporated	\$960	\$1,066	\$(497)	\$1,578	\$1,673	\$1,634
Diluted earnings (loss) per common share attributable to Corning Incorporated	\$1.07	\$1.13	\$(0.66)	\$1.76	\$1.78	\$1.60

* Core performance measures are non-GAAP financial measures. The reconciliation between these non-GAAP measures and their most directly comparable GAAP measure is provided on pages 22 through 25 of our Annual Report, as well as on the Company's website. Core performance measures are adjusted to exclude the impact of changes in foreign exchange rates, as well as other items that do not reflect ongoing operations of the Company. 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 contract used to mitigate the impact of changes in currency exchange rates on our earnings and cash flows.



To Our Shareholders:

In 2019, Corning fulfilled its commitment to you, our shareholders, as we marked the successful completion of our Strategy and Capital Allocation Framework. Over the last four years, we delivered strong shareholder returns while building you a stronger, more resilient company. The path wasn't always smooth. But this is Corning – we do what we say we're going to do. Challenges arise, and when they do, we're honest about the problems, straightforward in our analyses, and resolute in our actions to stay on track.

As a company that has operated during three centuries, Corning is no stranger to holding the course through tough times, and we enter our new Strategy & Growth Framework with the same resolve. We're realistic about our current environment. We have a tremendous set of opportunities before us. We have a powerful strategy. And the structural steel is in place to ensure the company is stronger than any challenges we face. Each business and function within our organization has a clear understanding of what we are working toward to reach our sales and profitability growth goals over the next four years.

We are a company that has been innovating to solve tough technology challenges and improve the lives of people all around the world for 169 years. We are confident that our capabilities and industry relationships will create additional value for you as we move forward.

2019

January

Introduced the industry's first AutoGrade™ Corning Gorilla Glass solutions

February

Announced a quarterly dividend of \$0.20 per share, an 11% increase

March

Recognized as a top global supplier by Daimler AG for strategic partnership on emissions control innovation

April

Launched Amplify screen protectors through a collaboration with OtterBox

Received our sixth consecutive ENERGY STAR® Partner of the Year award

2019 Financial Performance

Before I delve into our strategy, I'd like to share Corning's financial results from last year. Our core sales were \$11.7 billion, up 2% from 2018, driven by growth in Environmental Technologies, Specialty Materials, and Life Sciences. Core earnings per share were \$1.76. During 2019, we set new four-year targets for growth and capital allocation, we increased our dividend, and we demonstrated our ability to generate significant operating cash flow even with market performance below our expectations. Strong capital stewardship is a cornerstone of our management approach.

Once again, we outperformed our underlying markets in each business segment. We grew Environmental Technologies sales 16% against a backdrop of declining car sales. We grew Specialty Materials sales 8% while smartphone units were down. In Life Sciences, we exceeded industry growth rates on the strength of new bioprocess and advanced cell culture products. In Display Technologies, our glass volume grew at a mid-single digit rate even though TV unit sales were down. And, in Optical Communications, we outperformed

the passive optical market, which declined.

We entered 2019 with strong momentum following two years of solid growth, and that growth continued in the first half of the year. In the second half, we felt the impact of challenging global market conditions, particularly in Display Technologies and Optical Communications.

In Display Technologies, we experienced a temporary supply chain adjustment. Set makers purchased panels more conservatively, which drove panel maker utilization reductions in the second half. As panel makers purchased less glass, our volume declined accordingly.

In Optical Communications, after sales increased 13% year over year in the first half, they declined 16% in the back half. Changes in spending by two large customers accounted for a significant portion of the year-over-year decline.

We acted quickly to mitigate lower-than-expected second-half demand in both Display Technologies and Optical Communications. While everyone in the company relentlessly

executed by making careful program choices, controlling spending, and increasing operational efficiencies, our profitability declined along with factory utilization due to decreased volume.

We expect to return to sales and profit growth in the second half barring any external disruptions that could severely affect our ability to conduct normal business operations. In Display, we see indicators that the supply chain correction has ended, and we expect to resume volume growth in 2020, with the majority reflected in the second half. We also plan to start production at our next Gen 10.5 plants, which will support faster-than-market growth as they ramp. In Optical, we expect year-over-year growth in the second half, driven by projects for 5G, fiber-to-the-home, and hyperscale data center deployments. As volumes in both businesses increase, so will our factory utilization, improving the profitability of the corporation.

Framework Execution and Results

The successful completion of our four-year Strategy and Capital Allocation Framework represented a major milestone for the company.

May

Opened a gasoline particulate filter manufacturing facility in Hefei, China

Introduced Corning® Astra™ Glass at SID's Display Week

June

Established the 2020-2023 Strategy & Growth Framework

July

Opened a manufacturing facility in Hefei, China, for the industry's first large-part AutoGrade™ Glass solutions

August

Astra Glass chosen for Chengdu CEC Panda Display's Oxide-LCD line

September

Announced Apple's additional \$250 million investment from its Advanced Manufacturing Fund

October

Received FDA approval of Corning Valor® Glass for use as a primary package for a marketed drug product

Established a co-innovation partnership with Verizon to create the 5G factory of the future

Announced a 5G in-building network collaboration with Intel

November

Celebrated 25 billion square feet sold of Corning® EAGLE XG® Glass substrates

December

Exceeded \$1 billion in 2019 sales in our Life Sciences segment

We met or exceeded the strategic goals we set in 2015 while returning more than \$12.5 billion to shareholders during the four-year period, including increasing dividends per share by 67%.

We also made significant progress in each of our Market-Access Platforms, with continued strong progress in the final year of the plan despite second-half headwinds. In 2019, we made commercial and regulatory progress on Corning Valor® Glass, a breakthrough glass for the life sciences industry. We opened a dedicated factory for our burgeoning automotive glass business and grew our order book significantly. We also advanced several compelling innovations in Corning® Gorilla® Glass and Optical Communications.

Overall, we advanced our strategic position in each of our markets and continued technology investments focused on high-impact inventions:

- **In Automotive**, accelerating gasoline particulate filter (GPF) adoption drove more than \$250 million in 2019 sales. We delivered the industry's first AutoGrade™ Gorilla Glass for 2D and 3D interiors along with our proprietary Corning® ColdForm™ Technology. We also commercialized these inventions

across the auto ecosystem with industry leaders, including Visteon Corporation, LG Electronics, BOE, and GAC.

- **In Optical Communications**, we continued to transform the way the world connects by enabling 5G and hyperscale data center solutions with industry leaders – exemplified by collaborations with Intel, Verizon, CenturyLink, and Altice Portugal. We also earned global recognition for products such as RocketRibbon™ extreme density cable, which enables up to 30% faster installation in hyperscale data centers.
- **In Mobile Consumer Electronics**, we increased Corning content on – and in – mobile devices with Amplify screen protectors, decorative backs, and durable solutions for wearables. Gorilla Glass has now been used on more than 7 billion devices worldwide thanks to the expanded adoption of Gorilla Glass 6 and advanced glass innovations for smartphones, wearables, and other devices. We extended our industry leadership with next-generation cover glass solutions and deepened customer commitments, including an additional \$250 million investment from Apple's Advanced

Manufacturing Fund to support Corning's processes, equipment, and materials integral to the delivery of next-generation consumer devices.

- **In Life Sciences Vessels**, we signed commercial agreements with three major pharmaceutical companies, building on the announcement that a leading pharmaceutical manufacturer received FDA approval of Valor Glass for use as a primary package for a marketed drug product. We also exceeded \$1 billion in sales in our Life Sciences segment as adoption of our industry-leading bioprocess and advanced cell culture products continued, driving our organic growth.
- **In Display**, we created richer entertainment experiences through display glass innovation, including the launch of Corning® Astra™ Glass, which was selected by Chengdu CEC Panda Display Technology Co. for use in the growing oxide display market. We continued our leadership in Gen 10.5, increasing output at our first Gen 10.5 plant to support the market shift to large-size TVs.

Our businesses in each of these markets have the potential to contribute to double-digit earnings growth in the coming years, which means we have many horses pulling the wagon.

Looking Ahead: Strategy & Growth Framework

As I noted earlier, Corning has successfully managed across multiple business cycles during our 169-year history, and this cycle will be no different. We expect 2020 to be, in many ways, the mirror image of 2019 – with challenging market and customer dynamics in the first half and an expected return to growth in the second half as both Display Technologies and Optical Communications improve and strong growth continues in Environmental Technologies, Specialty Materials, and Life Sciences. As this happens, we expect the company to return to growing sales and profitability.

Looking to the longer term, we expect to drive significant organic growth and create additional value for shareholders under our new Strategy & Growth Framework. Specifically, from 2020 to 2023, we expect to deliver 6% to 8% compound annual sales growth and 12% to 15% compound annual earnings growth. We also expect to expand operating margin and return on invested capital. We'll continue to use our cash to grow, extend our leadership,

and reward shareholders. We plan to invest between \$10 billion and \$12 billion with a focus on organic growth. And we intend to return \$8 billion to \$10 billion to shareholders through a combination of dividend increases and opportunistic share repurchases.

Under our new Framework, from 2020 to 2023, we seek to increase annual sales by \$3 billion to \$4 billion and improve profitability, driven primarily by our strategy to create – and sell into – new product categories that enhance our customers' offerings. That provides a path to growth – even in challenging markets. We're not just counting on everybody buying more stuff; we're putting more Corning into the products people already buy.

Our technology and commercial progress reinforce our position for growth and market momentum. We are excited by the breadth and depth of the opportunities we have created in each of our markets. Here is a closer look at the Market-Access Platform opportunities that support our four-year 6% to 8% sales growth CAGR target:

- **In Automotive**, we remain on track to double sales by the end of 2023. In emissions control, regulations continue to increase our opportunity per car, and our GPF technology positions us as the industry leader. In auto glass, designers increasingly rely on interior glass as a point of differentiation. Our proprietary technology uniquely meets their needs. We also see upside in glass components for head-up displays and autonomous vehicles. Successfully ramping our new Hefei factories is key to our success.
- **In Optical Communications**, our technologies will play a key role in both 5G and hyperscale data center deployments. Our new suite of products for 5G and preconnectorized solutions for data centers will play a vital role in the acceleration of these key industry trends. We are also making adjustments to how we run the business, with operational improvements in product development and delivery, inventory management, and overall accountability. We will continue to align production output and working capital to current customer demand. That type of focus and improvement takes hard work, but I'm encouraged by the team's dedication and progress.
- **In Mobile Consumer Electronics**, our sales continue on a path to doubling, driven by Gorilla Glass performance innovations that push the state-of-the-art forward. Acceptance of our DX and DX+ durable covers for

smartwatches is outstanding, and innovations for foldables are making progress. We believe that 5G could stimulate smartphone unit growth and also increase the number of phones with our glass on the front and the back.

- **In Life Sciences Vessels**, our leadership continues to drive growth at more than twice the industry rate. We are leaders in products for cell-based medicine, which is one of the most promising and fastest growing life sciences segments. Additionally, Valor Glass provides a new standard for drug packaging.
- **In Display**, we expect to see further stabilization as panel maker utilization increases, TV screen size continues to increase, and our new Gen 10.5 plants come online.

For investors, it's important to note that the majority of capital necessary to deliver on our Strategy & Growth Framework goals has already been deployed. And our technology and commercial progress position us to capture the significant opportunities we see.

Closing Thoughts

Our sustained investments in technology and people, and our ability to create some of the most consequential material innovations in history, are what make Corning a leader in the markets we serve. It's why our cover glass has been featured on more than 7 billion mobile devices worldwide since the launch of Gorilla Glass. It's why we've steadily increased our competitive advantage in display

glass over the last 35 years. It's how we're extending 50 years of automotive leadership to keep winning in the newest category of emissions control. It's also why top pharmaceutical and biotech companies are turning to Corning for their production and protection needs. And it's why we're able to utilize 50 years of Optical Communications expertise to transform the way the world connects. Today, few competitors can match our expertise in any of our core capabilities, and when we combine capabilities, we become truly formidable.

We have not only maintained our competitive advantage over decades—we've increased it. And we will continue to do so during the next four years. We have never been satisfied with what is currently possible. We have never been attracted to what is easiest. We have never substituted short-term returns for long-term value, which gives us the focus and intensity to persevere through challenging times.

We are all deeply committed to the success of this institution and to working every day to maintain the trust of shareholders. We are grateful for your partnership on our journey to bring life-changing innovations and products to the world.

Sincerely,



Wendell P. Weeks

Chairman, Chief Executive Officer, and President

Strategy & Growth

FRAMEWORK

Leadership Priorities 2020 through 2023

Focus Portfolio and Utilize Financial Strength:

Grow

- Sales CAGR of 6%-8%
- EPS CAGR of 12%-15%
- Invest \$10B-\$12B

Increase Returns

- Increase operating margin and ROIC
- Deliver \$8B-\$10B to shareholders, including $\geq 10\%$ annual dividend increases

Sustainability: *Innovating for Good* with our Actions and Products

Innovating for Good means we are committed to making the world a better place with our actions and our products. By doing this, we are helping to create a sustainable future for the company and our people, the communities in which we operate, and the planet we all share.



Protecting the Environment

We're committed to using less energy, water, and natural resources at every step of our operations. Last year, five more projects went online for a total of 15 solar-energy initiatives at Corning facilities around the globe. These efforts earned us our sixth consecutive ENERGY STAR® Partner of the Year award from the U.S. Environmental Protection Agency.



Improving Communities & Economies

Last year, we gave approximately \$50 million to support nonprofits and help boost the economies in which we operate. We supported educational programs, such as Corning Glass Class in Mainland China and the Future Innovators Program in Taiwan, that help prepare students for promising futures. Our employees continued to donate their time and efforts to help improve the quality of life in our communities around the world.



Valuing Diversity & Inclusion

In 2019, we achieved 100% pay equity for men and women in Mainland China and Taiwan and made significant progress in other locations outside the U.S., where we achieved pay equity in 2017. Last year, Corning was named to the “Best-of-the-Best” Corporations for Inclusion list by the National LGBT Chamber of Commerce, earned a score of 100 on the Disability Equality Index for the second year in a row, and was recognized as a “Best Place to Work” by the American Association of People with Disabilities and Disability:IN.



Transforming Lives with our Products

For more than four decades, our clean-air products have been removing harsh gases and particulate matter from the exhaust of cars and trucks. Gorilla Glass for Automotive improves safety and fuel efficiency. Corning® EAGLE XG® Slim Glass for displays is produced with no added heavy metals. Our lab products support important medical research and our pharmaceutical packaging enhances the storage and delivery of medicines essential to public health. Optical fiber and cable connects communities because being connected is no longer a privilege, but a necessity.



Annual Report
2019

Corning Incorporated 2019 Annual Report

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

This report contains forward-looking statements that involve a number of risks and uncertainties. These statements relate to our future plans, objectives, expectations and estimates and may contain words such as “believes,” “expects,” “anticipates,” “estimates,” “forecasts,” or similar expressions. Our actual results could differ materially from what is expressed or forecasted in our 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.

Business Description

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 more than 165 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 our customers capture new opportunities in dynamic industries. Today, Corning’s markets include optical communications, mobile consumer electronics, display technology, automotive emissions control and glass products and life sciences vessels. Corning’s industry-leading products include damage-resistant cover glass for mobile devices; precision glass for advanced displays; optical fiber, 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, Environmental Technologies, Specialty Materials and Life Sciences, and manufactures products at 116 plants in 15 countries.

Display Technologies Segment

Corning’s Display Technologies segment manufactures glass substrates for high-performance displays, including organic light-emitting diode (“OLEDs”) and liquid crystal displays (“LCDs”) that are used primarily in televisions, notebook computers and flat panel desktop monitors. 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 and dimensional stability and 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 for providing product innovations that enable our customers to produce larger, lighter, thinner 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, a line of thin glass substrates which enables lighter-weight portable devices and thinner televisions and monitors;
- Corning IRIS™ Glass, a light-guide plate solution which enables televisions and monitors to be less than 5-mm thick;
- The family of Corning LOTUS™ Glass, high-performance display glass developed to enable cutting-edge technologies, OLEDs and next generation LCDs. These substrate glasses provide industry-leading levels of low total pitch variation, resulting in brighter, more energy-efficient displays with higher resolutions for consumers and better yields for panel makers;
- The world’s first Gen 10 and Gen 10.5 glass substrates in support of improved efficiency in manufacturing large-sized televisions; and
- Astra Glass™, an optimized glass solution to meet the emerging needs for future high-resolution displays. These substrate glasses enable higher-resolution oxide displays for consumers.

Corning has display glass manufacturing operations in South Korea, Japan, Taiwan and China, and services all its glass customers in all regions directly, 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 28% of Corning’s segment net sales in 2019.

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 bandwidth 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 bandwidth-carrying capacity. Our experience puts us in a unique position to design and deliver optical solutions that reach every edge of the communications network.

Business Description

This segment is classified 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® submarine optical fibers for use in submarine networks; LEAF® optical fiber for long-haul, regional and metropolitan networks; SMF-28® ULL fiber for more scalable long-haul and regional networks; SMF-28e+™ single-mode optical fiber that provides additional transmission wavelengths in metropolitan and access networks; ClearCurve® ultra-bendable single-mode fiber for use in multiple-dwelling units and fiber-to-the-home applications; and Corning® SMF-28® Ultra Fiber, designed for high performance across the range of long-haul, metro, access, fiber-to-the-home network applications, combining the benefits of industry-leading attenuation and improved macrobend performance in one fiber. A portion of our optical fiber is sold directly to end users and third-party cablers 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 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 FlexNAP™ terminal distribution system, which provides pre-connectorized distribution and drop cable assemblies for cost-effectively deploying fiber-to-the-home ("FTTH") and 5G networks; and the Centrix™ platform, which provides a high-density fiber management system with industry-leading density and innovative jumper routing that can be deployed in a wide variety of carrier switching centers.

To keep pace with surging demand for mobile bandwidth, Corning has a full complement of operator-grade distributed antenna systems ("DAS"), including the recently developed Optical Network Evolution wireless platform. The ONE™ Wireless Platform ("ONE") is the first all-optical converged cellular and Wi-Fi® solution built on an all-optical backbone with modular service support. It provides virtually unlimited bandwidth, and meets all wireless service needs of large-scale enterprises at a lower cost than the typical DAS solution.

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. In addition, Corning offers coaxial RF interconnects for the cable television industry as well as microwave applications for GPS, radars, satellites, manned and unmanned military vehicles, wireless applications and telecommunications systems.

Our enterprise network portfolio also includes optical fiber products, including ClearCurve® ultra-bendable multimode fiber for private and hyperscale data centers and other enterprise network applications; InfiniCor® fibers for local area networks; and more recently ClearCurve® VSDN® ultra-bendable optical fiber designed to support emerging high-speed interconnects between computers and other consumer electronics devices. The remainder of Corning's 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 include a broad

range of tight-buffered, loose tube and ribbon cable designs with flame-retardant versions available for indoor and indoor/outdoor applications that meet local building code requirements.

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 Pretium EDGE® platform, which provides high-density pre-connectorized solutions for data center applications, and continues to evolve with recent updates for upgrading to 40/100G applications and port tap modules for network monitoring; the previously mentioned ONE Wireless platform, which spans both carrier and enterprise network applications; and our recently introduced optical connectivity solutions to support customer initiatives.

During 2018, Corning acquired substantially all of the 3M Company's (3M) Communication Markets Division ("CMD") for \$841 million. This transaction served to augment its Optical Communications segment's global market access and expand its broad portfolio of high-bandwidth optical connectors, assemblies, hardware, and accessories for carrier networks, enterprise LAN and data center solutions.

Our optical fiber manufacturing facilities are in North Carolina, China and India. Cabling operations are in North Carolina, Poland and smaller regional locations. Our manufacturing operations for hardware and equipment products are in Texas, Arizona, Mexico, Brazil, Denmark, Germany, Poland, Israel, Australia 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 35% of Corning's segment net sales in 2019.

Specialty Materials Segment

The Specialty Materials segment manufactures products that provide more than 150 material formulations for glass, glass ceramics and fluoride crystals to meet demand for unique customer needs. Consequently, this segment operates in a wide variety of commercial and industrial markets including display optics and components, semiconductor optics components, aerospace and defense, astronomy, ophthalmic products, telecommunications components and cover glass optimized for display devices.

Our cover glass, known as Corning® Gorilla® Glass, is a thin sheet glass designed specifically to function as a cover glass for display devices such as mobile phones, tablets, smartwatches and notebook PCs. Elegant and lightweight, Corning® Gorilla® Glass is durable enough to resist many real-world events that commonly cause glass failure, while maintaining optical clarity, touch sensitivity, and damage resistance, enabling exciting new applications in technology and design. In 2018, Corning unveiled its latest Corning® Gorilla® Glass innovation, Corning® Gorilla® Glass 6, which is designed to be stronger than previous formulas and provide further protection against breakage. Corning® Gorilla® Glass 6 survives higher drop heights and more repeated drops than Corning® Gorilla® Glass 5.

Corning® Gorilla® Glass is manufactured in Kentucky, South Korea and Taiwan.

Semiconductor optics manufactured by Corning include high-performance optical material products, optical-based metrology instruments and optical assemblies for applications in the global semiconductor industry. Corning's semiconductor optics products are manufactured in New York.

Other specialty glass products include glass lens and window components and assemblies made in New York, New Hampshire and France, and sourced from China.

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 segment net sales in 2019.

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 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 12% of Corning's segment net sales in 2019.

Corporate Investments

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 holds a 49.9% interest in Hemlock Semiconductor LLC and a 40.25% interest in

Life Sciences Segment

As a leading developer, manufacturer and global supplier of laboratory products for over 100 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 and for emerging cell and gene therapies.

Life Sciences products include consumables, such as plastic vessels, 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 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, 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 segment net sales in 2019.

All Other

All other segments 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 the pharmaceutical technologies business, auto glass, new product lines and development projects, as well as certain corporate investments.

The All Other segment represented 2% of Corning's segment net sales in 2019.

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 18 (Reportable Segments) to the consolidated financial statements.

Hemlock Semiconductor Operations LLC which are recorded as equity method investments of Corning and are affiliated companies of HSG. HSG manufactures polysilicon products for the semiconductor and solar industries. HSG's solar business primarily serves the solar power panel industry.

Business Description

In prior years, HSG's solar and semiconductor customers entered into long-term "take or pay" contracts which included up-front cash payments to secure capacity. During the last few years, and more significantly in 2019, the solar power panel industry experienced significant overcapacity in the market, resulting in declining sales volumes and market prices. As a result, HSG's solar business experienced lower market penetration, overall price declines, and settled contracts with customers that had committed volume and fixed pricing above the current market price. While these settlements positively impacted HSG's cash flow in 2019, they reduced expectations for future sales in HSG's solar business.

Due to the adverse change in HSG's solar business, HSG was required to assess the recoverability of its long-lived assets in the fourth quarter. Based on this assessment, HSG determined that the carrying values of HSG's solar asset group significantly exceeded its fair values. HSG engaged a third-party appraiser to assist in determining the fair value of the assets within in the solar asset group based on the highest and best use of the asset group. As a result of the fair value determination, HSG recognized a pre-tax asset impairment charge of \$916 million for the year ended December 31, 2019. Corning's share of the pre-tax impairment was \$369 million.

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, reliability of supply, product quality 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 high-performance 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. Asahi Glass Co. Ltd. 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, price 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 competing producers of the Optical Communications segment are CommScope and Prysmian Group.

Due to the adverse changes above, the carrying values of HSG's solar business inventories were also affected resulting in an inventory write-down of \$257 million for the year. Corning's pre-tax share of the provision was \$105 million.

HSG adopted the new revenue standard on January 1, 2019 and the timing of HSG's revenue recognition for certain remaining performance obligations measured at January 1, 2019 was deferred for recognition. This deferral reduced the carrying amount of Corning's investment in HSG by \$239 million. During the fourth quarter, a significant number of the performance obligations were satisfied and \$434 million was recognized into HSG's net income. Corning's share of the equity earnings was \$208 million.

In addition, HSG settled certain revenue contracts in the fourth quarter, resulting in settlement gains of \$383 million in net income. Corning's share of the settlement gains was \$185 million.

Additional information about corporate investments is presented in Note 6 (Investments) to the consolidated financial statements.

Specialty Materials Segment

Corning has deep capabilities in materials science, optical design, shaping, coating, finishing, metrology and system assembly. We continue to address the emerging needs of the consumer electronics industry with the development of chemically strengthened glass. Corning® Gorilla® Glass is a thin-sheet glass that is better able to survive events that most commonly cause glass failure. Its advanced composition allows a deeper layer of chemical strengthening than is possible with most other chemically strengthened glasses, making it both durable and damage resistant. Our products and capabilities in this segment position the Company to meet the needs of a broad array of markets including display, semiconductor, aerospace, defense, astronomy, vision care, industrial, commercial, and telecommunications. For this segment, Schott, Asahi Glass Co. Ltd., Nippon Electric Glass Co. Ltd. and Heraeus are the main competitors.

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 Ividen 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 Group AG, Eppendorf AG, Starstedt AG and Danaher Corporation. Corning also faces increasing 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 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 United States 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 2019, Corning was granted about 550 patents in the U.S. and over 1,575 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 2019, Corning and its wholly-owned subsidiaries owned over 12,500 unexpired patents in various countries of which over 4,600 were U.S. patents. Between 2020 and 2022, approximately 9% of these patents will expire, while at the same time Corning intends to seek patents protecting its newer innovations. Worldwide, Corning has about 10,600 patent applications in process, with about 2,300 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.

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.
- **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.
- **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.
- **Life Sciences:** patents relating to methods and apparatus for the manufacture and use of scientific laboratory equipment including multiwell plates and cell culture products, equipment and processes for cell and gene therapy research and bioproduction.

Products reported in All Other include development projects, new product lines, and other businesses or investments that do not meet the threshold for separate reporting.

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

	Number of patents worldwide	U.S. patents	Important patents expiring between 2020 and 2022
Display Technologies	1,650	290	9
Optical Communications	4,750	2,180	35
Environmental Technologies	1,150	380	13
Specialty Materials	1,800	660	5
Life Sciences	640	190	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 principal trademarks include the following: Axygen, Corning, Celcor, CellSTACK, ClearCurve, DuraTrap, Eagle XG, Edge8, Gorilla®, HPFS, HYPERStack, Leaf, Pyrex, Steuben, Falcon, SMF-28e, UniCam, Valor, Willow and RocketRibbon.

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 \$13.8 million in 2019 and are estimated to be \$16.6 million in 2020.

Corning's 2019 consolidated operating results were charged with approximately \$74 million for depreciation, maintenance, waste disposal and other operating expenses associated with pollution control.

Employees

At December 31, 2019, Corning had approximately 49,500 full-time employees. From time to time, Corning also retains consultants, independent contractors, temporary and part-time workers.

Executive Officers

James P. Clappin *Executive Vice President, Corning Glass Technologies*

Mr. Clappin joined Corning in 1980 as a process engineer. He transitioned to GTE Corporation in 1983 and returned to Corning in 1988. He held a variety of manufacturing management roles in the consumer products division, transferring to the display glass business in 1994. He was appointed as general manager of Corning Display Technologies (CDT) in 2002, and was president of CDT from September 2005 to July 2010. He was appointed president, Corning Glass Technologies, in 2010. He was appointed to his present position in 2017. Age 62.

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. He has also served as senior vice president and general manager for Corning Optical Fiber. Mr. Curran was appointed as Corning's first innovation officer in August 2012. Age 61.

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 oversees corporate strategy, corporate communications, and advanced analytics. Prior to joining Corning, Dr. Evenson was a senior vice president with Sanford C. Bernstein, 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. He was appointed executive vice president in 2018. Age 54.

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 54.

Clark S. Kinlin *Executive Vice President, Corning Optical Communications*

Mr. Kinlin joined Corning in 1981 in the Specialty Materials division. From 1985 to 1995 he worked in the Optical Fiber division. In 1995, he joined Corning Consumer Products. In 2000, Mr. Kinlin was named president, Corning International Corporation and, in 2003, he was appointed as general manager for Greater China. From April 2007 to March 2008, he was chief operating officer, Corning Cable Systems, (now Corning Optical Communications) with responsibility for global sales, marketing, and operations. He was named president and chief executive officer of Corning Cable Systems in April 2008. He was appointed executive vice president in 2012. Age 60.

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. He was appointed vice president Corporate Development in 2000, senior vice president Corporate Development in 2003, senior vice president Strategy and Corporate Development in 2005, and executive vice president Strategy and Corporate Development in 2010. Mr. McRae has served on Corning's management committee since 2002 and was named vice chairman in 2015. Age 61.

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. Prior to his current role, he served as senior vice president and director, Corporate Research. Dr. Morse was appointed to his current position in 2012. He is a member of the National Academy of Engineering. Age 67.

Anne Mullins *Senior Vice President & Chief Digital & Information Officer*

Ms. Mullins joined Corning as senior vice president and 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 57.

Eric S. Musser *Executive Vice President, Corning Technologies and International*

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 2007-2012 and president of Corning International 2012-2014. He was appointed executive vice president in 2014. Age 60.

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 technical accounting, financial management and reporting. Age 52.

Lewis A. Steverson *Executive Vice President and General Counsel*

Mr. Steverson joined Corning in 2013 as senior 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 in 2018. Age 56.

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 60.

Wendell P. Weeks *Chairman, Chief Executive Officer and President*

Mr. Weeks joined Corning in 1983 in the finance group. He has held a variety of financial, business development, commercial, and general management roles. In 1993 he was named general manager of external development in Corning's telecommunications business. He was named vice president and general manager of the Optical Fiber business in 1996 and president, Corning Optical Communications in 2001. Mr. Weeks has been a member of Corning's Board of Directors since December 2000. He became Corning's president and chief operating officer in 2002. He was named chief executive officer in April 2005 and chairman of the board in April 2007. He added the title of president in 2010. Mr. Weeks is a director of Merck & Co. Inc. and Amazon.com, Inc. Age 60.

Document Availability

A copy of Corning's 2019 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.

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 & Growth framework and the trading price of our common stock or debt. The following discussion identifies the most significant factors that may adversely affect our business, operations, financial position or future financial performance. This information should be read in conjunction with our 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.

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 revenues from, and have significant operations, outside of the United States. 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 business and operating results. Our success depends, in part, on our ability to anticipate and manage these risks.

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 concerns;

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 2019
Display Technologies	4	72%
Optical Communications	2	21%
Specialty Materials	3	59%
Environmental Technologies	3	74%
Life Sciences	2	41%

Business disruptions could affect our operating results

A major earthquake, weather event, fire or other catastrophic event that results in the destruction or disruption of any of our critical facilities, or our suppliers' or customers' facilities, could severely affect our ability to conduct normal business operations and, as a result, our financial results could be materially and adversely affected. For example, certain manufacturing sites require high quality, continuous, and uninterrupted power and access to industrial water. Unplanned outages could have a material negative impact on our operations and ability to supply our customers.

- Political unrest, 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.

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 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 in each of our businesses, our sales could be negatively impacted by the actions or insolvency of one or more key customers, as well as our ability to retain these customers

A relatively small number of end customers accounted for a high percentage of net sales in each of our reportable segments. Mergers and consolidations between customers could result in further concentration of Corning's customer base. Further concentration, or the loss or insolvency of a key customer, could result in a substantial loss of sales and reduction in anticipated in cash flows.

We have been closely monitoring the outbreak of the coronavirus that originated in Wuhan, China. We have operations in Wuhan and other areas of China. We have taken steps to protect our employees and operations. The coronavirus may impact the global economy, our ability, as well as the ability of our customers and suppliers, to manufacture products and may reduce demand in our markets which could result in an impact to our financial results. We are taking steps to mitigate potential financial impacts, including supplying customers from other regions when appropriate. Currently, it is not possible for us to determine the financial impact of the coronavirus, if any.

Additionally, a significant amount of the specialized manufacturing capacity for our reportable segments is concentrated in single-site locations. Due to the specialized nature of the assets, in the event such a location experiences disruption, it may not be possible to find replacement capacity quickly or substitute production from other facilities. Accordingly, disruption at a single-site manufacturing operation could significantly impact Corning's ability to supply its customers and could produce a near-term severe impact on our individual businesses and the Company as a whole.

Geopolitical events, as well as other events outside of Corning's control, 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

A natural disaster, epidemic, labor strike, war and social or political unrest in regions where we operate could adversely affect Corning's ability to supply our customers and impact the value of our assets. Such events may also impact our customers' facilities and reduce our sales to such customers. For example, a sizeable portion of Corning's glass manufacturing capacity is in South Korea and we generate a significant portion of our sales through two South Korean customers. Deterioration of the geopolitical climate in such a region 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.

Given the geographical concentration of certain of our plants, the highly engineered nature of our 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 suppliers, or our customers have a presence, could adversely impact our results.

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 cyber security vulnerabilities could lead to reduced revenue, liability claims, or competitive harm

The Company is dependent on information technology systems and infrastructure, including cloud-based services, ("IT systems") to conduct its business. Our IT systems may be vulnerable to disruptions from human error, outdated applications, computer viruses, natural disasters, unauthorized access, cyber-attack and other similar disruptions. We have measures and defenses in place against such events, but we may not be able to prevent, immediately detect, or remediate all instances of such events. Any significant disruption, breakdown, intrusion, interruption or corruption of these systems or data breaches could cause the loss of data or intellectual property, equipment damage, downtime, and/or safety related issues and could have a material adverse effect on our business. A material security breach or disruption of our IT systems could result in theft, unauthorized use, or publication of our intellectual property and/or confidential business information, harm our competitive position, disrupt our manufacturing, reduce the value of our investment in research and development and other strategic initiatives, impair our ability to access vendors, suppliers and cloud-based services, or otherwise adversely affect our business.

Additionally, we believe that utilities and other operators of critical infrastructure that serve our facilities face heightened security risks, including cyber-attack. In the event of such an attack, disruption in service from our utility providers could disrupt our manufacturing operations which rely on a continuous source of power (electrical, gas, etc.).

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 expensive and often involves a long investment cycle. We make significant expenditures and 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 revenues and operating margins both near- and long-term.

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 and we expect that we will continue to experience fluctuations in the U.S. dollar value of these activities if it is not possible or cost effective to hedge our currency exposures or should we elect not to hedge certain currency exposures. Alternatively, we may experience gains or losses if the underlying exposure which we have hedged increases or decreases significantly and we are unable to reverse, unwind, or terminate the hedges concurrent with changes in the underlying notional exposure.

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

Our hedge portfolio may reduce our ability to respond to price moves by our Display Technologies segment competitors. Foreign currency movements may impact our competitive cost position relative to our largest, Japan-based competitors in the Display Technologies segment. The profitability of customers may also be impacted as they typically purchase from us in Japanese yen and sell in various currencies.

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 to the Japanese yen, new Taiwan dollar, South Korean won, Chinese yuan and euro. 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.

If we are unable to obtain certain specialized equipment, raw and batch materials or natural resources required in our products or processes, our business will suffer

Our ability to meet customer demand depends, in part, on our ability to obtain timely and adequate delivery of 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 businesses.

We use specialized raw materials from single-source suppliers (e.g., specific mines or quarries) and natural resources (e.g., helium) in certain products and processes. If a supplier is unable to provide the required raw materials or the natural resource is in scarce supply or not readily available, we may be unable to change our product composition or manufacturing process to prevent disruption to our business.

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. Significant judgment is required in determining our worldwide provision for income taxes. Although we believe our tax estimates are reasonable, the final determination of tax audits and any related litigation could be materially different from our historical income tax provisions and accruals. The results of an audit or litigation could have a material effect on our financial statements in the period or periods for which that determination is made.

The 2017 Tax Act significantly impacted how U.S. global corporations are taxed. Significant guidance has been issued with the intention of clarifying the new tax provisions. To date, some of the regulations had been finalized and clarified but a considerable amount of this guidance is still in the form of proposed regulations. Due to volume and complexity of both of final and proposed regulations, we continue to evaluate any development and impact of the 2017 Tax Act that could have a material adverse impact on our tax expense and cash flow. In addition to the 2017 Tax Act, other foreign countries and international organizations such as Organisation for Economic Co-operation and Development (“OECD”) may have law changes and issue new international tax standards that may also impact our taxes.

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, waste water, 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 waste water 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.

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 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 United States. We cannot predict the nature, scope or effect of future regulatory requirements to which our operations might be subject or 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 for the purpose of obtaining or retaining 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 United States, 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 United States, 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 (including our equity affiliates/joint ventures) from being able to sell and/or manufacture products in certain countries. The implementation of more restrictive trade policies, such as higher tariffs or new barriers to entry, in countries in which we 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. These policies also affect our equity companies.

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 13 (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, 2019 and 2018, Corning had accrued approximately \$41 million (undiscounted) and \$30 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.

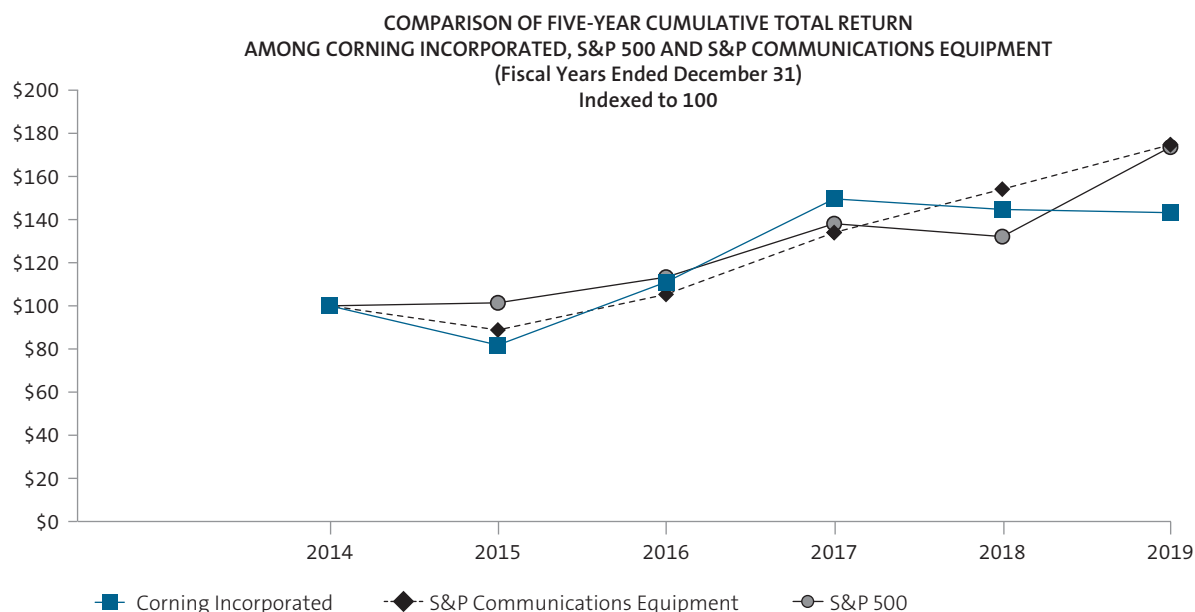
Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

(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 ticker symbol for Corning Incorporated is "GLW".

As of December 31, 2019, there were approximately 12,400 registered holders of common stock and approximately 496,000 beneficial shareholders.

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 our purchases of our common stock during the fiscal fourth quarter of 2019:

Issuer Purchases of Equity Securities

Period	Number of shares purchased ⁽¹⁾	Average price paid per share	Number of shares purchased as part of publicly announced plans or programs	Approximate dollar value of shares that may yet be purchased under the plans or programs
October 1-31, 2019	4,920,237	\$ 29.07	4,881,900	
November 1-30, 2019	1,349,462	\$ 29.68	1,347,400	
December 1-31, 2019	1,427,861	\$ 28.34	1,410,800	
Total	7,697,560	\$ 29.04	7,640,100	\$ 5,423,181,765

(1) This column reflects the following transactions during the fourth quarter of 2019: (i) the deemed surrender to us of 11,430 shares of common stock to satisfy tax withholding obligations in connection with the vesting of employee restricted stock units; (ii) the deemed surrender to us of 45,929 shares of common stock to satisfy tax withholding obligations in connection with the vesting of restricted stock issued to employees; (iii) the deemed surrender to us of 101 shares of common stock to pay the exercise price and to satisfy tax withholding obligations in connection with the exercise of employee stock options; and (iv) the purchase of 7,640,100 shares of common stock under the 2018 and 2019 Repurchase Programs.

Selected Financial Data (Unaudited)

<i>(In millions, except per share amounts and number of employees)</i>	Years ended December 31,				
	2019	2018	2017	2016	2015
Results of operations					
Net sales	\$ 11,503	\$ 11,290	\$ 10,116	\$ 9,390	\$ 9,111
Research, development and engineering expenses	\$ 1,031	\$ 993	\$ 864	\$ 736	\$ 745
Equity in earnings of affiliated companies	\$ 17	\$ 390	\$ 361	\$ 284	\$ 299
Net income (loss) attributable to Corning Incorporated ⁽¹⁾⁽²⁾	\$ 960	\$ 1,066	\$ (497)	\$ 3,695	\$ 1,339
Earnings (loss) per common share attributable to Corning Incorporated:					
Basic earnings (loss) per common share	\$ 1.11	\$ 1.19	\$ (0.66)	\$ 3.53	\$ 1.02
Diluted earnings (loss) per common share	\$ 1.07	\$ 1.13	\$ (0.66)	\$ 3.23	\$ 1.00
Cash dividends declared per common share	\$ 0.80	\$ 0.72	\$ 0.62	\$ 0.54	\$ 0.36
Shares used in computing per share amounts:					
Basic	776	816	895	1,020	1,219
Diluted	899	941	895	1,144	1,343
Financial position					
Working capital	\$ 3,942	\$ 3,723	\$ 5,618	\$ 6,297	\$ 5,455
Total assets	\$ 28,898	\$ 27,505	\$ 27,494	\$ 27,899	\$ 28,527
Long-term debt ⁽³⁾	\$ 7,729	\$ 5,994	\$ 4,749	\$ 3,646	\$ 3,890
Total Corning Incorporated shareholders' equity	\$ 12,907	\$ 13,792	\$ 15,698	\$ 17,893	\$ 18,788
Selected data					
Capital expenditures	\$ 1,978	\$ 2,242	\$ 1,804	\$ 1,130	\$ 1,250
Depreciation and amortization	\$ 1,503	\$ 1,293	\$ 1,158	\$ 1,195	\$ 1,184
Number of employees	49,500	51,500	46,200	40,700	35,700

(1) Year ended December 31, 2017 includes the impact of the 2017 Tax Act, including a provisional toll charge (\$1.1 billion) and provisional remeasurement of deferred tax balances due to the reduction in Corning's tax rate (\$347 million).

(2) Year ended December 31, 2016 includes a \$2.7 billion non-taxable gain on the strategic realignment of our ownership interest in Dow Corning.

(3) Refer to Note 11 (Debt) to the consolidated financial statements for additional information.

Reference should be made to the notes to the consolidated financial statements and Management's Discussion and Analysis of Financial Condition and Results of Operations.

Quarterly Operating Results

(unaudited) (In millions, except per share amounts)

2019	First quarter	Second quarter	Third quarter	Fourth quarter	Total year
Net sales	\$ 2,812	\$ 2,940	\$ 2,934	\$ 2,817	\$ 11,503
Gross margin	\$ 1,099	\$ 1,065	\$ 1,017	\$ 854	\$ 4,035
Equity in (losses) earnings of affiliated companies	\$ 25	\$ 33	\$ 23	\$ (64)	\$ 17
(Provision) benefit for income taxes	\$ (76)	\$ (124)	\$ (71)	\$ 15	\$ (256)
Net income attributable to Corning Incorporated	\$ 499	\$ 92	\$ 337	\$ 32	\$ 960
Basic earnings per common share	\$ 0.61	\$ 0.09	\$ 0.40	\$ 0.01	\$ 1.11
Diluted earnings per common share	\$ 0.55	\$ 0.09	\$ 0.38	\$ 0.01	\$ 1.07

2018	First quarter	Second quarter	Third quarter	Fourth quarter	Total year
Net sales	\$ 2,500	\$ 2,747	\$ 3,008	\$ 3,035	\$ 11,290
Gross margin	\$ 955	\$ 1,072	\$ 1,232	\$ 1,202	\$ 4,461
Equity in earnings of affiliated companies	\$ 39	\$ 31	\$ 32	\$ 288	\$ 390
Provision for income taxes	\$ (124)	\$ (126)	\$ (133)	\$ (54)	\$ (437)
Net (loss) income attributable to Corning Incorporated	\$ (589)	\$ 738	\$ 625	\$ 292	\$ 1,066
Basic (loss) earnings per common share	\$ (0.72)	\$ 0.87	\$ 0.75	\$ 0.34	\$ 1.19
Diluted (loss) earnings per common share	\$ (0.72)	\$ 0.78	\$ 0.67	\$ 0.32	\$ 1.13

Management's Discussion and Analysis of Financial Condition and Results of Operations

For discussion of 2018 results year-over-year comparison with 2017 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, 2018.

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

Strategy and Capital Allocation Framework and recently introduced Strategy & Growth Framework

On June 14, 2019, Corning introduced its 2020-2023 Strategy & Growth Framework. From 2020 to 2023, the company plans to invest \$10 billion to \$12 billion for growth and to return \$8 billion to \$10 billion to shareholders.

In October 2015, Corning announced a strategy and capital allocation framework (the "Framework") that reflects the Company's financial and operational strengths, as well as its ongoing commitment to increasing shareholder value. The Framework outlined our leadership priorities and articulated the opportunities we saw across our businesses. We designed the Framework to create significant value for shareholders by focusing our portfolio and leveraging our financial strength. Under the Framework, we targeted generating \$26 billion to \$30 billion of cash through 2019, returning more than \$12.5 billion to shareholders and investing \$10 billion to extend our leadership positions and deliver growth. As of June 30, 2019, Corning met its goal of returning more than \$12.5 billion to shareholders. As of December 31, 2019, Corning had invested almost \$11 billion for growth and extended leadership.

Corning's Frameworks outline the company's leadership priorities. With the completed Strategy and Capital Allocation Framework and new Strategy & Growth Framework, Corning plans to focus its portfolio and utilize its financial strength. 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.

2019 Results

Net sales in the year ended December 31, 2019 were \$11.5 billion, an increase of \$213 million, or 2%, when compared to the year ended December 31, 2018, driven by increased sales in the Specialty Materials, Environmental Technologies and Life Sciences segments offset by decreased sales in the Display Technologies and Optical Communications segments.

For the year ended December 31, 2019, we generated net income of \$960 million, or \$1.07 per share, compared to a net income of \$1,066 million, or \$1.13 per share, for 2018. When compared to 2018, the \$106 million decrease in net income was primarily due to the following items (amounts presented after tax):

- Lower equity earnings in affiliated companies of \$284 million when compared to the prior period, primarily driven by asset impairments and an inventory provision, partially offset by the deferred revenue recognition associated with adoption of the new revenue standard, as well as one-time settlement gains from revenue contracts;
- Higher costs of \$238 million, primarily driven by accelerated depreciation and asset write-offs for our Display Technologies and Optical Communications segments; and
- Lower segment net income of \$83 million primarily driven by lower sales in our Display Technologies and Optical Communications segments.

Partially offsetting these events were the following items:

- Translated earnings contract gains in the current period were \$287 million higher than prior year losses;
- Costs related to litigation, regulatory and other legal matters were \$109 million lower, primarily driven by the absence of a \$103 million charge related to legal matters recorded in 2018, including a ruling in an intellectual property lawsuit and developments in civil litigation;
- A positive impact of \$44 million resulting from a lower mark-to-market loss for our defined benefit pension plans; and
- The positive impact of \$42 million in tax adjustments primarily relating to the absence of a \$172 million IRS audit settlement, or approximately \$40 million of taxes payable after the utilization of tax attributes, recorded in the first quarter of 2018, netted against changes in tax reserves, changes in foreign valuation allowances and changes in the estimate of 2018 tax expense due to new tax reform guidance.

Diluted earnings per share decreased by \$0.06 per share, or 5%, when compared to 2018, driven by the decrease in net income described above, partially offset by the repurchase of 31.0 million shares of common stock over the last twelve months.

The translation impact of fluctuations in foreign currency exchange rates, including the impact of hedges realized in the current year, negatively impacted Corning's net income by approximately \$44 million in the year ended December 31, 2019, when compared to the same period in 2018.

2020 Corporate Outlook

We have been closely monitoring the outbreak of the coronavirus that originated in Wuhan, China. We have operations in Wuhan and other areas of China. We have taken steps to protect our employees and operations. The coronavirus may impact the global economy, our ability, as well as the ability of our customers and suppliers, to

manufacture products and may reduce demand in our markets which could result in an impact to our financial results. We are taking steps to mitigate potential financial impacts, including supplying customers from other regions when appropriate. Currently, it is not possible for us to determine the financial impact of the coronavirus, if any. Our 2020 corporate outlook, outlined above, does not include any potential impact for the coronavirus.

We believe 2020 will be another year of growth in several segments and continued investment in innovations, consistent with our Strategy & Growth Framework. Corning expects its display glass volume to grow by a mid-single digit percentage, similar to the mid-single digit percentage growth expected in the display glass market. The company expects glass price declines to remain moderate, down a mid-single digit percentage for the full year. The company expects Optical Communications full-year sales to decline by 5% to 10%. We expect mid-single digit percentage sales growth in our Environmental Technologies and Life Sciences segments. We expect high-single digit percentage sales growth in the Specialty Materials segment.

Results of Operations

Selected highlights from our operations follow (in millions):

	2019	2018	2017	% change	
				19 vs. 18	18 vs. 17
Net sales	\$ 11,503	\$ 11,290	\$ 10,116	2	12
Gross margin	\$ 4,035	\$ 4,461	\$ 4,020	(10)	11
(gross margin %)	35%	40%	40%		
Selling, general and administrative expenses	\$ 1,585	\$ 1,799	\$ 1,473	(12)	22
(as a % of net sales)	14%	16%	15%		
Research, development and engineering expenses	\$ 1,031	\$ 993	\$ 864	4	15
(as a % of net sales)	9%	9%	9%		
Equity in earnings of affiliated companies	\$ 17	\$ 390	\$ 361	(96)	8
(as a % of net sales)		3%	4%		
Translated earnings contract gain (loss), net	\$ 248	\$ (93)	\$ (121)	*	23
(as a % of net sales)	2%	(1)%	(1)%		
Income before income taxes	\$ 1,216	\$ 1,503	\$ 1,657	(19)	(9)
(as a % of net sales)	11%	13%	16%		
Provision for income taxes	\$ (256)	\$ (437)	\$ (2,154)	41	80
(as a % of net sales)	(2)%	(4)%	(21)%		
Net income (loss) attributable to Corning Incorporated	\$ 960	\$ 1,066	\$ (497)	(10)	*
(as a % of net sales)	8%	9%	(5)%		

* Percent change not meaningful.

Segment Net Sales

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

	Years ended December 31,			% change	% change
	2019	2018	2017	19 vs. 18	18 vs. 17
Display Technologies	\$ 3,254	\$ 3,276	\$ 3,137	(1)%	4%
Optical Communications	4,064	4,192	3,545	(3)%	18%
Specialty Materials	1,594	1,479	1,403	8%	5%
Environmental Technologies	1,499	1,289	1,106	16%	17%
Life Sciences	1,015	946	879	7%	8%
All Other	230	216	188	6%	15%
Net sales of reportable segments and All Other	\$ 11,656	\$ 11,398	\$ 10,258	2%	11%
Constant-currency adjustment	(153)	(108)	(142)	(42)%	24%
Consolidated net sales	\$ 11,503	\$ 11,290	\$ 10,116	2%	12%

For the year ended December 31, 2019, segment net sales increased by \$258 million, or 2%, when compared to the same period in 2018. The primary sales drivers by segment were as follows:

- Net sales in the Display Technologies segment decreased by \$22 million, with glass volume up a mid-single digit percentage and low-single digit percentage display glass price declines; the combination of finished goods volume, unfinished glass sold to our equity affiliates and a low-single-digit percentage price decline resulted in a one percent sales decline;
- Optical Communications net sales decreased \$128 million, primarily due to lower sales in carrier products, down \$199 million, partially offset by an increase of \$71 million in enterprise network sales;
- Specialty Materials segment net sales increased by \$115 million, primarily driven by strong demand for Gorilla® Glass;
- Net sales for Environmental Technologies increased \$210 million, primarily driven by sales growth of gasoline particulate filters; and
- Life Sciences net sales increased by \$69 million, as sales volume continued to outpace market growth.

Movements in foreign exchange rates negatively impacted Corning's consolidated net sales by \$45 million in the year ended December 31, 2019, when compared to the same period in 2018.

In 2019, sales in international markets accounted for 68% of total net sales.

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, 2019, gross margin dollars decreased by \$426 million, or 10%, and gross margin as a percentage of net sales declined by 5% when compared to the same period last year. Negative impacts to gross margin were primarily driven by accelerated depreciation, asset write-offs and lower sales in our Display Technologies and Optical Communications segments during 2019. As volume declined in the second half of 2019, factory utilization was less efficient and negatively impacted gross margin.

Movements in foreign exchange rates had a \$33 million positive impact on Corning's consolidated gross margin in the year ended December 31, 2019, when compared to the same period in 2018.

Selling, General and Administrative Expenses

When compared to the year ended December 31, 2018, selling, general and administrative expenses decreased by \$214 million, or 12%, in the year ended December 31, 2019. Selling, general and administrative expenses decreased by 2% as a percentage of sales. The decrease was primarily driven by the following items:

- The absence of a \$132 million charge related to legal matters in 2018, including a ruling in an intellectual property lawsuit and developments in civil litigation matters; and
- Reduced variable compensation expenses of \$85 million.

Research, Development and Engineering Expenses

For the year ended December 31, 2019, research, development and engineering expenses increased by \$38 million, or 4%, when compared to the same period in prior year, driven by higher costs associated with new product launches and our emerging businesses. As a percentage of sales, these expenses were consistent when compared to the same period in the previous year.

Equity in Earnings of Affiliated Companies

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

	Years ended December 31,		
	2019	2018	2017
Hemlock Semiconductor Group	\$ 27	\$ 388	\$ 352
All other	(10)	2	9
Total equity earnings	\$ 17	\$ 390	\$ 361

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 holds a 49.9% interest in Hemlock Semiconductor LLC and a 40.25% interest in Hemlock Semiconductor Operations LLC which are recorded as equity method investments of Corning and are affiliated companies of HSG. HSG manufactures polysilicon products for the semiconductor and solar industries. HSG's solar business primarily serves the solar power panel industry.

In prior years, HSG's solar and semiconductor customers entered into long-term "take or pay" contracts which included up-front cash payments to secure capacity. During the last few years, and more significantly in 2019, the solar power panel industry experienced significant over-capacity in the market, resulting in declining sales volumes and market prices. As a result, HSG's solar business experienced lower market penetration, overall price declines, and settled contracts with customers that had committed volume and fixed pricing above the current market price. While these settlements positively impacted HSG's cash flow in 2019, they reduced expectations for future sales in HSG's solar business.

Due to the adverse change in HSG's solar business, HSG was required to assess the recoverability of its long-lived assets in the fourth quarter. Based on this assessment, HSG determined that the carrying values of HSG's solar asset group significantly exceeded its fair values. HSG engaged a third-party appraiser to assist in determining the fair value of the assets within in the solar asset group based on the highest and best use of the asset group. As a result of the fair value determination, HSG recognized a pre-tax asset impairment charge of \$916 million for the year ended December 31, 2019. Corning's share of the pre-tax impairment was \$369 million.

The following table provides detailed information on the impact of our translated earnings contracts gains and losses for the years ended December 31, 2019, 2018 and 2017:

(in millions)	Income (loss)	Net	Loss before	Net	Income before	Net
	before tax	income (loss)	tax	loss	tax	Income
	2019		2018		2019 vs. 2018	
Hedges related to translated earnings:						
Realized gain, net	\$ 18	\$ 14	\$ 97	\$ 78	\$ (79)	\$ (64)
Unrealized gain (loss)	230	179	(190)	(189)	420	368
Total translated earnings contract gain (loss), net	\$ 248	\$ 193	\$ (93)	\$ (111)	\$ 341	\$ 304
	2018		2017		2018 vs. 2017	
Hedges related to translated earnings:						
Realized gain, net	\$ 97	\$ 78	\$ 270	\$ 169	\$ (173)	\$ (91)
Unrealized loss	(190)	(189)	(391)	(247)	201	58
Total translated earnings contract loss, net	\$ (93)	\$ (111)	\$ (121)	\$ (78)	\$ 28	\$ (33)

Due to the adverse changes above, the carrying values of HSG's solar business inventories were also affected resulting in an inventory write-down of \$257 million for the year. Corning's pre-tax share of the provision was \$105 million.

HSG adopted the new revenue standard on January 1, 2019 and the timing of HSG's revenue recognition for certain remaining performance obligations measured at January 1, 2019 was deferred for recognition. This deferral reduced the carrying amount of Corning's investment in HSG by \$239 million. During the fourth quarter, a significant number of the performance obligations were satisfied and \$434 million was recognized into HSG's net income. Corning's share of the equity earnings was \$208 million.

In addition, HSG settled certain revenue contracts in the fourth quarter, resulting in settlement gains of \$383 million in net income. Corning's share of the settlement gains was \$185 million.

Additional information about corporate investments is presented in Note 6 (Investments) to the consolidated financial statements.

Translated earnings contracts

Included in the line item translated earnings contract gain (loss), net, is the impact of foreign currency hedges 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 (loss).

The gross notional value outstanding on our translated earnings contracts and foreign currency cash flow hedges were as follows (in billions):

	Years ended December 31,		
	2019	2018	2017
Japanese yen-denominated translated earnings contracts	\$ 10.2	\$ 11.6	\$ 13.0
South Korean won-denominated translated earnings contracts	0.4	0.1	0.8
Euro-denominated translated earnings contracts	1.3	1.2	0.3
Other translated earnings contracts	0.3	0.7	0.2
Total gross notional value outstanding for translated earnings contracts	12.2	13.6	14.3
Japanese yen-denominated foreign currency cash flow hedges	1.5		
Other foreign currency cash flow hedges	0.6	0.4	0.3
Total gross notional value for foreign currency cash flow hedges	2.1	0.4	0.3
Total gross notional value outstanding	\$ 14.3	\$ 14.0	\$ 14.6

Income Before Income Taxes

The translation impact of fluctuations in foreign currency exchange rates, including the impact of hedges realized in the current year, negatively impacted Corning's income before income taxes by \$39 million in the year ended December 31, 2019, when compared to the same period in 2018.

Provision for Income Taxes

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

	Years ended December 31,		
	2019	2018	2017
Provision for income taxes	\$ (256)	\$ (437)	\$ (2,154)
Effective tax rate	21.1%	29.1%	130.0%

For the year ended December 31, 2019, the effective income tax rate differed from the U.S. statutory rate of 21% primarily due to the following:

- Additional net provision of \$102 million from changes to our tax reserves;
- A net benefit of \$45 million due to releases of foreign valuation allowances on foreign deferred tax assets that are now considered realizable; and
- Additional net benefit, including a change in estimate from prior year, from the 2017 Tax Act attributable to foreign intangible income (FDII) deduction of \$103 million offset by taxes for global intangible low-taxed income (GILTI) of \$15 million.

For the year ended December 31, 2018, the effective income tax rate differed from the U.S. statutory rate of 21% primarily due to the following:

- Additional taxes of \$55 million related primarily to the global intangible low-taxed income ("GILTI") provisions of the 2017 Tax Act; and
- Incremental tax expense of \$172 million related to a preliminary agreement with the IRS for the income tax audit of years 2013 and 2014.

These items were partially offset by the following:

- A benefit of \$35 million related to the finalization of the one-time toll charge recorded in 2017; and

- An \$82 million benefit from the release of a valuation allowance on deferred tax assets that are now considered realizable.

Generally, Corning will indefinitely reinvest the foreign earnings of: (1) any of its subsidiaries located in jurisdictions where Corning lacks the ability to repatriate its earnings, (2) any of its 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, (5) any subsidiaries which have a positive earnings and profits balance but for which the entity lacks sufficient local statutory earnings or stock basis from which to make a distribution, and (6) future distribution would trigger a significant federal income inclusion to the U.S. shareholder.

During 2019, the Company distributed approximately \$424 million from foreign subsidiaries to their respective U.S. parent companies. As of December 31, 2019, Corning has approximately \$2.5 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 5 (Income Taxes) to the consolidated financial statements for further details regarding income tax matters.

Net Income (Loss) Attributable to Corning Incorporated

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

	Years ended December 31,		
	2019	2018	2017
Net income (loss) attributable to Corning Incorporated	\$ 960	\$ 1,066	\$ (497)
Net income (loss) attributable to Corning Incorporated used in basic earnings per common share calculation (Note 17)	\$ 862	\$ 968	\$ (595)
Net income (loss) attributable to Corning Incorporated used in diluted earnings (loss) per common share calculation (Note 17)	\$ 960	\$ 1,066	\$ (595)
Basic earnings (loss) per common share	\$ 1.11	\$ 1.19	\$ (0.66)
Diluted earnings (loss) per common share	\$ 1.07	\$ 1.13	\$ (0.66)
Weighted-average common shares outstanding - basic	776	816	895
Weighted-average common shares outstanding - diluted	899	941	895

Comprehensive Income

<i>(In millions)</i>	Years ended December 31,		
	2019	2018	2017
Net income (loss) attributable to Corning Incorporated	\$ 960	\$ 1,066	\$ (497)
Foreign currency translation adjustments and other	(143)	(185)	746
Net unrealized gains (losses) on investments	1	(1)	14
Unamortized (losses) gains and prior service (costs) credits for postretirement benefit plans	(64)	19	30
Net unrealized gains (losses) on designated hedges	45	(1)	44
Other comprehensive (loss) income, net of tax (Note 16)	(161)	(168)	834
Comprehensive income attributable to Corning Incorporated	\$ 799	\$ 898	\$ 337

2019 vs. 2018

For the year ended December 31, 2019, comprehensive income decreased by \$99 million, when compared to the same period in 2018, primarily due to the following:

- A decrease in net income of \$106 million; and
- An \$83 million increase in unamortized actuarial losses for post-retirement benefit plans, \$53 million of which was related to the adoption of the new standard for reclassification of stranded tax effects in AOCI with the remainder of the impact driven by decreases in the discount rates used to value our post-retirement obligations.

These losses were partially offset by the following:

- A decrease in the loss on foreign currency translation adjustments in the amount of \$42 million, most significantly impacted by the Chinese yuan, South Korean won and Japanese yen; and
- The impact of a change to net unrealized gains on designated hedges of \$46 million.

Refer to Note 12 (Employee Retirement Plans) and Note 16 (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, and other charges or 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 and Specialty Materials segments for the Japanese yen, South Korean won, Chinese

yuan and new Taiwan dollar currencies. Effective January 1, 2019, Corning also began using constant-currency reporting for our Environmental Technologies and Life Sciences segments for the euro, Japanese yen and Chinese yuan. 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 United States ("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.

Effective July 1, 2019, we replaced the term "Core Earnings" with "Core Net Income". The terms are interchangeable and the underlying calculations remain the same.

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):

	Years ended December 31,			% change	
	2019	2018	2017	19 vs. 18	18 vs. 17
Core net sales	\$ 11,656	\$ 11,398	\$ 10,258	2%	11%
Core equity in earnings of affiliated companies	\$ 237	\$ 241	\$ 211	(2)%	14%
Core net income	\$ 1,578	\$ 1,673	\$ 1,634	(6)%	2%

Core Net Sales

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

	Years ended December 31,			% change	
	2019	2018	2017	19 vs. 18	18 vs. 17
Display Technologies	\$ 3,254	\$ 3,276	\$ 3,137	(1)%	4%
Optical Communications	4,064	4,192	3,545	(3)%	18%
Specialty Materials	1,594	1,479	1,403	8%	5%
Environmental Technologies	1,499	1,289	1,106	16%	17%
Life Sciences	1,015	946	879	7%	8%
All Other	230	216	188	6%	15%
Total segment net sales*	\$ 11,656	\$ 11,398	\$ 10,258	2%	11%

* Segment 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):

	Years ended December 31,			% change	
	2019	2018	2017	19 vs. 18	18 vs. 17
Hemlock Semiconductor Group	\$ 229	\$ 236	\$ 201	(3)%	17%
All other	8	5	10	60%	(50)%
Total core equity earnings	\$ 237	\$ 241	\$ 211	(2)%	14%

Core Net Income

2019 vs. 2018

In the year ended December 31, 2019, we generated core net income of \$1,578 million or \$1.76 per share, compared to core net income generated in the year ended December 31, 2018 of \$1,673 million, or \$1.78 per share. The decrease in core net income of \$95 million was driven by the following items:

- A decrease in the Optical Communications segment of \$103 million primarily driven by decreases in volume;
- A decrease in the Display Technologies segment of \$49 million primarily driven by decreases in volume and glass shipments during the second half of 2019, resulting in lower factory utilization and negatively impacting profitability; and
- A decrease of \$11 million in the Specialty Materials segment, largely driven by the absence of customer support for new product development costs for the launch of new product innovations in 2019.

Partially offsetting these decreases in core net income were the following:

- An increase in the Environmental Technologies segment of \$55 million resulting from earnings growth driven by increased sales of gas particulate filters; and
- An increase of \$33 million in the Life Sciences segment resulting from higher volumes outpacing the underlying market.

Core earnings per share decreased in the year ended December 31, 2019 to \$1.76 per share, driven by the decrease in core net income and partially offset by the repurchase of 31.0 million shares of common stock over the last twelve months.

Included in core net income for the years ended December 31, 2019, 2018 and 2017, is net periodic pension expense in the amount of \$84 million, \$52 million and \$49 million, which excludes the annual pension mark-to-market adjustments.

Refer to Note 12 (Employee Retirement Plans) to the consolidated financial statements for additional information.

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):

	2019	2018	2017
Core net income attributable to Corning Incorporated	\$ 1,578	\$ 1,673	\$ 1,634
Less: Series A convertible preferred stock dividend	98	98	98
Core net income available to common stockholders - basic	1,480	1,575	1,536
Add: Series A convertible preferred stock dividend	98	98	98
Core net income available to common stockholders - diluted	\$ 1,578	\$ 1,673	\$ 1,634
Weighted-average common shares outstanding - basic	776	816	895
Effect of dilutive securities:			
Stock options and other dilutive securities	8	10	11
Series A convertible preferred stock	115	115	115
Weighted-average common shares outstanding - diluted	899	941	1,021
Core basic earnings per common share	\$ 1.91	\$ 1.93	\$ 1.72
Core diluted earnings per common share	\$ 1.76	\$ 1.78	\$ 1.60

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 (loss) or statement 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 (loss) or statement of cash flows.

Core net sales, core equity in earnings of affiliated companies and core net income 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.

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, 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 ⁽⁶⁾			(17)	(13)		(0.01)
Restructuring, impairment and other charges ⁽⁷⁾		6	439	334		0.37
Equity in losses of affiliated companies ⁽⁸⁾		213	213	165		0.18
Pension mark-to-market adjustment ⁽¹⁰⁾			95	69		0.08
Core performance measures	\$ 11,656	\$ 237	\$ 1,949	\$ 1,578	19.0%	\$ 1.76

	Year ended December 31, 2018					
	Net sales	Equity earnings	Income before income taxes	Net income	Effective tax rate ^(a)	Earnings per share
As reported	\$ 11,290	\$ 390	\$ 1,503	\$ 1,066	29.1%	\$ 1.13
Constant-currency adjustment ⁽¹⁾	108	2	156	127		0.13
Translation loss on Japanese yen-denominated debt ⁽²⁾			18	15		0.02
Translated earnings contract loss, net ⁽³⁾			73	97		0.10
Acquisition-related costs ⁽⁴⁾			132	103		0.11
Discrete tax items and other tax-related adjustments ⁽⁵⁾				79		0.08
Litigation, regulatory and other legal matters ⁽⁶⁾			124	96		0.10
Restructuring, impairment and other charges ⁽⁷⁾			130	96		0.10
Equity in earnings of affiliated companies ⁽⁸⁾		(151)	(151)	(119)		(0.13)
Pension mark-to-market adjustment ⁽¹⁰⁾			145	113		0.12
Core performance measures	\$ 11,398	\$ 241	\$ 2,130	\$ 1,673	21.5%	\$ 1.78

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

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

	Year ended December 31, 2017					
	Net sales	Equity earnings	Income before income taxes	Net (loss) income	Effective tax rate ^(a)	(Loss) earnings per share
As reported	\$ 10,116	\$ 361	\$ 1,657	\$ (497)	130.0%	\$ (0.66)
Constant-currency adjustment ⁽¹⁾	142	2	168	138		0.15
Translation gain on Japanese yen-denominated debt ⁽²⁾			(14)	(9)		(0.01)
Translated earnings contract loss, net ⁽³⁾			125	78		0.09
Acquisition-related costs ⁽⁴⁾			84	59		0.07
Discrete tax items and other tax-related adjustments ⁽⁵⁾				127		0.14
Litigation, regulatory and other legal matters ⁽⁶⁾			(12)	(9)		(0.01)
Restructuring, impairment and other charges ⁽⁷⁾			72	62		0.07
Equity in earnings of affiliated companies ⁽⁸⁾		(152)	(152)	(97)		(0.11)
Adjustments related to acquisitions ⁽⁹⁾			10	13		0.01
Pension mark-to-market adjustment ⁽¹⁰⁾			22	14		0.02
Adjustments resulting from the 2017 Tax Act ⁽¹¹⁾				1,755		1.96
Core performance measures	\$ 10,258	\$ 211	\$ 1,960	\$ 1,634	16.6%	\$ 1.60

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

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

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

- (1) **Constant-currency adjustment:** Because a significant portion of segment revenues 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 segment sales and net income are primarily denominated in Japanese yen, but also impacted by the South Korean won, Chinese yuan, and new Taiwan dollar. Beginning January 1, 2019, as our Environmental Technologies and Life Science segments sales and net income are impacted by the euro, Chinese yuan and Japanese yen, these segments will also be presented on a constant-currency basis. We have not recast the prior periods for these two segments as the impact of fluctuations in these currencies are not material for prior periods. 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	€1.81

- (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:** We have excluded the impact of the realized and unrealized gains and losses of our Japanese yen, South Korean won, Chinese yuan and new Taiwan dollar-denominated foreign currency hedges related to translated earnings, as well as the unrealized gains and losses of our euro and 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 2019, these include discrete period tax items such as changes in tax law, the impact of tax audits, changes in judgement about the realizability of certain deferred tax assets and other tax-related adjustments. For 2018, this amount primarily relates to the preliminary IRS audit settlement offset by changes in judgment about the realizability of certain deferred tax assets. For 2017, this amount represents the removal of discrete adjustments (e.g., changes in tax law, other than those of the 2017 Tax Act which are set forth separately, and changes in judgment about the realizability of certain deferred tax assets) as well as other non-operational tax-related adjustments.
- (6) **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.
- (7) **Restructuring, impairment and other charges or credits:** This amount includes restructuring, impairment and other charges or 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.

- (8) Equity in (earnings) losses of affiliated companies: These adjustments relate to costs not related to continuing operations of our affiliated companies, such as restructuring, impairment and other charges and settlements, or modifications, under "take-or-pay" contracts.
- (9) Adjustments related to acquisitions: Includes fair value adjustments to the Corning Precision Materials ("CPM") indemnity asset related to contingent consideration, post-combination expenses and other acquisition and disposal adjustments.
- (10) 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.
- (11) Adjustments resulting from the 2017 Tax Act: Includes a provisional amount related to the one-time mandatory tax on unrepatriated foreign earnings, a provisional amount related to the remeasurement of U.S. deferred tax assets and liabilities, changes in valuation allowances resulting from the 2017 Tax Act, and adjustments for the elimination of excess foreign tax credit planning.

Reportable Segments

Our 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 segments 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 pharmaceutical technologies, auto glass, new product lines and development projects, as well as certain corporate investments.

We prepared the financial results for our reportable segments on a basis consistent with our internal disaggregation of financial information to assist in making internal operating decisions. We use a segment tax rate of 21% when presenting segment information. The impact of changes in the Japanese yen, euro, South Korean won, Chinese yuan and new Taiwan dollar are excluded from segment sales and segment net income for the Display Technologies, Specialty Materials, Environmental Technologies and Life Science segments. Certain corporate income and expenses are included in the unallocated amounts in the reconciliation of reportable segment net income to consolidated net income. These include items that are not used by our CODM in evaluating the results of, or in allocating resources to, our segments and include the following items: the impact of our translated earnings contracts; acquisition-related costs; discrete tax items and other tax-related adjustments; certain litigation, regulatory and other legal matters; restructuring, impairment and other charges or credits; adjustments relating to acquisitions; and other non-recurring non-operational items. Although we exclude these amounts from segment results, they are included in reported consolidated results.

We included the earnings of equity affiliates that are closely associated with our reportable segments in the respective segment's net income. We have allocated certain common expenses among reportable segments differently than we would for stand-alone financial information. Segment net income 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:

	Years ended December 31,			% change	% change
	2019	2018	2017	19 vs. 18	18 vs. 17
Segment net sales	\$ 3,254	\$ 3,276	\$ 3,137	(1%)	4%
Segment net income	\$ 786	\$ 835	\$ 888	(6%)	(6%)

2019 vs. 2018

Net sales in the Display Technologies segment decreased by \$22 million, or 1%, for the year ended December 31, 2019, when compared to the prior year. Corning's glass volume increased by a mid-single digit percentage, higher than the overall market, driven by increased Gen 10.5 output during the year. The combination of finished goods volume, unfinished glass sold to our equity affiliates and a low-single-digit percentage price decline resulted in a one percent sales decline.

Net income in the Display Technologies segment decreased by \$49 million in the year ended December 31, 2019, driven by the decrease in sales outlined above. Display Technologies shipped more glass in the first half of 2019 than in the latter half. Due to lower glass volumes in the second half of 2019, factory utilization declined impacting profitability.

Outlook:

For full-year 2020, Corning expects its display glass volume to grow by a mid-single digit percentage, similar to the mid-single digit percentage growth expected in the display glass market. The company expects display glass price declines to remain moderate, down a mid-single percentage for the full year.

Optical Communications

The following table provides net sales and net income for the Optical Communications segment:

	Years ended December 31,			% change	% change
	2019	2018	2017	19 vs. 18	18 vs. 17
Segment net sales	\$ 4,064	\$ 4,192	\$ 3,545	(3%)	18%
Segment net income	\$ 489	\$ 592	\$ 469	(17%)	26%

2019 vs. 2018

Net sales declined by \$128 million, or 3%, in the year ended December 31, 2019, when compared to the same period in 2018, primarily due to lower sales in carrier products, down \$199 million, partially offset by an increase of \$71 million in enterprise network sales. Sales were lower than expected due to weakness in the optical market, highlighted by capital spending reductions at two of our significant customers in the latter half of 2019.

Net income in the year ended December 31, 2019 decreased by \$103 million, or 17%. Lower sales volumes in the latter half of 2019 drove less efficient factory utilization negatively impacting profitability.

Movements in foreign currency exchange rates did not materially impact net income in this segment in the year ended December 31, 2019 when compared to the same period in 2018.

Outlook:

Full-year 2020 Optical Communications sales are expected to decrease by five to ten percent on a year-over-year basis.

Specialty Materials

The following table provides net sales and net income for the Specialty Materials segment:

	Years ended December 31,			% change	% change
	2019	2018	2017	19 vs. 18	18 vs. 17
Segment net sales	\$ 1,594	\$ 1,479	\$ 1,403	8%	5%
Segment net income	\$ 302	\$ 313	\$ 301	(4%)	4%

2019 vs. 2018

Net sales in the Specialty Materials segment increased by \$115 million, or 8%, in the year ended December 31, 2019, when compared to the same period in 2019, primarily driven by strong demand for Gorilla® Glass.

Net income in the year ended December 31, 2019 decreased by \$11 million, or 4%, when compared to the same period in 2018. The decrease was primarily related to the absence of customer support for new product development costs for the launch of new product innovations in 2019.

Outlook:

The company expects high-single digit percentage growth for the Specialty Materials segment on a year-over-year basis for full-year 2020.

Environmental Technologies

The following table provides net sales and net income for the Environmental Technologies segment:

	Years ended December 31,			% change	% change
	2019	2018	2017	19 vs. 18	18 vs. 17
Segment net sales	\$ 1,499	\$ 1,289	\$ 1,106	16%	17%
Segment net income	\$ 263	\$ 208	\$ 165	26%	26%

2019 vs. 2018

Net sales increased \$210 million, or 16% in the year ended December 31, 2019, primarily driven sales growth of gasoline particulate filters.

Net income in the year ended December 31, 2019 increased by \$55 million, or 26%, driven by the sales increase outlined above and strong operational performance and successful ramping of additional gasoline particulate filter capacity in China.

Outlook:

We expect mid-single digit sales growth on a year-over-year basis in our Environmental Technologies segment for full-year 2020.

Life Sciences

The following table provides net sales and net income for the Life Sciences segment:

	Years ended December 31,			% change	% change
	2019	2018	2017	19 vs. 18	18 vs. 17
Segment net sales	\$ 1,015	\$ 946	\$ 879	7%	8%
Segment net income	\$ 150	\$ 117	\$ 95	28%	23%

2019 vs. 2018

Net sales in the Life Sciences segment increased by \$69 million, or 7%, in the year ended December 31, 2019, when compared to the same period in 2018, driven by strong performance across all product categories and sales that continued to outpace market growth.

Net income increased by \$33 million, or 28%, in the year ended December 31, 2019, driven by the reasons outlined above and improved manufacturing efficiencies.

Outlook:

For full-year 2020, sales are expected to grow by a mid-single-digit percentage on a year-over-year basis.

All Other

All other segments 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 the pharmaceutical technologies business, auto glass, new product lines and development projects, as well as certain corporate investments.

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

	Years ended December 31,			% change	% change
	2019	2018	2017	19 vs. 18	18 vs. 17
Segment net sales	\$ 230	\$ 216	\$ 188	6%	15%
Segment net loss	\$ (289)	\$ (281)	\$ (259)	(3%)	(8%)

2019 vs. 2018

Net sales of this segment increased by \$14 million, or 6%, in the year ended December 31, 2019, respectively, when compared to the same period in 2018, driven by an increase in sales in our emerging businesses. The increase in the net loss of \$8 million, a decline of 3%, reflects increased spending on our development projects when compared to 2018.

Liquidity and Capital Resources

Financing and Capital Structure

The following items discuss Corning's financing and changes in capital structure during 2019 and 2018:

2019

In the third quarter of 2019, Corning issued two Japanese yen-denominated debt securities (the "Notes"), as follows:

- ¥31.3 billion 1.153% senior unsecured notes with a maturity of 12 years; and
- ¥5.9 billion 1.513% senior unsecured notes with a maturity of 20 years.

The proceeds from the Notes were received in Japanese yen and converted to U.S. dollars on the date of issuance. The net proceeds received in U.S. dollars, after deducting offering expenses, were approximately \$349 million and will be used for general corporate purposes. Payments of principal and interest on the Notes will be in Japanese yen, or should yen be unavailable due to circumstances beyond Corning's control, a U.S. dollar equivalent.

In the fourth quarter of 2019, Corning issued two U.S. dollar-denominated debt securities (the "Notes"), as follows:

- \$400 million 3.90% senior unsecured notes with a maturity of 30 years; and
- \$1.1 billion 5.45% senior unsecured notes with a maturity of 60 years.

The net proceeds, after deducting offering expenses, were approximately \$1.5 billion and will be used for general corporate purposes. We can redeem these notes at any time, subject to certain terms and conditions.

In the fourth quarter of 2019, Corning redeemed \$300 million of 4.25% notes due in 2020, paying a premium of \$4.7 million by exercising our make-whole call. The bond redemption resulted in an \$8.4 million loss during the same quarter.

Common Stock Dividends

On February 6, 2018, Corning's Board of Directors declared a 16.1% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.155 to \$0.18 per share of common stock, beginning with the dividend to be paid in the first quarter of 2018.

On February 6, 2019, Corning's Board of Directors declared an 11.1% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.18 to \$0.20 per share of common stock, beginning with the dividend paid in the first quarter of 2019.

On February 5, 2020, Corning's Board of Directors declared a 10.0% 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. This increase marks the ninth dividend increase since October 2011.

Fixed Rate Cumulative Convertible Preferred Stock, Series A

Corning has 2,300 outstanding shares of Fixed Rate Cumulative Convertible Preferred Stock, Series A. The preferred stock is convertible at the option of the holder and the Company upon certain events, at a conversion rate of 50,000 shares of Corning's common stock per one

share of preferred stock, subject to certain anti-dilution provisions. As of December 31, 2019, the preferred stock has not been converted, and none of the anti-dilution provisions have been triggered.

Customer Deposits

As of December 31, 2019 and 2018, Corning had customer deposits of approximately \$1.0 billion. The majority of these represent non-refundable cash deposits for customers to secure rights to an amount of glass produced by Corning under long-term supply agreements. The duration of these long-term supply agreements ranges up to ten years. As glass is shipped to customers, Corning will recognize revenue and issue credit memoranda to reduce the amount of the customer deposit liability, which are applied against customer receivables resulting from the sale of glass. Credit memoranda of \$37 million were issued in 2019; no such memoranda were issued in 2018.

Capital Spending

Capital spending totaled \$1,978 million in 2019, a decrease of \$264 million when compared to 2018, primarily driven by lower spending in the Optical Communications and Display Technologies segments. We expect our 2020 capital expenditures to be approximately \$1.5 billion.

Cash Flows

Summary of cash flow data (in millions):

	Years ended December 31,		
	2019	2018	2017
Net cash provided by operating activities	\$ 2,031	\$ 2,919	\$ 2,004
Net cash used in investing activities	\$ (1,891)	\$ (2,887)	\$ (1,710)
Net cash used in financing activities	\$ (47)	\$ (1,995)	\$ (1,624)

2019 vs. 2018

Net cash provided by operating activities decreased by \$888 million in the year ended December 31, 2019, when compared to the same period last year, primarily driven by a decrease in customer deposits received of \$558 million and net unfavorable movements in working capital of \$352 million.

In the year ended December 31, 2019, net cash used in investing activities decreased by \$996 million, primarily driven by lower acquisition and capital expenditures of \$842 million and \$264 million, respectively, partially offset by the absence of cash received of \$196 million for a contingent consideration asset, when compared to the prior year.

Net cash used in financing activities decreased by \$1,948 million in the year ended December 31, 2019, when compared to the same period last year. The primary drivers were lower share repurchases, down \$1,287 million, lower debt repayments, down \$329 million and increased borrowing, up \$346 million.

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, 2019, this plan accounted for 76% of our consolidated defined benefit pension plans' projected benefit obligation and 86% of the related plans' assets.

In 2019, we made no voluntary contributions to our domestic defined benefit pension plan and cash contributions of \$2 million to our international pension plans. During 2020, we anticipate making cash contributions of \$85 million to our U.S. qualified pension plan and \$54 million to our international pension plans.

Refer to Note 12 (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,	
	2019	2018
Working capital	\$ 3,942	\$ 3,723
Current ratio	2.1:1	2.1:1
Trade accounts receivable, net of allowances	\$ 1,836	\$ 1,940
Days sales outstanding	59	58
Inventories	\$ 2,320	\$ 2,037
Inventory turns	3.3	3.6
Days payable outstanding ⁽¹⁾	48	55
Long-term debt	\$ 7,729	\$ 5,994
Total debt to total capital	37%	30%

(1) Includes trade payables only.

Management Assessment of Liquidity

We ended the fourth quarter of 2019 with approximately \$2.4 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, 2019, approximately 51% of the consolidated amount was held outside of the United States.

To manage interest rate exposure, the Company, from time to time, enters into interest rate swap agreements. As of December 31, 2019, there are no interest rate swaps outstanding.

Our Revolving Credit Agreement provides a committed \$1.5 billion unsecured multi-currency line of credit and expires August 15, 2023. At December 31, 2019, there were no outstanding amounts under the Revolving Credit Agreement.

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. The Company's Revolving Credit Agreement is available to support obligations under the commercial paper program, if needed. At December 31, 2019, Corning did not have outstanding commercial paper.

Share Repurchases

During 2018, Corning repurchased 74.8 million shares for approximately \$2.2 billion through open market repurchases under the 2016 and 2018 Repurchase Programs.

During the year ended December 31, 2019, the Company repurchased 31.0 million shares of common stock on the open market for approximately \$0.9 billion as part of its 2018 and 2019 Repurchase Programs.

Refer to Note 16 (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 which may signal possible customer credit issues. From time to time, we factor accounts receivable. During 2019, Corning participated in customer-initiated payment programs which resulted in accelerated collections of \$143 million in accounts receivable. We currently have not identified any potential material impact on our liquidity resulting from customer credit issues.

Our major source of funding for 2020 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.

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, 2019, our leverage using this measure was approximately 37%. As of December 31, 2019, we were in compliance with this financial covenant.

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, 2019, 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 2019 through 2023, with average rate forwards and options. In the years ended December 31, 2019 and 2018, we recorded pre-tax net gains of \$201 million and pre-tax net losses of \$96 million, respectively, related to changes in the fair value of these instruments. Included in these amounts are realized losses of \$7 million and realized gains of \$64 million, respectively. The gross notional value outstanding for these instruments which hedge our exposure to the Japanese yen at December 31, 2019 and 2018, was \$10.2 billion and \$11.6 billion, respectively.

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, 2019 and 2018, we recorded a pre-tax net gain of \$6 million and a pre-tax net loss of \$26 million, respectively, related to changes in the fair value of these instruments. Included in these amounts is a realized loss of \$1 million and a realized gain of \$46 million, respectively. These instruments had a gross notional value outstanding at December 31, 2019 and 2018, of \$0.4 and \$0.1 billion, respectively.

We have entered into a portfolio of average rate forwards to hedge against our euro translation exposure. In the years ended December 31, 2019 and 2018, we recorded pre-tax gains of \$37 million and \$43 million, respectively. Included in these amounts are realized gains of \$29 million and realized losses of \$14 million, respectively. At December 31, 2019 and 2018, the euro-denominated average rate instruments had a gross notional amount of \$1.3 billion and \$1.2 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 (loss).

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 13 (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 absorbs a majority of the entity's expected losses, receives a majority of its expected residual returns, or both, as a result of holding variable interests, which 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 interests.

Corning has identified ten entities that qualify as a variable interest entity and are not consolidated. These entities are not considered to be significant to Corning's consolidated financial statements.

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

Contractual Obligations

The amounts of our obligations follow (in millions):

	Amount of commitment and contingency expiration per period				
	Total	Less than 1 year	1 to 3 years	3 to 5 years	5 years and thereafter
Performance bonds and guarantees	\$ 163	\$ 30	\$ 4	\$ 1	\$ 128
Stand-by letters of credit ⁽¹⁾	43	31	8	3	1
Subtotal of commitment expirations per period	\$ 206	\$ 61	\$ 12	\$ 4	\$ 129
Purchase obligations ⁽²⁾	\$ 554	\$ 190	\$ 199	\$ 75	\$ 90
Capital expenditure obligations ⁽³⁾	592	592			
Total debt ⁽⁴⁾	7,195		437	588	6,170
Finance leases and financing obligations	600	11	30	160	399
Interest on long-term debt ⁽⁵⁾	8,948	298	583	543	7,524
Imputed interest on finance leases and financing obligations	296	27	53	43	173
Operating Lease Obligations	755	98	153	116	388
Uncertain tax positions ⁽⁶⁾	58				
Subtotal of contractual obligation payments due by period ⁽⁶⁾	\$ 18,998	\$ 1,216	\$ 1,455	\$ 1,525	\$ 14,744
Total commitments and contingencies⁽⁶⁾	\$ 19,204	\$ 1,277	\$ 1,467	\$ 1,529	\$ 14,873

(1) At December 31, 2019, we had stand-by letters of credit commitments of \$82 million; \$39 million was included in other accrued liabilities on our 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 our capital expansion activities.

(4) Total debt above is 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, 2019, \$58 million was included on our consolidated balance sheets related to uncertain tax positions.

We believe a significant majority of these guarantees and contingent liabilities will expire without being funded.

Environment

Refer to Item 3. Legal Proceedings or Note 13 (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.

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 our long-lived assets in each quarter to assess whether 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 extent or manner in which a long-lived asset is being used or in 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 in excess of 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 the majority 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, 2019 and 2018, the carrying value of precious metals was lower than the fair market value by \$849 million and higher than the fair market value by \$719 million, respectively. The majority of these precious metals are utilized by the Display Technologies and Specialty Materials segments. Corning believes these precious metal assets to be recoverable due to the significant positive cash flow in both 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.

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 a particular 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 income 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 (loss). 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 15 (Fair Value Measurements) to the consolidated financial statements for additional information.

Probability of litigation outcomes

We are 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

We are 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 remeasurements triggered by a curtailment, settlement or significant plan changes, as well as any true-up to the annual valuation, are recognized as a mark-to-market adjustment in the quarter in which such event occurs.

Costs for our 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 income 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:

<i>(In millions)</i>	December 31,		
	2019	2018	2017
Actual return on plan assets – Domestic plans	\$ 576	\$ (202)	\$ 393
Expected return on plan assets – Domestic plans	161	178	163
Actual return on plan assets – International plans	39	1	18
Expected return on plan assets – International plans	10	11	11
Weighted-average actual and expected return on assets:			
Actual return on plan assets – Domestic plans	21.89%	(6.83)%	14.92%
Expected return on plan assets – Domestic plans	6.00%	6.00%	6.00%
Actual return on plan assets – International plans	7.99%	(0.06)%	3.93%
Expected return on plan assets – International plans	2.01%	2.13%	3.97%

As of December 31, 2019, the Projected Benefit Obligation (PBO) for U.S. pension plans was \$3.9 billion.

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

Change in assumption	Effect on 2020 pre-tax pension expense	Effect on December 31, 2019 PBO
25 basis point decrease in each spot rate	- 3 million	+ 110 million
25 basis point increase in each spot rate	+ 2 million	- 105 million
25 basis point decrease in expected return on assets	+ 8 million	
25 basis point increase in expected return on assets	- 8 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.

In addition, at December 31, 2019, a 25 basis point decrease in each spot rate would decrease shareholders' equity by \$133 million before tax, and a 25 basis point increase in each spot rate would increase shareholders' equity by \$127 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 2020 pre-tax OPEB expense	Effect on December 31, 2019 APBO*
25 basis point decrease in each spot rate	- 0 million	+ 23 million
25 basis point increase in each spot rate	+ 0 million	- 22 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.

On January 1, 2018, we adopted the new revenue standard and applied the modified retrospective method of accounting to those contracts which were not completed as of January 1, 2018. Results for reporting periods beginning after January 1, 2018 are presented under Topic 606, while prior period amounts are not adjusted and continue to be reported in accordance with our historic accounting under ASC Topic 605 "Revenue Recognition". Because the impact of adopting the standard on Corning's financial statements was immaterial, we have not made an adjustment to opening retained earnings.

One of Corning's equity affiliates adopted the new revenue standard on January 1, 2019. The impact of adopting the new standard to Corning's financial statements was a net reduction of \$186 million to 2019 beginning retained earnings. Timing of revenue recognition for certain open performance obligations as measured at January 1, 2019 under the new standard was approximately \$239 million with offsetting deferred tax impacts of \$53 million.

New Accounting Standards

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

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, which impact our net equity.

Our most significant foreign currency exposures relate 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. 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 exposures 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. revenues

are denominated in Japanese yen. When these revenues are 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 our foreign currency exposures. 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, 2019, 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 \$1.3 billion compared to \$1.1 billion at December 31, 2018. 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 \$1.0 billion at December 31, 2019 and 2018. 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.

Interest Rate Risk Management

To manage interest rate exposure, the Company, from time to time, enters into interest rate derivatives agreements. In the second quarter of 2018, the Company entered into Treasury rate lock agreements with notional amounts of \$300 million to hedge against the variability in cash flows due to changes in the benchmark interest rate related to an anticipated debt issuance. The instruments were designated as cash flow hedges, and were settled with \$16 million received on October 31, 2018 concurrent with the debt issuance. As of December 31, 2019, there were no interest rate derivatives agreements outstanding.

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 United States of America. 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 United States of America, 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, 2019. The effectiveness of the Company's internal control over financial reporting as of December 31, 2019 has been audited by PricewaterhouseCoopers LLP, an independent registered accounting firm, as stated in their report and is included herein.



Wendell P. Weeks

Chairman, Chief Executive Officer and President



R. Tony Tripeny

Executive Vice President and Chief Financial Officer

Report of Independent Registered Public Accounting Firm

PricewaterhouseCoopers LLP

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 as of December 31, 2019 and 2018, and the related consolidated statements of income (loss), comprehensive income, changes in shareholders' equity and cash flows for each of the three years in the period ended December 31, 2019, including the related notes and schedule of valuation and qualifying accounts for each of the three years in the period ended December 31, 2019 listed in the accompanying index (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2019, 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, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019 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, 2019, 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 Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (i) relate 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 matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Income Taxes - Receivables for South Korean Tax Disputes

As described in Notes 1, 5, and 10 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 liability for unrecognized tax benefits in the period in which management determines the issue is effectively settled with the tax authorities, the statute of limitations expires for 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. Management believes that it is more likely than not that these tax positions will prevail in the appeal process and as a result, management recorded a non-current receivable of \$415 million as of December 31, 2019 for the amount on deposit with the South Korean government. In the fourth quarter of 2019, the Company received a refund of \$38 million from the South Korean government related to tax years 2006 through 2009. As of December 31, 2019, management has also recorded a current receivable of \$33 million for an amount refunded in January 2020 related to the same issue for the tax year 2015.

The principal considerations for our determination that performing procedures relating to the receivables for South Korean tax disputes is a critical audit matter are there was 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. This in turn led to 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. In addition, the audit effort involved the use of professionals with specialized skill and knowledge to assist in performing these procedures and evaluating the audit evidence obtained.

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, including application of the tax law.

Impairment at the Equity Method Investee, Hemlock Semiconductor Group - The Long-lived Asset Impairment of the Solar Power Panel Asset Group ("Solar Group")

As described in Notes 1 and 6 to the consolidated financial statements, the Company's 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 if there is evidence of a loss in value of an equity investment. Hemlock Semiconductor LLC and Hemlock Semiconductor Operations LLC, of which the Company has 49.9% and 40.25% ownerships respectively, are recorded as equity method investments and are affiliated companies of Hemlock Semiconductor Group (HSG). Due to the adverse change in HSG's solar business, HSG was required to assess the recoverability of its long-lived assets in the fourth quarter. Based on this assessment, HSG determined that the carrying values of HSG's Solar Group significantly exceeded its fair value. HSG engaged a third-party appraiser to assist in determining the fair value of the assets within the Solar Group based on the highest and best use of the asset group. As a result of the fair value determination, HSG recognized pre-tax asset impairment charges of \$916 million for the year ended December 31, 2019. The Company's share of the pre-tax impairment was \$369 million.

The principal considerations for our determination that performing procedures relating to HSG's long-lived asset impairment of the Solar Group is a critical audit matter are there was a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating audit evidence relating to (i) management's assessment of the impairment at HSG, and (ii) the determination of the asset groups and the fair value of the assets within HSG's Solar Group, including the assumptions related to the highest and best use of the assets. In addition, the audit effort involved the use of professionals with specialized skill and knowledge to assist in performing these procedures and evaluating the audit evidence obtained.

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 the equity method investment accounting, including controls over management's recording of the Company's share of the pre-tax impairment at HSG's Solar Group. These procedures also included, among others, (i) evaluating management's assessment of the impairment at HSG and the Company's share of the pre-tax impairment, and (ii) testing HSG's process for determining the fair value of the long-lived assets within HSG's Solar Group. Testing the fair value of these long-lived assets included determining the appropriateness of the asset groups and reasonableness of the assumptions related to the determination of the fair value of the long-lived assets in the Solar Group based on their highest and best use. Professionals with specialized skill and knowledge were used to assist in evaluating the assumptions related to the highest and best use of the long-lived assets and evaluating the consistency of the assumptions with evidence obtained in other areas of the audit.

PricewaterhouseCoopers LLP

New York, New York
February 14, 2020

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

Consolidated Statements of Income (Loss)

Corning Incorporated and Subsidiary Companies

<i>(In millions, except per share amounts)</i>	Years ended December 31,		
	2019	2018	2017
Net sales	\$ 11,503	\$ 11,290	\$ 10,116
Cost of sales	7,468	6,829	6,096
Gross margin	4,035	4,461	4,020
Operating expenses:			
Selling, general and administrative expenses	1,585	1,799	1,473
Research, development and engineering expenses	1,031	993	864
Amortization of purchased intangibles	113	94	75
Operating income	1,306	1,575	1,608
Equity in earnings of affiliated companies (Note 6)	17	390	361
Interest income	21	38	45
Interest expense	(221)	(191)	(155)
Translated earnings contract gain (loss), net	248	(93)	(121)
Other expense, net	(155)	(216)	(81)
Income before income taxes	1,216	1,503	1,657
Provision for income taxes (Note 5)	(256)	(437)	(2,154)
Net income (loss) attributable to Corning Incorporated	\$ 960	\$ 1,066	\$ (497)
Earnings (loss) per common share attributable to Corning Incorporated:			
Basic (Note 17)	\$ 1.11	\$ 1.19	\$ (0.66)
Diluted (Note 17)	\$ 1.07	\$ 1.13	\$ (0.66)

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

Consolidated Statements of Comprehensive Income

Corning Incorporated and Subsidiary Companies

<i>(In millions)</i>	Years ended December 31,		
	2019	2018	2017
Net income (loss) attributable to Corning Incorporated	\$ 960	\$ 1,066	\$ (497)
Foreign currency translation adjustments and other	(143)	(185)	746
Net unrealized gains (losses) on investments	1	(1)	14
Unamortized (losses) gains and prior service (costs) credits for postretirement benefit plans	(64)	19	30
Net unrealized gains (losses) on designated hedges	45	(1)	44
Other comprehensive (loss) income, net of tax (Note 16)	(161)	(168)	834
Comprehensive income attributable to Corning Incorporated	\$ 799	\$ 898	\$ 337

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

Consolidated Balance Sheets

Corning Incorporated and Subsidiary Companies

<i>(In millions, except share and per share amounts)</i>	December 31,	
	2019	2018
Assets		
Current assets:		
Cash and cash equivalents	\$ 2,434	\$ 2,355
Trade accounts receivable, net of doubtful accounts and allowances - \$81 and \$64	1,836	1,940
Inventories, net of inventory reserves - \$201 and \$182 (Note 3)	2,320	2,037
Other current assets (Note 10 and 14)	873	702
Total current assets	7,463	7,034
Investments (Note 6)	334	376
Property, plant and equipment, net of accumulated depreciation - \$12,995 and \$11,932 (Note 8)	15,337	14,895
Goodwill, net (Note 9)	1,935	1,936
Other intangible assets, net (Note 9)	1,185	1,292
Deferred income taxes (Note 5)	1,157	951
Other assets (Note 10 and 14)	1,487	1,021
Total Assets	\$ 28,898	\$ 27,505
Liabilities and Equity		
Current liabilities:		
Current portion of long-term debt and short-term borrowings (Note 11)	\$ 11	\$ 4
Accounts payable	1,587	1,456
Other accrued liabilities (Note 10 and 13)	1,923	1,851
Total current liabilities	3,521	3,311
Long-term debt (Note 11)	7,729	5,994
Postretirement benefits other than pensions (Note 12)	671	662
Other liabilities (Note 10 and 13)	3,980	3,652
Total liabilities	15,901	13,619
Commitments, contingencies and guarantees (Note 13)		
Shareholders' equity (Note 16):		
Convertible preferred stock, Series A – Par value \$100 per share; Shares authorized 3,100; Shares issued: 2,300	2,300	2,300
Common stock – Par value \$0.50 per share; Shares authorized: 3.8 billion; Shares issued: 1,718 million and 1,713 million	859	857
Additional paid-in capital – common stock	14,323	14,212
Retained earnings	16,408	16,303
Treasury stock, at cost; shares held: 956 million and 925 million	(19,812)	(18,870)
Accumulated other comprehensive loss	(1,171)	(1,010)
Total Corning Incorporated shareholders' equity	12,907	13,792
Noncontrolling interests	90	94
Total equity	12,997	13,886
Total Liabilities and Equity	\$ 28,898	\$ 27,505

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

Consolidated Statements of Cash Flows

Corning Incorporated and Subsidiary Companies

<i>(In millions)</i>	Years ended December 31,		
	2019	2018	2017
Cash Flows from Operating Activities:			
Net income (loss)	\$ 960	\$ 1,066	\$ (497)
Adjustments to reconcile net income (loss) to net cash provided by operating activities:			
Depreciation	1,390	1,199	1,083
Amortization of purchased intangibles	113	94	75
Loss on disposal of assets	118	35	80
Stock compensation charges	56	51	46
Equity in earnings of affiliated companies	(17)	(390)	(361)
Dividends received from affiliated companies	106	241	201
Deferred tax (benefit) provision	(191)	(38)	1,796
Customer incentives and deposits, net	142	700	100
Employee benefit payments less than (in excess of) expense	78	(88)	24
Translated earnings contract (gain) loss, net	(248)	93	121
Unrealized translation loss (gain) on transactions	33	55	(339)
Changes in certain working capital items:			
Trade accounts receivable	48	(154)	(225)
Inventories	(298)	(346)	(170)
Other current assets	(300)	(20)	(172)
Accounts payable and other current liabilities	36	358	169
Other, net	5	63	73
Net cash provided by operating activities	2,031	2,919	2,004
Cash Flows from Investing Activities:			
Capital expenditures	(1,978)	(2,242)	(1,804)
Acquisitions of businesses, net of cash received		(842)	(171)
Proceeds from settlement of initial contingent consideration asset		196	
Purchase of equipment for related party	(9)	(68)	
Sale of equipment to related party	78	19	
Realized gains on translated earnings contracts	66	108	270
Other, net	(48)	(58)	(5)
Net cash used in investing activities	(1,891)	(2,887)	(1,710)
Cash Flows from Financing Activities:			
Net repayments of short-term borrowings and current portion of long-term debt	(300)	(629)	(252)
Proceeds from issuance of long-term debt, net	1,831	1,485	1,445
Proceeds from exercise of stock options	58	81	309
Repurchases of common stock for treasury	(940)	(2,227)	(2,452)
Dividends paid	(742)	(685)	(651)
Other, net	46	(20)	(23)
Net cash used in financing activities	(47)	(1,995)	(1,624)
Effect of exchange rates on cash	(14)	1	356
Net increase (decrease) in cash and cash equivalents	79	(1,962)	(974)
Cash and cash equivalents at beginning of year	2,355	4,317	5,291
Cash and cash equivalents at end of year	\$ 2,434	\$ 2,355	\$ 4,317

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

Consolidated Statements of Changes in Shareholders' Equity

Corning Incorporated and Subsidiary Companies

<i>(In millions)</i>	Convertible preferred stock	Common stock	Additional paid-in capital common	Retained earnings	Treasury stock	Accumulated other comprehensive (loss) income	Total Corning Incorporated shareholders' equity	Non-controlling interests	Total
Balance at December 31, 2016	\$ 2,300	\$ 846	\$ 13,695	\$ 16,880	\$ (14,152)	\$ (1,676)	\$ 17,893	\$ 67	\$ 17,960
Net (loss) income				(497)			(497)	18	(479)
Other comprehensive income						834	834	6	840
Purchase of common stock for treasury			14		(2,462)		(2,448)		(2,448)
Shares issued to benefit plans and for option exercises		8	349		(2)		355		355
Common Dividends (\$0.62 per share)				(556)			(556)		(556)
Preferred Dividends (\$42,500 per share)				(98)			(98)		(98)
Other, net ⁽¹⁾			31	201	(17)		215	(19)	196
Balance at December 31, 2017	\$ 2,300	\$ 854	\$ 14,089	\$ 15,930	\$ (16,633)	\$ (842)	\$ 15,698	\$ 72	\$ 15,770
Net income				1,066			1,066	24	1,090
Other comprehensive loss						(168)	(168)	(1)	(169)
Purchase of common stock for treasury					(2,230)		(2,230)		(2,230)
Shares issued to benefit plans and for option exercises		3	123				126		126
Common Dividends (\$0.72 per share)				(590)			(590)		(590)
Preferred Dividends (\$42,500 per share)				(98)			(98)		(98)
Other, net				(5)	(7)		(12)	(1)	(13)
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 ⁽²⁾				(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

(1) Adjustment to retained earnings of \$233 million includes the cumulative effect of the accounting change recorded upon adoption of the new standard improving employee share-based payment accounting.

(2) Adjustments to retained earnings including the effect of Adjustments to retained earnings include the effect of the accounting change we recorded upon adoption of the new standard for reclassification of stranded tax effects in accumulated other comprehensive income ("AOCI") in the amount of \$53 million, and a \$(186) million, net of tax, effect from an equity affiliate's adoption of the new revenue standard.

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

Notes to Consolidated Financial Statements

Corning Incorporated and Subsidiary Companies

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; 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

Our consolidated financial statements were prepared in conformity with generally accepted accounting principles in the U.S. and include the assets, liabilities, revenues 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 affiliated companies, in which at least 20% of the voting securities is owned and we have significant influence but not control over the entity, 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.

All material 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 our results of operations, financial position, or changes in shareholders' equity.

Leases

Corning leases certain real estate, vehicles, and equipment from third parties. On January 1, 2019 we adopted the new leasing standard. Corning classifies leases as either financing or operating. Operating leases are included in other assets with the corresponding liability in other accrued liabilities and other liabilities on our consolidated balance sheets. Finance leases are included in property, plant and equipment

with the corresponding liability in the current portion and long-term debt line items on our consolidated balance sheets. Leases where we are the lessor are not significant.

Lease expense is recognized on a straight-line basis over the lease term for operating leases. Financing leases are recognized on the effective interest method for interest expense and straight-line method for asset amortization. Renewals and terminations are included in the calculation of the Right of Use (“ROU”) assets and lease liabilities when considered to be reasonably certain to be exercised. When the implicit rate is unknown, we use our incremental borrowing rate based on commencement date in determining the present value of lease payments.

Our leases do not include residual value guarantees. We are not the primary beneficiary in or have other forms of variable interests with the lessor of the leased assets. The impact to the balance sheet for operating leases is a gross-up for the addition of ROU assets and liabilities relating to the operating leases in the amount of \$449 million at adoption. The impact to the balance sheet for financing leases was not material.

Corning elected the following practical expedients and accounting policy elections to apply the new lease accounting standard at its effective date as of January 1, 2019:

- Leases of less than 12 months in duration to be recorded as expense only;
- Account for lease and non-lease components of a contract as a single lease component; and
- Comparative reporting of prior periods was not restated due to modified retrospective implementation.

At adoption, Corning recorded a nominal cumulative-effect adjustment to beginning retained earnings.

Refer to Note 4 (Leases) to the consolidated financial statements for additional information.

Revenue

One of Corning's equity affiliates adopted the new revenue standard on January 1, 2019. The impact of adopting the new standard to Corning's financial statements was a net reduction of \$186 million to 2019 beginning retained earnings. Timing of revenue recognition for certain open performance obligations as measured at January 1, 2019 under the new standard was approximately \$239 million with offsetting deferred tax impacts of \$53 million.

Income Taxes

In February 2018, the FASB issued a new standard for Income Statement - Reporting Comprehensive Income, which allows for reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the 2017 Tax Cuts and Jobs Act. We adopted this new standard effective January 1, 2019. The impact of the new standard resulted in a reclassification of \$53 million from accumulated other comprehensive income (“AOCI”) to beginning retained earnings.

Use of Estimates

The preparation of financial statements requires management to make estimates and assumptions that affect amounts reported 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.

Revenue Recognition

The majority of our revenues are generated by delivery of products to our customers and recognized at a point in time based on our evaluation of when the customer obtains control of the products. Revenue is recognized 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.

Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Sales tax, value-added tax, and other taxes we collect concurrent 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 we have offered product warranties, we also establish liabilities 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 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.

Research and Development Costs

Research and development costs are charged to expense as incurred. Research and development costs totaled \$833 million, \$807 million and \$689 million in 2019, 2018 and 2017, 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 our 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. We recorded net losses of \$19 million and \$43 million for foreign currency transaction activity for the years ended December 31, 2019 and 2018, respectively, and a net gain of \$20 million for foreign currency transaction activity for the year ended December 31, 2017. These amounts were recorded in the line item Other expense, net in the consolidated statements of income (loss).

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 income 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.

Share-Based Compensation

Corning maintains long-term incentive plans (the "Plans") for key employees and non-employee members of our 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, 2019, there were approximately 60 million unissued common shares available for future grants authorized under the Plans.

The Company measures and recognizes compensation cost for all share-based payment awards made to employees and directors based on estimated fair values.

Total share-based compensation expense was \$56 million, \$51 million and \$46 million for the years ended December 31, 2019, 2018 and 2017, respectively. The income tax benefit realized from share-based compensation was not significant for the years ended December 31, 2019, 2018 and 2017. Refer to Note 5 (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"). Awards to retirement eligible employees are fully vested at the date of grant, and the related compensation expense is recognized immediately upon grant or over the period from the grant date to the date of retirement eligibility for employees that become age 55 during the vesting period.

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 assumption is the period of time 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 our stock option plans:

	2019	2018	2017
Expected volatility	29.1-29.9%	30.6-31.4%	32.4-36.1%
Weighted-average volatility	29.9%	31.4%	36.1%
Expected dividends	2.36-2.95%	2.22-2.66%	1.98-2.28%
Risk-free rate	1.5-2.4%	2.7-3.1%	2.1-2.3%
Expected term (in years)	7.4-7.4	7.4-7.4	7.4-7.4
Pre-vesting departure rate	0.6-0.6%	0.6-0.6%	0.6-0.6%

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.

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

	Years ended December 31,		
	2019	2018	2017
Non-cash transactions:			
Accruals for capital expenditures	\$ 592	\$ 412	\$ 584
Cash paid for interest and income taxes:			
Interest ⁽¹⁾	\$ 248	\$ 205	\$ 178
Income taxes, net of refunds received	\$ 474	\$ 567	\$ 405

(1) Included in this amount are approximately \$54 million, \$49 million and \$36 million of interest costs that were capitalized as part of property, plant and equipment, net of accumulated depreciation, in 2019, 2018 and 2017, respectively.

Allowance for Doubtful Accounts

The Company's allowance for doubtful accounts is determined based on a variety of factors that affect the potential collectability of the related receivables, including length of time receivables are past due, customer credit ratings, financial stability of customers, specific one-time events and past customer history. 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 majority of accounts are individually evaluated on a regular basis and appropriate reserves are established as deemed appropriate based on the above criteria.

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

Inventories are stated at the lower of cost (first-in, first-out basis) or market.

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 8 (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
Computer hardware and software	3 to 7 years
Manufacturing equipment	2 to 15 years
Furniture and fixtures	5 to 10 years
Transportation equipment	3 to 20 years

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 our manufacturing process over a very long useful life. We treat the physical loss of precious metals in the manufacturing and reclamation process as depletion and account for these losses as a period expense based on actual units lost. Precious metals are integral to many of our glass production processes. They are only acquired to support our operations and are not held for trading or other purposes.

Goodwill and Other Intangible Assets

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 to 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 if no indicators suggest a test should be performed in the interim. 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 assessment is performed by assessing various factors to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount. These factors include, but are not limited to, changes in macroeconomic conditions, industry and market considerations, cost factors, overall financial performance, other relevant entity-specific events, or a sustained decrease in share price.

In 2018, we performed a quantitative goodwill impairment assessment in addition to assessing the qualitative factors each quarter. Our assessment is based on our annual strategic planning process. This process includes an extensive review of expectations for the long-term growth of our businesses and forecasted future cash flows. 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 present value using an appropriate discount rate. Our estimates are based upon our historical experience, our current knowledge from our commercial relationships, and available external information about future trends. The quantitative assessment requires the exercise of significant judgment, including judgment about appropriate discount rates, growth rates and the timing of expected future cash flows of the respective reporting unit.

The quantitative assessment of goodwill resulted in fair values significantly exceeding the carrying values for all our reporting units. We also performed a sensitivity analysis, using a range between 7-10% for the discount rate and 0%-3% for the growth rate, which had no material impact on our results. Based on the quantitative test performed in 2018, no goodwill impairment was required.

Other intangible assets include patents, trademarks, and other intangible assets acquired from independent parties. Such intangible assets have a definite life and are amortized on a straight-line basis over estimated useful lives ranging from 4 to 50 years.

Impairment of Long-Lived Assets

We review the recoverability of our long-lived assets, such as plant and equipment and intangible assets, 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, 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. 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. 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.

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 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 remeasurements triggered by a curtailment, settlement or significant plan change, as well as any true-up to the annual valuation, are recognized as a mark-to-market adjustment in the quarter in which such event occurs.

Costs for our 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. We recognize the actuarial gains and losses resulting from changes in actuarial assumptions as a component of accumulated other comprehensive income 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.

Refer to Note 12 (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 our 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 liability for unrecognized tax benefits in the period in which we determine the issue is effectively settled with the tax authorities, the statute of limitations expires for the return containing the tax position or when new information becomes available. Our liability for unrecognized tax benefits, including accrued penalties and interest, is included in other accrued liabilities and other long-term liabilities on our consolidated balance sheets and in income tax expense in our consolidated statements of income (loss).

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 of its subsidiaries located in jurisdictions where Corning lacks the ability to repatriate its earnings, (2) any of its 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, (5) any subsidiaries which have a positive earnings and profits balance but for which the entity lacks sufficient local statutory earnings or stock basis from which to make a distribution, and (6) future distribution would trigger a significant federal income inclusion to the U.S. shareholder.

A company can make a policy election to account for the tax on GILTI as a period cost or to recognize deferred tax assets and liabilities when basis differences exist that are expected to affect the amount of GILTI inclusion upon reversal. Corning has elected to account for the GILTI provisions as a period cost.

Equity Method Investments

Our 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 if there is evidence of a loss in value of an equity investment. Factors we consider include:

- Absence of our ability to recover the carrying amount;
- Inability of the equity affiliate to sustain an earnings capacity which would justify the carrying amount of the investment; and
- Significant litigation, bankruptcy or other events that could impact recoverability.

For an equity investment with impairment indicators, we measure fair value on the basis of discounted cash flows or other appropriate valuation methods, depending on the nature of the company involved. If it is probable that we will not recover the carrying amount of our investment, the impairment is considered other-than-temporary and recorded in earnings, and the equity investment balance is reduced to its fair value accordingly. Consequently, adjustments for asset recoverability are included in equity earnings. We require our material equity method affiliates to provide audited financial statements. We also utilize these financial statements in our recoverability assessment.

Fair Value of Financial Instruments

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 we do not have significant 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, we consider the principal or most advantageous market in which we would transact and consider assumptions that market participants would use when pricing the asset or liability, such as inherent risk, transfer restrictions, and risk of non-performance.

Derivative Instruments

We participate in a variety of foreign exchange forward contracts and foreign exchange option contracts entered into in connection with the management of our exposure to fluctuations in foreign exchange rates. We utilize interest rate swaps 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. These financial exposures are managed in accordance with corporate policies and procedures.

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

New Accounting Standards

In June 2016, the FASB issued ASU 2016-13, Financial Instruments - Credit Losses (Topic 326). The ASU introduces a new accounting model, the Current Expected Credit Losses model (CECL), which requires earlier recognition of credit losses and additional disclosures related to credit risk. The CECL model utilizes a lifetime expected credit loss measurement objective for the recognition of credit losses at the time the financial asset is originated or acquired. ASU 2016-13 is effective for annual period beginning after December 15, 2019, including interim reporting periods within those annual reporting periods. 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, 2020.

2. Revenue

Product Revenue (Point in Time)

Most of our revenues are generated by delivery of products to our customers and recognized at a point in time based on our evaluation of when the customer obtains control of the products. Revenue is recognized 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.

Revenue is measured as the amount of consideration we expect to receive in exchange for transferring goods or providing services. Sales tax, value-added tax, and other taxes we collect concurrent 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 we have offered product warranties, we also establish liabilities 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, 2019 and 2018.

Our revenues by product category are as follows (in millions):

	Years ended December 31,		
	2019	2018	2017
Display products	\$ 3,180	\$ 3,168	\$ 2,997
Telecommunication products	4,064	4,192	3,545
Specialty glass products	1,594	1,479	1,403
Environmental substrate and filter products	1,440	1,289	1,106
Life science products	995	946	879
All Other	230	216	186
Total Revenue	\$ 11,503	\$ 11,290	\$ 10,116
Constant-currency adjustment ⁽¹⁾	153	108	142
Net sales of reportable segments and All Other	\$ 11,656	\$ 11,398	\$ 10,258

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

Other Revenue (Over Time)

Corning's over time revenues are mainly related to Telecommunications products, and are 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 follows satisfaction of the performance obligations. Corning's other revenue is inconsequential to our results.

Revenue Disaggregation Table

The following table shows revenues by major product categories, similar to our 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 inconsequential number of Telecommunications products, our product category revenues are recognized at point in time when control transfers to the customer. Revenue recognized in the years ended December 31, 2019 and 2018, is presented based on ASC 606. Amounts for the year ended December 31, 2017 are presented under the ASC 605 basis of revenue recognition.

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 our products and their respective manufacturing processes.

Contract liabilities include deferred revenues, other advanced payments and customer deposits. Deferred revenue and other advanced payments are not significant to our operations and are classified as part of other accrued liabilities in our financial statements. Customer deposits are predominately related to Display products and are classified as part of other accrued liabilities and other liabilities as appropriate, and are disclosed below.

Customer Deposits

As of December 31, 2019 and 2018, Corning had customer deposits of approximately \$1.0 billion. The majority of these were non-refundable cash deposits for customers to secure rights to an amount of glass produced by Corning under long-term supply agreements. The duration of these long-term supply agreements ranges up to 10 years. As glass is

shipped to customers, Corning will recognize revenue and issue credit memoranda to reduce the amount of the customer deposit liability, which are applied against customer receivables resulting from the sale of glass. In the year ended December 31, 2019, a credit memorandum of \$37 million was issued; no such memorandums were issued in 2018. As of December 31, 2019 and 2018, \$927 million and \$922 million were recorded as other long-term liabilities, respectively. The remaining \$104 million and \$54 million, respectively, were classified as other current liabilities.

Practical Expedients and Exemptions

We do not disclose the value of unsatisfied performance obligations for (i) contracts with an original expected length of one year or less and (ii) contracts for which we recognize revenue at the amount to which we have the right to invoice for services performed.

We treat shipping and handling fees as fulfillment costs and not as separate performance obligations under the terms of our revenue contracts due to the perfunctory nature of the shipping and handling obligations.

Significant Customers

For 2019, 2018 and 2017, no customer met or exceeded 10% of Corning's consolidated net sales.

3. Inventories, Net of Inventory Reserves

Inventories, net of inventory reserves comprise the following (in millions):

	December 31,	
	2019	2018
Finished goods	\$ 973	\$ 854
Work in process	421	386
Raw materials and accessories	481	409
Supplies and packing materials	445	388
Total inventories, net of inventory reserves	\$ 2,320	\$ 2,037

4. Leases

We have operating and finance leases for real estate, vehicles, and equipment.

We incurred lease expense in the amount of \$171 million for the year ended December 31, 2019. Operating and Financing lease costs were \$148 million and \$23 million, respectively, for the year ended December 31, 2019. Short-term rental expense, for agreements less than one year in duration, was immaterial. Financing lease cost is comprised of expenses for depreciation of right-of-use assets and interest on lease liabilities, and these expenses were not material for the year ended December 31, 2019.

Cash paid for amounts included in the measurement of lease liabilities totaled \$123 million for the year ended December 31, 2019. Operating cash outflows for operating leases were \$105 million. Cash payments for finance leases were \$18 million, comprised of \$6 million and \$12 million of principal and interest payments, respectively.

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

	December 31, 2019
Operating Leases	
Operating lease right-of-use assets, net ⁽¹⁾	\$ 504
Other current liabilities	\$ 62
Operating lease liabilities ⁽²⁾	450
Total operating lease liabilities	\$ 512
Finance Leases	
Property and equipment, at cost	\$ 294
Accumulated depreciation	(52)
Property and equipment, net	\$ 242
Current portion of long-term debt	\$ 9
Long-term debt	271
Total finance lease liabilities	\$ 280

(1) Included in other assets.

(2) Included in other liabilities.

The weighted average remaining lease terms for operating and financing leases are 12.5 years and 10.9 years, respectively. The weighted average discount rates for operating and financing leases are 4.1% and 5.5%, respectively.

As of December 31, 2019, maturities of lease liabilities under the new lease standard are as follows (in millions):

	2020	2021	2022	2023	2024	After 2024	Gross Total	Imputed Discount	Total
Operating Leases	\$ 98	\$ 81	\$ 72	\$ 64	\$ 52	\$ 388	\$ 755	\$ (243)	\$ 512
Financing Leases	19	19	21	145	21	168	393	(113)	280

As of December 31, 2018, maturities of lease liabilities under the previous lease standard were as follows (in millions):

	Total	Less than 1 year	1 to 3 years	3 to 5 years	5 years and thereafter
Capital leases and financing obligations	\$ 393	\$ 4	\$ 11	\$ 132	\$ 246
Imputed interest on capital leases and financing obligations	205	20	38	37	110
Minimum rental commitments	581	82	133	111	255

Total rental expense for operating leases was \$156 million and \$135 million for 2018 and 2017, respectively.

As of December 31, 2019, we have additional operating leases, primarily for new production facilities and equipment, that have not yet commenced or been recorded, of approximately \$260 million on an undiscounted basis. These operating leases will commence between fiscal year 2020 and fiscal year 2021 with lease terms of 10 years to 20 years.

5. Income Taxes

Income before income taxes follows (in millions):

	Years ended December 31,		
	2019	2018	2017
U.S. companies	\$ 504	\$ 472	\$ 653
Non-U.S. companies	712	1,031	1,004
Income before income taxes	\$ 1,216	\$ 1,503	\$ 1,657

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

	Years ended December 31,		
	2019	2018	2017
Current:			
Federal	\$ (82)	\$ (256)	\$ (20)
State and municipal	(12)	(22)	(21)
Foreign	(354)	(196)	(317)
Deferred:			
Federal	64	(34)	(1,617)
State and municipal	13	4	(109)
Foreign	115	67	(70)
Provision for income taxes	\$ (256)	\$ (437)	\$ (2,154)

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

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

	Years ended December 31,		
	2019	2018	2017
Statutory U.S. income tax rate	21.0%	21.0%	35.0%
State income tax, net of federal effect	0.6	0.9	0.8
Global intangible low-taxed income ⁽¹⁾	1.2	3.6	
Foreign derived intangible income ⁽¹⁾	(8.5)	(0.6)	
Repatriation tax on accumulated previously untaxed foreign earnings		(1.2)	67.4
Remeasurement of deferred tax assets and liabilities	(0.6)	(0.1)	21.0
Impact of foreign earnings	5.4	(2.3)	(3.9)
IRS settlements & change in reserve	8.5	11.5	
Valuation allowance	(3.7)	(3.8)	6.8
Tax credit ⁽¹⁾	(2.8)	(0.7)	(0.4)
Non-deductible expenses	2.1		
Other items, net	(2.1)	0.8	3.3
Effective income tax rate	21.1%	29.1%	130.0%

(1) Including a change in estimate from prior year.

Generally, Corning will indefinitely reinvest the foreign earnings of: (1) any of its subsidiaries located in jurisdictions where Corning lacks the ability to repatriate its earnings, (2) any of its 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, (5) any subsidiaries which have a positive earnings and profits balance but for which the entity lacks sufficient local statutory earnings or stock basis from which to make a distribution, and (6) future distribution would trigger a significant federal income inclusion to the U.S. shareholder.

During 2019, the Company distributed approximately \$424 million from foreign subsidiaries to their respective U.S. parent companies. As of December 31, 2019, Corning has approximately \$2.5 billion of indefinitely reinvested foreign earnings. It remains impracticable to calculate the tax cost of repatriating our 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,	
	2019	2018
Loss and tax credit carryforwards	\$ 388	\$ 479
Other assets	345	45
Asset impairments and restructuring reserves	30	33
Postretirement medical and life benefits	168	162
Other accrued liabilities	218	265
Other employee benefits	345	289
Gross deferred tax assets	1,494	1,273
Valuation allowances	(215)	(317)
Total deferred tax assets	1,279	956
Intangible and other assets	(110)	(96)
Fixed assets	(216)	(256)
Financing leases	(121)	
Total deferred tax liabilities	(447)	(352)
Net deferred tax assets	\$ 832	\$ 604

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

	December 31,	
	2019	2018
Deferred tax assets	\$ 1,157	\$ 951
Other liabilities	(325)	(347)
Net deferred tax assets	\$ 832	\$ 604

Details on deferred tax assets for loss and tax credit carryforwards at December 31, 2019 are as follows (in millions):

	Amount	Expiration			
		2019-2023	2024-2028	2029-2038	Indefinite
Net operating losses	\$ 340	\$ 137	\$ 30	\$ 28	\$ 145
Tax credits	48		24	19	5
Totals as of December 31, 2019	\$ 388	\$ 137	\$ 54	\$ 47	\$ 150

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

	2019	2018	2017
Balance at January 1	\$ 435	\$ 252	\$ 243
Additions based on tax positions related to the current year	3	204	1
Additions for tax positions of prior years	2		13
Reductions for tax positions of prior years		(10)	
Settlements and lapse of statute of limitations		(378)	(11)
Balance at December 31	\$ 62	\$ 435	\$ 252

During the year, Corning finalized agreements with various tax authorities, including the Internal Revenue Service ("IRS") to resolve its 2013-2014 audit (which was preliminarily agreed to in 2018). These agreements resulted in Corning reclassifying certain reserves from tax reserve liability to income tax payable and releasing certain tax reserves. The net impact of these was a \$378 million reduction to the tabular roll-forward.

Included in the balance at December 31, 2019, 2018 and 2017 are \$35 million, \$263 million and \$97 million, respectively, of unrecognized tax benefits that would impact our effective tax rate if recognized.

We recognize accrued interest and penalties associated with uncertain tax positions as part of tax expense. For the years ended December 31, 2019, 2018 and 2017 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 within which we operate. We believe we have provided adequate contingent reserves for these matters. However, if upon conclusion of these matters, the ultimate determination of taxes owed is for an amount materially different than our current reserves, our overall tax expense and effective tax rate could be materially impacted in the period of adjustment. As of December 31, 2019, 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. We do not expect any material proposed adjustments from any of these audits.

Our foreign subsidiaries file income tax returns in the countries in which they have operations. 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 (2013) and South Korea (2013).

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. We believe that it is more likely than not that we will prevail in the appeal process, and as a result we have recorded a non-current receivable of \$415 million as of December 31, 2019 for the amount on deposit with the South Korean government. In the fourth quarter of 2019, we received a refund of \$38 million from the South Korean government related to tax years 2006 to 2009. As of December 31, 2019, we have also recorded a current receivable of \$33 million for an amount refunded in January 2020 related to the same issue for tax year 2015.

6. Investments

Investments are comprised of the following (in millions):

	Ownership interest	December 31,	
		2019	2018
Affiliated companies accounted for by the equity method ⁽¹⁾⁽²⁾	20% to 50%	\$ 291	\$ 354
Other investments		43	22
Subtotal Investment Assets		\$ 334	\$ 376
Affiliated companies accounted for by the equity method - HSG ⁽¹⁾⁽²⁾	50%	\$ 270	
Subtotal Investment Liabilities		\$ 270	

(1) Amounts reflect Corning's direct ownership interest in the affiliated companies at December 31, 2019 and 2018. Corning does not control these entities.

(2) Hemlock Semiconductor LLC and Hemlock Semiconductor Operations LLC, of which Corning has 49.9% and 40.25% ownership, respectively, are recorded as equity method investments and are affiliated companies of HSG. At December 31, 2019, the negative carrying value of Corning's investment in HSG was \$270 million and recorded in Other Liabilities. At December 31, 2018, the carrying value of the investment in HSG was \$42 million and recorded in Investments.

Affiliated Companies at Equity Method

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

	2019	2018	2017
Statement of operations:			
Net sales	\$ 1,508	\$ 1,759	\$ 2,346
Gross profit	\$ 79	\$ 424	\$ 560
Net (loss) income	\$ (102)	\$ 835	\$ 750
Net income attributable to the affiliated companies	\$ 70	\$ 798	\$ 721
Corning's equity in earnings of affiliated companies	\$ 17	\$ 390	\$ 361
Related party transactions:			
Corning sales to affiliated companies	\$ 277	\$ 184	\$ 108
Corning purchases from affiliated companies	\$ 12	\$ 11	\$ 12
Corning transfers of assets, at cost, to affiliated companies	\$ 8	\$ 2	\$ 22
Dividends received from affiliated companies	\$ 106	\$ 241	\$ 201
Intercompany sales within HSG (included in net sales)	\$ 112	\$ 206	\$ 312

	2019	2018
Balance sheet:		
Current assets	\$ 1,566	\$ 1,716
Noncurrent assets	\$ 943	\$ 1,922
Short-term borrowings, including current portion of long-term debt	\$ 4	\$ 8
Other current liabilities	\$ 632	\$ 810
Long-term debt	\$ 68	\$ 14
Other long-term liabilities	\$ 1,522	\$ 1,708
Non-controlling interest	\$ 42	\$ 259
Related party transactions:		
Balances due from affiliated companies	\$ 42	\$ 95
Balances due to affiliated companies	\$ 4	
Intercompany receivables and payables within HSG (included in current assets and other current liabilities)	\$ 15	\$ 39

As of December 31, 2019 and 2018, the undistributed earnings of equity companies included in our 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 holds a 49.9% interest in Hemlock Semiconductor LLC and a 40.25% interest in Hemlock Semiconductor Operations LLC which are recorded as equity method investments of Corning and are affiliated companies of HSG. HSG manufactures polysilicon products for the semiconductor and solar industries. HSG’s solar business primarily serves the solar power panel industry.

In prior years, HSG’s solar and semiconductor customers entered into long-term “take or pay” contracts which included up-front cash payments to secure capacity. During the last few years, and more significantly in 2019, the solar power panel industry experienced significant over-capacity in the market, resulting in declining sales volumes and market prices. As a result, HSG’s solar business experienced lower market penetration, overall price declines, and settled contracts with customers that had committed volume and fixed pricing above the current market price. While these settlements positively impacted HSG’s cash flow in 2019, they reduced expectations for future sales in HSG’s solar business.

Due to the adverse change in HSG’s solar business, HSG was required to assess the recoverability of its long-lived assets in the fourth quarter. Based on this assessment, HSG determined that the carrying values of HSG’s solar asset group significantly exceeded its fair values. HSG engaged a third-party appraiser to assist in determining the fair value of the assets within in the solar asset group based on the highest and best use of the asset group. As a result of the fair value determination, HSG recognized a pre-tax asset impairment charge of \$916 million for the year ended December 31, 2019. Corning’s share of the pre-tax impairment was \$369 million.

Due to the adverse changes above, the carrying values of HSG’s solar business inventories were also affected resulting in an inventory write-down of \$257 million for the year. Corning’s pre-tax share of the provision was \$105 million.

HSG adopted the new revenue standard on January 1, 2019 and the timing of HSG’s revenue recognition for certain remaining performance obligations measured at January 1, 2019 was deferred for recognition. This deferral reduced the carrying amount of Corning’s investment in HSG by \$239 million. During the fourth quarter, a significant number of the performance obligations were satisfied and \$434 million was recognized into HSG’s net income. Corning’s share of the equity earnings was \$208 million.

In addition, HSG settled certain revenue contracts in the fourth quarter, resulting in settlement gains of \$383 million in net income. Corning’s share of the settlement gains was \$185 million.

HSG information is presented below as of December 31 for each respective year (in millions):

	2019	2018	2017
Statement of operations:			
Net sales	\$ 779	\$ 1,158	\$ 1,716
Gross profit	\$ 9	\$ 367	\$ 469
Net (loss) income	\$ (117)	\$ 814	\$ 746
Net income attributable to HSG	\$ 54	\$ 776	\$ 706
Corning's equity in earnings of affiliated companies	\$ 27	\$ 388	\$ 352
Related party transactions:			
Dividends received from affiliated companies	\$ 100	\$ 241	\$ 196
Intercompany sales within HSG (included in net sales)	\$ 112	\$ 206	\$ 312

	2019	2018
Balance sheet:		
Current assets	\$ 1,011	\$ 1,188
Noncurrent assets	\$ 420	\$ 1,414
Short-term borrowings, including current portion of long-term debt	\$ 3	\$ 3
Other current liabilities	\$ 412	\$ 540
Long-term debt	\$ 8	\$ 11
Other long-term liabilities	\$ 1,507	\$ 1,708
Non-controlling interest	\$ 42	\$ 259
Related party transactions:		
Intercompany receivables and payables within HSG (included in current assets and other current liabilities)	\$ 15	\$ 39

7. Acquisitions

There were no material acquisitions completed in 2019.

During 2018, Corning acquired substantially all of CMD in two cash transactions totaling \$841 million. Corning acquired a manufacturing facility and a business, which designs, manufactures and markets high bandwidth and optical fiber products. The acquisition was accounted for as a business combination.

A summary of the allocation of the total purchase price to the net tangible and other intangible assets acquired, with the remainder recorded as goodwill based on fair value is as follows (in millions):

Property, plant and equipment	\$ 32
Other intangible assets	525
Other net assets	13
Total identified net assets	570
Purchase consideration	841
Goodwill⁽¹⁾⁽²⁾	\$ 271

(1) Amounts reflect measurement period adjustments.

(2) The goodwill recognized is deductible for U.S. income tax purposes. The goodwill was allocated to the Optical Communications segment.

Goodwill is related to the value of CMD's product and customer portfolio and its combination with Corning's existing optical communications platform, as well as synergies and other intangibles that do not qualify for separate recognition. Other intangible assets consist primarily of \$434 million of customer relationships and \$91 million of other intangibles that are amortized over the weighted average useful life of approximately 14 and 11 years, respectively. Acquisition-related costs of \$18 million for the year ended December 31, 2018, included costs for legal,

accounting, valuation and other professional services and were included in selling, general and administrative expense in the consolidated statements of income (loss). Supplemental pro forma information was not provided because the acquisition was not material to Corning's consolidated financial statements.

There were no material acquisitions completed in 2017.

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

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

	December 31,	
	2019	2018
Land	\$ 452	\$ 467
Buildings	6,023	5,924
Equipment	19,100	18,078
Construction in progress	2,757	2,358
Subtotal	28,332	26,827
Accumulated depreciation	(12,995)	(11,932)
Total	\$ 15,337	\$ 14,895

Approximately \$54 million, \$49 million and \$36 million of interest costs were capitalized as part of property, plant and equipment, net of accumulated depreciation, in 2019, 2018 and 2017, respectively.

Manufacturing equipment includes certain components of production equipment that are constructed of precious metals. At December 31, 2019 and 2018, the recorded value of precious metals totaled \$3 billion in each period. Depletion expense for precious metals in the years ended December 31, 2019, 2018 and 2017 was \$16 million, \$14 million and \$13 million, respectively.

9. Goodwill and Other Intangible Assets

Goodwill

Changes in the carrying amount of goodwill for the twelve months ended December 31, 2019 and 2018, were as follows (in millions):

	Display Technologies	Optical Communications	Specialty Materials	Life Sciences	All Other	Total
Balance at December 31, 2017	\$ 136	\$ 671	\$ 150	\$ 623	\$ 114	\$ 1,694
Acquired goodwill ⁽¹⁾		257		2		259
Measurement period adjustment		11				11
Foreign currency translation adjustment	(4)	(13)		(8)	(3)	(28)
Balance at December 31, 2018	\$ 132	\$ 926	\$ 150	\$ 617	\$ 111	\$ 1,936
Measurement period adjustment		3				3
Foreign currency translation adjustment	(3)	2		(1)	(2)	(4)
Balance at December 31, 2019	\$ 129	\$ 931	\$ 150	\$ 616	\$ 109	\$ 1,935

(1) The Company completed the acquisition of CMD in 2018.

Corning's gross goodwill balance and accumulated impairment losses were \$8.4 billion and \$6.5 billion, respectively, for the years ended December 31, 2019 and 2018. Accumulated impairment losses were generated primarily through goodwill impairments related to the Optical Communications segment.

Other Intangible Assets

Other intangible assets follow (in millions):

	December 31,					
	2019			2018		
	Gross	Accumulated amortization	Net	Gross	Accumulated amortization	Net
Amortized intangible assets:						
Patents, trademarks & trade names	\$ 469	\$ 228	\$ 241	\$ 465	\$ 203	\$ 262
Customer list and other	1,301	357	944	1,308	278	1,030
Total	\$ 1,770	\$ 585	\$ 1,185	\$ 1,773	\$ 481	\$ 1,292

Amortized intangible assets are primarily related to the Optical Communications and Life Sciences segments. The net carrying amount of intangible assets decreased by \$107 million during the year ended December 31, 2019, primarily due to acquisitions of \$9 million of patents and other intangible assets, offset by amortization of \$113 million and foreign currency translation and other adjustments of \$3 million.

Amortization expense related to all intangible assets is estimated to be \$113 million annually for 2020, \$113 million annually for 2021, \$111 million annually for 2022, \$110 million annually for 2023, and \$110 million annually for 2024.

10. Other Assets and Other Liabilities

Other assets follow (in millions):

	December 31,	
	2019	2018
Current assets:		
Derivative instruments (Note 15)	\$ 157	\$ 103
South Korean tax deposits	33	
Other current assets	683	599
Other current assets	\$ 873	\$ 702
Non-current assets:		
Derivative instruments (Note 15)	\$ 92	\$ 45
South Korean tax deposits	415	425
Operating leases (Note 4)	504	
Other non-current assets	476	551
Other assets	\$ 1,487	\$ 1,021

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. We believe that it is more likely than not that we will prevail in the appeal process, and

as a result we recorded a non-current receivable of \$415 million as of December 31, 2019 for the amount on deposit with the South Korean government. In the fourth quarter of 2019, we received a refund of \$38 million from the South Korean government related to tax years 2006 to 2009. As of December 31, 2019, we have also recorded a current receivable of \$33 million for an amount refunded in January 2020 related to the same issue for tax year 2015.

Other liabilities follow (in millions):

	December 31,	
	2019	2018
Current liabilities:		
Wages and employee benefits	\$ 565	\$ 642
Income taxes	182	169
Derivative instruments (Note 15)	100	56
Asbestos and other litigation	57	113
Customer deposits (Note 2)	104	54
Short-term leases (Note 4)	62	
Other current liabilities	853	817
Other accrued liabilities	\$ 1,923	\$ 1,851
Non-current liabilities:		
Defined benefit pension plan liabilities	\$ 980	\$ 831
Derivative instruments (Note 15)	165	386
Asbestos and other litigation	196	279
Investment in Hemlock Semiconductor Group ⁽¹⁾	270	
Customer deposits (Note 2)	927	922
Deferred tax liabilities	325	347
Long-term leases (Note 4)	450	
Other non-current liabilities	667	887
Other liabilities	\$ 3,980	\$ 3,652

(1) The negative carrying value resulted from a one-time charge to this entity in 2019 for the impairment of certain assets. Refer to Note 6 (Investments) to the consolidated financial statements for additional information.

11. Debt

(In millions)	December 31,	
	2019	2018
Current portion of long-term debt	\$ 11	\$ 4
Long-term debt		
Debtors, 4.25%, due 2020		\$ 291
Debtors, 8.875%, due 2021	\$ 64	65
Debtors, 2.90%, due 2022	374	373
Debtors, 3.70%, due 2023	249	249
Medium-term notes, average rate 7.66%, due through 2023	45	45
Debtors, 7.00%, due 2024	100	100
Debtors, 3.9%, due 2049	395	
Debtors, 5.45%, due 2079	1,085	
Yen-denominated Debtors, 0.698%, due 2024	192	191
Yen-denominated Debtors, 0.722%, due 2025	91	90
Yen-denominated Debtors, 0.992%, due 2027	430	426
Yen-denominated Debtors, 1.043%, due 2028	278	276
Yen-denominated Debtors, 1.153%, due 2031	285	
Yen-denominated Debtors, 1.513%, due 2039	54	
Debtors, 6.85%, due 2029	163	164
Yen-denominated Debtors, 1.219%, due 2030	227	226
Debtors, callable, 7.25%, due 2036	249	248
Debtors, 4.70%, due 2037	295	295
Yen-denominated Debtors, 1.583%, due 2037	91	91
Debtors, 5.75%, due 2040	395	395
Debtors, 4.75%, due 2042	496	496
Debtors, 5.35%, due 2048	543	543
Debtors, 4.375%, due 2057	742	742
Debtors, 5.85%, due 2068	296	296
Financing Leases, average discount rate 5.47%, due through 2044	280	
Other, average rate 4.27%, due through 2043	321	396
Total long-term debt	7,740	5,998
Less current portion of long-term debt	11	4
Long-term debt	\$ 7,729	\$ 5,994

Corning did not have outstanding commercial paper at December 31, 2019 and 2018.

In the third quarter of 2018, Corning amended and restated its revolving credit agreement (the "Revolving Credit Agreement"). The Revolving Credit Agreement provides a committed \$1.5 billion unsecured multi-currency line of credit and expires August 15, 2023. At December 31, 2019, there were no outstanding amounts under the Revolving Credit Agreement.

The following table shows debt maturities by year at December 31, 2019 (in millions)*:

2020	2021	2022	2023	2024	Thereafter
\$ 11	\$ 77	\$ 390	\$ 432	\$ 316	\$ 6,569

* Excludes interest rate swap gains, bond discounts and deferred expenses.

Based on borrowing rates currently available to us for loans with similar terms and maturities, the fair value of long-term debt was \$8.5 billion and \$6.0 billion at December 31, 2019 and 2018, 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.

Debt Issuances and Retirements

2019

In the third quarter of 2019, Corning issued two Japanese yen-denominated debt securities (the “Notes”), as follows:

- ¥31.3 billion 1.153% senior unsecured notes with a maturity of 12 years; and
- ¥5.9 billion 1.513% senior unsecured notes with a maturity of 20 years.

The proceeds from the Notes were received in Japanese yen and converted to U.S. dollars on the date of issuance. The net proceeds received in U.S. dollars, after deducting offering expenses, were approximately \$349 million and will be used for general corporate purposes. Payments of principal and interest on the Notes will be in Japanese yen, or should yen be unavailable due to circumstances beyond Corning’s control, a U.S. dollar equivalent.

In the fourth quarter of 2019, Corning issued two U.S. dollar-denominated debt securities (the “Notes”), as follows:

- \$400 million 3.90% senior unsecured notes with a maturity of 30 years; and
- \$1.1 billion 5.45% senior unsecured notes with a maturity of 60 years.

The net proceeds, after deducting offering expenses, were approximately \$1.5 billion and will be used for general corporate purposes. We can redeem these notes at any time, subject to certain terms and conditions.

In the fourth quarter of 2019, Corning redeemed \$300 million of 4.25% notes due in 2020, paying a premium of \$4.7 million by exercising our make-whole call. The bond redemption resulted in an \$8.4 million loss during the same quarter.

2018

In the second quarter of 2018, Corning issued three Japanese yen-denominated debt securities (the “Notes”), as follows:

- ¥10 billion 0.722% senior unsecured notes with a maturity of 7 years;

- ¥30.5 billion 1.043% senior unsecured notes with a maturity of 10 years; and
- ¥25 billion 1.219% senior unsecured notes with a maturity of 12 years.

The proceeds from the Notes were received in Japanese yen and converted to U.S. dollars on the date of issuance. The net proceeds received in U.S. dollars, after deducting offering expenses, were \$596 million. Payments of principal and interest on the Notes will be in Japanese yen, or should yen be unavailable due to circumstances beyond Corning’s control, a U.S. dollar equivalent. The net proceeds of \$596 million will be used for general corporate purposes.

In the fourth quarter of 2018, Corning issued three unsecured long-term notes as follows:

- \$50 million 4.70% senior unsecured notes with a maturity of 19 years;
- \$550 million 5.35% senior unsecured notes with a maturity of 30 years; and
- \$300 million 5.85% senior unsecured notes with a maturity of 50 years.

The net proceeds of \$889 million will be used for general corporate purposes. We can redeem these notes at any time, subject to certain terms and conditions.

In the fourth quarter of 2018, Corning redeemed \$250 million of 6.625% Notes due in 2019, paying a nominal call premium. The bond redemption incurred an insignificant loss during the fourth quarter of 2018.

On a quarterly basis, Corning will recognize the transaction gains and losses resulting from changes in the JPY/USD exchange rate in the Other expense, net line of the consolidated statements of income (loss). Cash proceeds from the offerings and payments for debt issuance costs are disclosed as financing activities, and cash payments to bondholders for interest will be disclosed as operating activities, in the consolidated statements of cash flows.

12. Employee Retirement Plans

Defined Benefit Plans

We have defined benefit pension plans covering certain domestic and international employees. Our funding policy has been to contribute, as necessary, an amount exceeding the minimum requirements in order to achieve the Company’s long-term funding targets. In 2019, we made no voluntary contributions to our domestic defined benefit pension plan and cash contributions of \$2 million to our international pension plans. In 2018, we made voluntary cash contributions to our domestic defined benefit pension plan and our international pension plans in the amount of \$105 million and \$12 million, respectively. During 2020, we anticipate making cash contributions of \$85 million to our U.S. qualified pension plan and \$54 million to our 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. For current retirees (including surviving spouses) and active employees eligible for the salaried retiree medical program, we have placed a “cap” on the amount we will contribute toward retiree medical coverage in the future. The cap is equal to 120% of our 2005 contributions toward retiree medical benefits. Once our 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.

Obligations and Funded Status

The change in benefit obligation and funded status of our employee retirement plans are as follows (in millions):

December 31,	Total pension benefits		Domestic pension benefits		International pension benefits	
	2019	2018	2019	2018	2019	2018
Change in benefit obligation						
Benefit obligation at beginning of year	\$ 4,003	\$ 4,188	\$ 3,358	\$ 3,522	\$ 645	\$ 666
Service cost	101	103	76	78	25	25
Interest cost	148	132	133	116	15	16
Plan participants' contributions	1	1	1	1		
Plan amendments		21		20		1
Actuarial loss (gain)	533	(210)	462	(200)	71	(10)
Other	6	(1)	6			(1)
Benefits paid	(214)	(202)	(180)	(179)	(34)	(23)
Foreign currency translation	3	(29)			3	(29)
Benefit obligation at end of year	\$ 4,581	\$ 4,003	\$ 3,856	\$ 3,358	\$ 725	\$ 645
Change in plan assets						
Fair value of plan assets at beginning of year	\$ 3,239	\$ 3,539	\$ 2,742	\$ 3,004	\$ 497	\$ 535
Actual gain (loss) on plan assets	615	(201)	576	(202)	39	1
Employer contributions	22	135	14	118	8	17
Plan participants' contributions	1	1	1	1		
Benefits paid	(214)	(208)	(180)	(179)	(34)	(29)
Foreign currency translation	8	(27)			8	(27)
Fair value of plan assets at end of year	\$ 3,671	\$ 3,239	\$ 3,153	\$ 2,742	\$ 518	\$ 497
Funded status at end of year						
Fair value of plan assets	\$ 3,671	\$ 3,239	\$ 3,153	\$ 2,742	\$ 518	\$ 497
Benefit obligations	(4,581)	(4,003)	(3,856)	(3,358)	(725)	(645)
Funded status of plans	\$ (910)	\$ (764)	\$ (703)	\$ (616)	\$ (207)	\$ (148)
Amounts recognized in the consolidated balance sheets consist of:						
Noncurrent asset	\$ 82	\$ 81			\$ 82	\$ 81
Current liability	(20)	(29)	\$ (13)	\$ (13)	(7)	(16)
Noncurrent liability	(972)	(816)	(690)	(603)	(282)	(213)
Recognized liability	\$ (910)	\$ (764)	\$ (703)	\$ (616)	\$ (207)	\$ (148)
Amounts recognized in accumulated other comprehensive income consist of:						
Net actuarial loss	\$ 338	\$ 338	\$ 306	\$ 324	\$ 32	\$ 14
Prior service cost (credit)	29	36	30	37	(1)	(1)
Amount recognized at end of year	\$ 367	\$ 374	\$ 336	\$ 361	\$ 31	\$ 13

The accumulated benefit obligation for defined benefit pension plans was \$4.3 billion and \$3.8 billion at December 31, 2019 and 2018, respectively.

December 31,	Postretirement benefits	
	2019	2018
Change in benefit obligation		
Benefit obligation at beginning of year	\$ 699	\$ 789
Service cost	9	10
Interest cost	27	24
Plan participants' contributions	8	8
Plan amendments	5	(40)
Actuarial loss (gain)	6	(48)
Other	1	
Benefits paid	(50)	(46)
Medicare subsidy received		2
Benefit obligation at end of year	\$ 705	\$ 699
Funded status at end of year		
Fair value of plan assets		
Benefit obligations	\$ (705)	\$ (699)
Funded status of plans	\$ (705)	\$ (699)
Amounts recognized in the consolidated balance sheets consist of:		
Current liability	\$ (34)	\$ (37)
Noncurrent liability	(671)	(662)
Recognized liability	\$ (705)	\$ (699)
Amounts recognized in accumulated other comprehensive income consist of:		
Net actuarial loss	\$ 28	\$ 21
Prior service credit	(32)	(44)
Amount recognized at end of year	\$ (4)	\$ (23)

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

	December 31,	
	2019	2018
Projected benefit obligation	\$ 4,298	\$ 3,754
Fair value of plan assets	\$ 3,305	\$ 2,910

In 2019 and 2018, the fair value of plan assets exceeded the projected benefit obligation for the United Kingdom pension plan.

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

	December 31,	
	2019	2018
Accumulated benefit obligation	\$ 3,904	\$ 3,410
Fair value of plan assets	\$ 3,178	\$ 2,766

In 2019, the fair value of plan assets exceeded the accumulated benefit obligation for the United Kingdom and South Korea pension plans. In 2018, the fair value of plan assets exceeded the accumulated benefit obligation for the United Kingdom, South Korea and one of the Taiwan pension plans.

The components of net periodic benefit cost for our employee retirement plans in the following tables (in millions):

December 31,	Total pension benefits			Domestic pension benefits			International pension benefits		
	2019	2018	2017	2019	2018	2017	2019	2018	2017
Service cost	\$ 101	\$ 103	\$ 92	\$ 76	\$ 78	\$ 66	\$ 25	\$ 25	\$ 26
Interest cost	148	132	126	133	116	112	15	16	14
Expected return on plan assets	(171)	(189)	(174)	(161)	(178)	(163)	(10)	(11)	(11)
Amortization of prior service cost (credit)	6	6	5	7	7	6	(1)	(1)	(1)
Recognition of actuarial loss	90	145	21	66	143	18	24	2	3
Total net periodic benefit expense	\$ 174	\$ 197	\$ 70	\$ 121	\$ 166	\$ 39	\$ 53	\$ 31	\$ 31
Settlement charge		(1)						(1)	
Special termination benefit charge	6			6					
Total expense	\$ 180	\$ 196	\$ 70	\$ 127	\$ 166	\$ 39	\$ 53	\$ 30	\$ 31
Other changes in plan assets and benefit obligations recognized in other comprehensive (income) loss:									
Settlements		\$ 1						\$ 1	
Current year actuarial loss (gain)	\$ 88	180	\$ (30)	\$ 47	\$ 182	\$ (8)	\$ 41	(2)	\$ (22)
Amortization of actuarial loss	(90)	(145)	(21)	(66)	(143)	(18)	(24)	(2)	(3)
Current year prior service cost		20			20				
Amortization of prior service (cost) credit	(6)	(6)	(5)	(7)	(7)	(6)	1	1	1
Total recognized in other comprehensive (income) loss	\$ (8)	\$ 50	\$ (56)	\$ (26)	\$ 52	\$ (32)	\$ 18	\$ (2)	\$ (24)

	Postretirement benefits		
	2019	2018	2017
Service cost	\$ 9	\$ 10	\$ 10
Interest cost	27	24	26
Amortization of net gain	(7)		(1)
Amortization of prior service credit		(7)	(3)
Recognition of actuarial gain	(1)		
Total net periodic benefit expense	\$ 28	\$ 27	\$ 32
Special termination benefit charge	1		
Total expense	\$ 29	\$ 27	\$ 32
Other changes in plan assets and benefit obligations recognized in other comprehensive loss (income):			
Current year actuarial loss (gain)	\$ 6	\$ (47)	\$ 17
Amortization of actuarial gain	1		1
Current year prior service cost (credit)	5	(40)	
Amortization of prior service credit	7	7	3
Total recognized in other comprehensive loss (income)	\$ 19	\$ (80)	\$ 21

The Company expects to recognize \$5 million of net prior service cost as a component of net periodic pension cost in 2020 for its defined benefit pension plans. The Company expects to recognize \$1 million of net actuarial loss and \$6 million of net prior service credit as components of net periodic postretirement benefit cost in 2020.

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 as well as 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 future plan benefits that are contingent upon participants' survival. To make this assumption, benefit plan sponsors typically use a base mortality table and an improvement scale that adjusts the rates of mortality for future anticipated changes to historical death rates.

Corning last updated the adjustment factors applied to its base mortality assumption (RP-2014 white collar table and RP-2014 blue collar table for non-union and union participants respectively) to value its U.S. benefit plan obligations as of December 31, 2017. In addition, Corning also updated to the MP-2017 projection scale at year-end 2017. As the Society of Actuaries publishes additional mortality improvement scales (i.e. MP-2019) and base mortality tables (i.e. Pri-2012), each year Corning has considered these revised schedules in setting its mortality assumptions. As of December 31, 2019, Corning decided to continue application of both its future improvement scale to the MP-2017 scale and base mortality assumptions to the RP-2014 tables.

Furthermore, Corning updated for the year ended 2017 the mortality assumption applied to disabled participants to be the RP-2014 disabled mortality base table with future improvements using MP-2017. These assumptions were unchanged for the year ended 2019.

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 at December 31 were as follows:

	Pension benefits						Postretirement benefits		
	Domestic			International			2019	2018	2017
	2019	2018	2017	2019	2018	2017			
Discount rate	3.28%	4.28%	3.58%	1.34%	1.96%	1.93%	3.41%	4.33%	3.63%
Rate of compensation increase	3.50%	3.50%	3.50%	2.96%	2.96%	2.81%			

The weighted-average assumptions used to determine net periodic benefit cost for years ended December 31 were as follows:

	Pension benefits						Postretirement benefits		
	Domestic			International			2019	2018	2017
	2019	2018	2017	2019	2018	2017			
Discount rate	4.28%	3.58%	4.01%	1.96%	1.93%	2.29%	4.33%	3.63%	4.06%
Expected return on plan assets	6.00%	6.00%	6.00%	2.01%	2.13%	3.97%			
Rate of compensation increase	3.50%	3.50%	3.50%	2.96%	2.81%	2.06%			

Expected long-term returns on plan assets is based on long-term expectations for future returns informed by historical data in conjunction with the investment policies further described within "Plan Assets" below. Reasonableness of the results is tested using models provided by the plan actuaries.

Assumed health care trend rates at December 31	2019	2018
Health care cost trend rate assumed for next year	6.75%	7.00%
Rate that the cost trend rate gradually declines to	5%	5%
Year that the rate reaches the ultimate trend rate	2027	2027

Assumed health care cost trend rates have a significant effect on the amounts reported for the health care plans. A one-percentage-point change in assumed health care cost trend rates would have the following effects (in millions):

	One-percentage-point increase	One-percentage-point decrease
Effect on annual total of service and interest cost (credit)	\$ 2	\$ (2)
Effect on postretirement benefit obligation	\$ 42	\$ (35)

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 for global equity investment is 20%-25% 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. The target allocation range for non-public investments in private equity and real estate is 5%-15%, and is used to enhance returns and offer additional asset diversification. The target allocation range for commodities is 0%-5%, which provides some inflation protection to the portfolio.

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 our domestic defined benefit plan assets:

(in millions)	December 31, 2019				December 31, 2018			
	Total	(Level 1)	(Level 2)	(Level 3)	Total	(Level 1)	(Level 2)	(Level 3)
Equity securities:								
U.S. companies	\$ 494	\$ 2	\$ 492		\$ 363	\$ 2	\$ 361	
International companies	387		387		324		324	
Fixed income:								
U.S. corporate bonds	2,017	226	1,791		1,626	183	1,443	
Private equity ⁽¹⁾	64			\$ 64	82			\$ 82
Real estate ⁽²⁾	145			145	148			148
Cash equivalents	46	46			199	199		
Total	\$ 3,153	\$ 274	\$ 2,670	\$ 209	\$ 2,742	\$ 384	\$ 2,128	\$ 230

(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 our international defined benefit plan assets:

(in millions)	December 31, 2019				December 31, 2018			
	Total	(Level 1)	(Level 2)	(Level 3)	Total	(Level 1)	(Level 2)	(Level 3)
Fixed income:								
International fixed income	\$ 455	\$ 373	\$ 82		\$ 428	\$ 361	\$ 67	
Insurance contracts	2			\$ 2	2			\$ 2
Mortgages	21			21	22			22
Cash equivalents	40	40			45	45		
Total	\$ 518	\$ 413	\$ 82	\$ 23	\$ 497	\$ 406	\$ 67	\$ 24

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, 2017	\$ 105	\$ 147	\$ 16	\$ 2
Actual return on plan assets relating to assets still held at the reporting date	15	9		
Transfers in or out of level 3	(38)	(8)	6	
Balance at December 31, 2018	\$ 82	\$ 148	\$ 22	\$ 2
Actual return on plan assets relating to assets still held at the reporting date		2		
Transfers in or out of level 3	(18)	(5)	(1)	
Balance at December 31, 2019	\$ 64	\$ 145	\$ 21	\$ 2

Credit Risk

64% of domestic plan assets are invested in long duration bonds. The average rating for these bonds is A-. These bonds are subject to credit risk, such that a decline in credit ratings for the underlying companies, countries or assets (for asset-backed securities) would result in a decline in the value of the bonds. These bonds are also subject to default risk.

Currency Risk

12% 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

7% 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, 2019 and 2018, 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 our 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
2020	\$ 207	\$ 25	\$ 34
2021	\$ 214	\$ 33	\$ 37
2022	\$ 223	\$ 30	\$ 37
2023	\$ 233	\$ 30	\$ 37
2024	\$ 239	\$ 34	\$ 37
2025-2029	\$ 1,299	\$ 210	\$ 190

Other Benefit Plans

We offer defined contribution plans covering employees meeting certain eligibility requirements. Total consolidated defined contribution plan expense was \$108 million, \$67 million and \$60 million for the years ended December 31, 2019, 2018 and 2017, respectively.

13. Commitments, Contingencies and Guarantees

The amounts of our obligations follow (in millions):

	Amount of commitment and contingency expiration per period				
	Total	Less than 1 year	1 to 3 years	3 to 5 years	5 years and thereafter
Performance bonds and guarantees	\$ 163	\$ 30	\$ 4	\$ 1	\$ 128
Stand-by letters of credit ⁽¹⁾	43	31	8	3	1
Subtotal of commitment expirations per period	\$ 206	\$ 61	\$ 12	\$ 4	\$ 129
Purchase obligations ⁽²⁾	\$ 554	\$ 190	\$ 199	\$ 75	\$ 90
Capital expenditure obligations ⁽³⁾	592	592			
Total debt ⁽⁴⁾	7,195		437	588	6,170
Finance leases and financing obligations	600	11	30	160	399
Interest on long-term debt ⁽⁵⁾	8,948	298	583	543	7,524
Imputed interest on finance leases and financing obligations	296	27	53	43	173
Operating Lease Obligations	755	98	153	116	388
Uncertain tax positions ⁽⁶⁾	58				
Subtotal of contractual obligation payments due by period ⁽⁶⁾	\$ 18,998	\$ 1,216	\$ 1,455	\$ 1,525	\$ 14,744
Total commitments and contingencies⁽⁶⁾	\$ 19,204	\$ 1,277	\$ 1,467	\$ 1,529	\$ 14,873

(1) At December 31, 2019, we had stand-by letters of credit commitments of \$82 million; \$39 million was included in other accrued liabilities on our 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 our capital expansion activities.

(4) Total debt above is 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, 2019, \$58 million was included on our consolidated balance sheets related to uncertain tax positions.

We are 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 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. We believe a significant majority of these guarantees and contingent liabilities will expire without being funded.

Product warranty liability accruals at December 31, 2019 and 2018 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, 2019, 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 we have 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.

Asbestos Claims

Corning and PPG Industries, Inc. each owned 50% of the capital stock of Pittsburgh Corning Corporation ("PCC"). PCC filed for Chapter 11 reorganization in 2000 and the Modified Third Amended Plan of Reorganization for PCC (the "Plan") became effective in April 2016. At December 31, 2016, the Company's liability under the Plan was \$290 million, which is required to be paid through a series of fixed payments beginning in the second quarter of 2017. Payments of \$50 million and \$35 million were made in June 2019 and June 2018, respectively. The total amount of remaining payments due in years 2020 through 2023 is \$135 million, of which \$35 million will be paid in the second quarter of 2020 and is classified as a current liability. The remaining \$100 million is classified as a non-current liability.

Non-PCC Asbestos Claims

Corning is a defendant in certain cases alleging injuries from asbestos unrelated to PCC (the "non-PCC asbestos claims") which had been stayed pending the confirmation of the Plan. The stay was lifted on August 25, 2016. At December 31, 2019 and 2018, the amount of the reserve for these non-PCC asbestos claims was estimated to be \$98 million and \$146 million, respectively. The change in reserve reflects post-stay claim experience and a reduction in expected defense costs. The reserve balance as of December 31, 2019 represents the undiscounted projection of claims and related legal fees for the estimated life of the litigation.

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 Corning 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 also 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 Corning for up to 50% of the excess liability, subject to certain conditions and limits. As of December 31, 2019, Dow Corning had recorded a reserve for breast implant litigation of \$165 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 Corning formally notified Corning of certain environmental matters for which Dow Corning asserts that it has or will experience losses arising from remediation and response at a number of sites. In the event Dow Corning is liable for these claims, Corning may be required to indemnify Dow Corning for up to 50% of that liability, subject to certain conditions and limits. As of December 31, 2019, the Company cannot estimate the fair value of the indemnification owed to Dow Corning, if any.

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, 2019 and 2018, Corning had accrued approximately \$41 million (undiscounted) and \$30 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.

14. Hedging Activities

Corning is exposed to interest rate and foreign currency risks due to the movement of these rates.

The areas in which exchange rate fluctuations affect us include:

- Financial instruments and transactions denominated in foreign currencies, which impact earnings; and
- The translation of net assets in foreign subsidiaries for which the functional currency is not the U.S. dollar, which impacts our net equity.

Our most significant foreign currency exposures relate to the Japanese yen, South Korean won, new Taiwan dollar, Chinese yuan, the euro and British pound. 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 hedge expirations coincide 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 our portfolio with a diverse group of highly-rated major financial institutions. 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. The Company qualified for and elected the end-user exception to the mandatory swap clearing requirement of the Dodd-Frank Act.

Cash Flow Hedges

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 customers and purchases from suppliers. The total gross notional values for foreign currency cash flow hedges are \$2.1 billion and \$0.4 billion at December 31, 2019 and 2018, respectively. The majority of our foreign exchange forward contracts hedge a portion of the Company's exposure to the Japanese yen denominated sales with maturities spanning the years 2020-2023 and with gross notional values of \$1.5 billion at December 31, 2019.

Our cash flow hedging activity also uses interest rate derivatives including Treasury rate lock agreements to reduce the risk of increases in benchmark interest rates on the probable issuance of debt. In the second quarter of 2018, the Company entered into Treasury rate lock agreements to hedge against the variability in cash flows due to changes in the benchmark interest rate related to an anticipated debt issuance. The instruments were designated as cash flow hedges, and were settled on October 31, 2018 concurrent with the debt issuance. The settlement amount of \$16 million received is released from accumulated other comprehensive income into earnings when the corresponding interest expense occurs each period.

Corning uses regression analysis or 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. 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, 2019, the amount expected to be reclassified into earnings within the next 12 months is a pre-tax net gain of \$30 million.

Undesignated Hedges

Corning also uses 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 exposures 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. revenues and expenses are denominated in Japanese yen, South Korean won, new Taiwan dollar, Chinese yuan and euro. When these revenues and 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 other derivative instruments.

The Company continued its foreign exchange hedge program in 2019 and entered into a series of average rate forwards, and purchased put or call options. These will hedge a significant portion of its projected yen exposure for the period of 2020-2023. As of December 31, 2019, the U.S. dollar gross notional value of the yen average rate forwards program is \$7.7 billion and \$2.5 billion for zero-cost collars and purchased put or call options. The average rate forward program was also expanded to partially hedge the impact of the South Korean won, Chinese yuan, euro, new Taiwan dollar and British pound translation on the Company's projected net income. As of December 31, 2019, these average rate forwards have a total notional value of \$2.0 billion. The entire average rate forward program will settle net without obligation to deliver Japanese yen, South Korean won, Chinese yuan, euro and British pound. With respect to the zero-cost collars, the gross notional amount includes the value of both put and call options. However, due to the nature of the zero-cost collars, only the put or the call option can be exercised at maturity.

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 (loss).

The following table summarizes the notional amounts and respective fair values of Corning's derivative financial instruments on a gross basis for December 31, 2019 and 2018 (in millions):

	Notional amount		Asset derivatives				Liability derivatives			
			Balance sheet location	Fair value		Balance sheet location	Fair value			
	2019	2018		2019	2018		2019	2018		
Derivatives designated as hedging instruments										
Foreign exchange contracts	\$ 2,123	\$ 391	Other current assets	\$ 38	\$ 4	Other accrued liabilities	\$ (7)	\$ (2)		
			Other assets	37	2	Other liabilities	(4)			
Derivatives not designated as hedging instruments										
Foreign exchange contracts and other	1,815	900	Other current assets	5	5	Other accrued liabilities	(19)	(7)		
			Other assets	21						
Translated earnings contracts	12,166	13,620	Other current assets	114	94	Other accrued liabilities	(74)	(47)		
			Other assets	34	43	Other liabilities	(161)	(386)		
Total derivatives	\$ 16,104	\$ 14,911		\$ 249	\$ 148		\$ (265)	\$ (442)		

The following tables summarize the effect on the consolidated financial statements relating to Corning's derivative financial instruments (in millions):

Derivatives in hedging relationships	Effect of derivative instruments on the consolidated financial statements for the years ended December 31						
	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 ⁽¹⁾		
	2019	2018	2017		2019	2018	2017
Cash flow hedges							
				Net sales			\$ 1
Interest rate hedge		\$ 16		Cost of sales	\$ 11	\$ 13	(12)
Foreign exchange contracts	\$ 72	(5)	\$ 38	Other expense, net		(1)	(2)
Total cash flow hedges	\$ 72	\$ 11	\$ 38		\$ 11	\$ 12	\$ (13)

Undesignated derivatives	Location of gain (loss) recognized in income	Gain (loss) recognized in income		
		2019	2018	2017
Foreign exchange and other contracts – balance sheet, loans and other	Other income (expense), net	\$ 21	\$ 22	\$ (16)
Translated earnings contracts	Translated earnings contract gain (loss), net	248	(93)	(121)
Total undesignated		\$ 269	\$ (71)	\$ (137)

(1) The effect of gain (loss) reclassified from accumulated OCI into income is not material to the financial statement line items in which effects of cash flow hedges are recorded for 2019, 2018 and 2017.

15. 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:

<i>(in millions)</i>	December 31, 2019	Fair value measurements at reporting date using		
		Quoted prices in active markets for identical assets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Current assets:				
Other current assets ⁽¹⁾	\$ 157		\$ 157	
Non-current assets:				
Other assets ⁽¹⁾⁽²⁾	\$ 92		\$ 71	\$ 21
Current liabilities:				
Other accrued liabilities ⁽¹⁾	\$ 100		\$ 100	
Non-current liabilities:				
Other liabilities ⁽¹⁾	\$ 165		\$ 165	

(1) Derivative assets and liabilities include foreign exchange contracts which are measured using observable inputs for similar assets and liabilities.

(2) Other assets include one of the Company's renewable energy derivative contracts that was measured using unobservable (Level 3) inputs, in the amount of \$21 million.

<i>(in millions)</i>	December 31, 2018	Fair value measurements at reporting date using		
		Quoted prices in active markets for identical assets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Current assets:				
Other current assets ⁽¹⁾	\$ 103		\$ 103	
Non-current assets:				
Investments ⁽²⁾	\$ 16			\$ 16
Other assets ⁽¹⁾	\$ 45		\$ 45	
Current liabilities:				
Other accrued liabilities ⁽¹⁾	\$ 56		\$ 56	
Non-current liabilities:				
Other liabilities ⁽¹⁾⁽³⁾	\$ 406		\$ 386	\$ 20

(1) Derivative assets and liabilities include foreign exchange contracts which are measured using observable inputs for similar assets and liabilities.

(2) One of the Company's equity securities was measured using unobservable (Level 3) inputs, in the amount of \$16 million.

(3) Other liabilities include contingent consideration that was measured using unobservable (Level 3) inputs, in the amount of \$20 million.

For the year ended December 31, 2019, assets and liabilities that were measured using unobservable (Level 3) inputs resulted in unrealized gains recognized in earnings of \$21 million for a renewable energy derivative contract and the reversal of a liability for contingent consideration of \$20 million.

At December 31, 2019, HSG, one of the Company's equity method affiliates, wrote down its long-lived assets to fair value on a nonrecurring basis. HSG engaged a third-party appraiser to assist in determining the fair value of its long-lived assets using unobservable (Level 3) inputs

based on the highest and best use of the asset group. As a result, HSG recognized pre-tax asset impairment charges of \$916 million for the year ended December 31, 2019. Corning's share of the pre-tax impairment was \$369 million. Refer to Note 6 (Investments) to the consolidated financial statements for additional information.

There were no other significant financial assets and liabilities measured on a nonrecurring basis during the years ended December 31, 2019 and 2018.

16. Shareholders' Equity

Common Stock Dividends

On February 6, 2018, Corning's Board of Directors declared a 16.1% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.155 to \$0.18 per share of common stock, beginning with the dividend paid in the first quarter of 2018.

On February 6, 2019, Corning's Board of Directors declared an 11.1% increase in the Company's quarterly common stock dividend, which increased the quarterly dividend from \$0.18 to \$0.20 per share of common stock, beginning with the dividend paid in the first quarter of 2019.

On February 5, 2020, Corning's Board of Directors declared a 10.0% 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. This increase marks the ninth dividend increase since October 2011.

Fixed Rate Cumulative Convertible Preferred Stock, Series A

On January 15, 2014, Corning designated a new series of its preferred stock as Fixed Rate Cumulative Convertible Preferred Stock, Series A, par value \$100 per share, and issued 1,900 shares of preferred stock at an issue price of \$1 million per share, for an aggregate issue price of \$1.9 billion, to Samsung Display with the acquisition of its equity interest in Samsung Corning Precision Materials. Corning also issued to Samsung Display an additional amount of preferred stock at closing, for an aggregate issue price of \$400 million in cash.

Dividends on the preferred stock are cumulative and accrue at the annual rate of 4.25% on the per share issue price of \$1 million. The dividends are payable quarterly as and when declared by the Company's Board of Directors. The preferred stock ranks senior to our common stock with respect to payment of dividends and rights upon liquidation. The preferred stock is not redeemable except in the case of a certain deemed liquidation event, the occurrence of which is under the control of the Company. The preferred stock is convertible at the option of the

holder and the Company upon certain events, at a conversion rate of 50,000 shares of Corning's common stock per one share of preferred stock, subject to certain anti-dilution provisions. As of December 31, 2019, the preferred stock has not been converted, and none of the anti-dilution provisions have been triggered. Following the seventh anniversary of the closing of the acquisition of Samsung Corning Precision Materials, the preferred stock will be convertible, in whole or in part, at the option of the holder. The Company has the right, at its option, to cause some or all the shares of preferred stock to be converted into common stock, if, for 25 trading days (whether or not consecutive) within any period of 40 consecutive trading days, the closing price of common stock exceeds \$35 per share. If the right becomes exercisable before the seventh anniversary of the closing, the Company must first obtain the written approval of the holders of a majority of the preferred stock before exercising its conversion right. The preferred stock does not have any voting rights except as may be required by law.

Share Repurchases

2017 Share Repurchases

In December 2016, Corning's Board of Directors approved a \$4 billion share repurchase program with no expiration (the "2016 Repurchase Program"). In the second quarter of 2017, Corning entered into and finalized an accelerated share repurchase agreement under which we paid \$500 million for a total of 17.1 million shares. In the third quarter of 2017, Corning entered into and finalized an additional accelerated share repurchase agreement under which we paid \$500 million for a total of 17.2 million shares. Collectively, these two agreements represent the "2017 ASR agreements".

In addition to the 2017 ASR agreements, during the year ended December 31, 2017, the Company repurchased 50.1 million shares of common stock on the open market for approximately \$1.4 billion, resulting in a total of 84.4 million shares repurchased for approximately \$2.4 billion during 2017.

2018 Share Repurchases

On April 26, 2018, Corning's Board of Directors approved a \$2 billion share repurchase program with no expiration (the "2018 Repurchase Program"). During the year ended December 31, 2018, the Company repurchased 74.8 million shares of common stock on the open market for approximately \$2.2 billion as part of its 2016 and 2018 Repurchase Programs.

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

2019 Share Repurchases

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 \$0.9 billion as part of its 2018 and 2019 Repurchase Programs.

	Common stock		Treasury stock	
	Shares	Par value	Shares	Cost
Balance at December 31, 2016	1,691	\$ 846	(765)	\$ (14,152)
Shares issued to benefit plans and for option exercises	17	8		(2)
Shares purchased for treasury			(84)	(2,462)
Other, net			(1)	(17)
Balance at December 31, 2017	1,708	\$ 854	(850)	\$ (16,633)
Shares issued to benefit plans and for option exercises	5	3		
Shares purchased for treasury			(75)	(2,230)
Other, net				(7)
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				(17)
Balance at December 31, 2019	1,718	\$ 859	(956)	\$ (19,812)

Accumulated Other Comprehensive Loss

A summary of changes in the components of accumulated other comprehensive loss, including our 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, 2016	\$ (1,275)	\$ (347)	\$ (17)	\$ (37)	\$ (1,676)
Other comprehensive income before reclassifications ⁽⁴⁾	\$ 711	\$ 13		\$ 33	\$ 757
Amounts reclassified from accumulated other comprehensive income ⁽²⁾		17	\$ 14	11	42
Equity method affiliates ⁽³⁾	35				35
Net current-period other comprehensive income	746	30	14	44	834
Balance at December 31, 2017	\$ (529)	\$ (317)	\$ (3)	\$ 7	\$ (842)
Other comprehensive (loss) income before reclassifications ⁽⁵⁾	\$ (180)	\$ (84)	\$ (1)	\$ 9	\$ (256)
Amounts reclassified from accumulated other comprehensive income (loss) ⁽²⁾		103		(10)	93
Equity method affiliates ⁽³⁾	(5)				(5)
Net current-period other comprehensive (loss) income	(185)	19	(1)	(1)	(168)
Balance at December 31, 2018	\$ (714)	\$ (298)	\$ (4)	\$ 6	\$ (1,010)
Other comprehensive (loss) income before reclassifications ⁽⁶⁾	\$ (129)	\$ (79)	\$ 1	\$ 54	\$ (153)
Amounts reclassified from accumulated other comprehensive income (loss) ⁽²⁾		15		(9)	6
Equity method affiliates ⁽³⁾	(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)

(1) All amounts are after tax. Amounts in parentheses indicate debits to accumulated other comprehensive income.

(2) Tax effect of reclassifications are disclosed separately within this footnote.

(3) Tax effects related to equity method affiliates are not significant in the reported periods.

(4) Amounts are net of total tax expense of \$97 million, including \$88 million, \$5 million and \$4 million, related to foreign currency translation adjustments, the hedge component and retirement plans, respectively.

(5) Amounts are net of total tax benefit of \$64 million, primarily driven by \$34 million and \$33 million, related to foreign currency translation adjustments and retirement plans, respectively.

(6) 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.

(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 (loss)
	Years ended December 31,			
	2019	2018	2017	
Amortization of net actuarial loss	\$ (89)	\$ (138)	\$ (20)	⁽²⁾
Amortization of prior service credit (cost)	1	(6)	(2)	⁽²⁾
	(88)	(144)	(22)	Total before tax
	73	41	5	Tax benefit ⁽³⁾
	\$ (15)	\$ (103)	\$ (17)	Net of tax
Realized losses on investments			\$ (3)	Other expense, net
			(11)	Tax expense
			\$ (14)	Net of tax
Realized gains (losses) on designated hedges			\$ 1	Sales
	\$ 11	\$ 13	(12)	Cost of sales
		(1)	(2)	Other expense, net
	11	12	(13)	Total before tax
	(2)	(2)	2	Tax (expense) benefit
	\$ 9	\$ 10	\$ (11)	Net of tax
Total reclassifications for the period	\$ (6)	\$ (93)	\$ (42)	Net of tax

(1) Amounts in parentheses indicate debits to the statement of income.

(2) These accumulated other comprehensive income components are included in net periodic pension cost. Refer to Note 12 (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 income to retained earnings for stranded tax effects.

17. Earnings (Loss) Per Common Share

Basic earnings (loss) per common share are computed by dividing income attributable to common shareholders by the weighted-average number of common shares outstanding for the period. Diluted earnings (loss) 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 (loss) per common share from operations is as follows (in millions, except per share amounts):

	Years ended December 31,		
	2019	2018	2017
Net income (loss) attributable to Corning Incorporated	\$ 960	\$ 1,066	\$ (497)
Less: Series A convertible preferred stock dividend	98	98	98
Net income (loss) available to common stockholders - basic	862	968	(595)
Plus: Series A convertible preferred stock dividend	98	98	
Net income (loss) available to common stockholders - diluted	\$ 960	\$ 1,066	\$ (595)
Weighted-average common shares outstanding - basic	776	816	895
Effect of dilutive securities:			
Stock options and other dilutive securities	8	10	
Series A convertible preferred stock ⁽¹⁾	115	115	
Weighted-average common shares outstanding - diluted	899	941	895
Basic earnings (loss) per common share	\$ 1.11	\$ 1.19	\$ (0.66)
Diluted earnings (loss) per common share	\$ 1.07	\$ 1.13	\$ (0.66)
Anti-dilutive potential shares excluded from diluted earnings (loss) per common share:			
Series A convertible preferred stock dividend ⁽¹⁾			115
Employee stock options and awards	2	2	13
Total	2	2	128

(1) For the year ended December 31, 2017, the Series A preferred stock was anti-dilutive and therefore excluded from the calculation of diluted earnings (loss) per share.

18. Reportable Segments

Our 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 segments 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 the pharmaceutical technologies, auto glass and new product lines and development projects, as well as certain corporate investments.

We prepared the financial results for our reportable segments on a basis consistent with our internal disaggregation of financial information to assist our 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, Chinese yuan and Japanese yen are excluded from segment sales and segment net income for our Environmental Technologies and Life Sciences segments. In January 2019, we began presenting results of the Environmental Technologies and Life Sciences segments on a constant-currency basis to mitigate the translation impact on these segments’ sales and net income. We have not recast prior periods as the impact of fluctuations in these currencies were not material as compared to prior periods. Certain income and expenses are included in the unallocated amounts in the reconciliation of reportable segment net income to consolidated net income. These include items that are not used by our CODM in evaluating the results of or in allocating resources to our segments and include the following items: the impact of our translated earnings contracts; acquisition-related costs; discrete tax items and other tax-related adjustments; certain litigation, regulatory and other legal matters; restructuring, impairment and other charges or credits; adjustments relating to acquisitions; and other non-recurring non-operational items. Although we exclude these amounts from segment results, they are included in reported consolidated results.

We included the earnings of equity affiliates that are closely associated with our reportable segments in the respective segment’s net income (loss). We have allocated certain common expenses among reportable segments differently than we 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

<i>(in millions)</i>	Display Technologies	Optical Communications	Specialty Materials	Environmental Technologies	Life Sciences	All Other	Total
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	\$ (206)	\$ (134)	\$ (81)	\$ (70)	\$ (40)	\$ 80	\$ (451)
Net income (loss) ⁽³⁾	\$ 786	\$ 489	\$ 302	\$ 263	\$ 150	\$ (289)	\$ 1,701
Investment in affiliated companies, at equity	\$ 145	\$ 3	\$ 3		\$ 3		\$ 154
Segment assets ⁽⁴⁾	\$ 9,022	\$ 3,004	\$ 2,433	\$ 1,912	\$ 627	\$ 891	\$ 17,889
Capital expenditures	\$ 872	\$ 329	\$ 176	\$ 287	\$ 80	\$ 155	\$ 1,899
For the year ended December 31, 2018							
Segment net sales	\$ 3,276	\$ 4,192	\$ 1,479	\$ 1,289	\$ 946	\$ 216	\$ 11,398
Depreciation ⁽¹⁾	\$ 585	\$ 218	\$ 136	\$ 119	\$ 50	\$ 38	\$ 1,146
Research, development and engineering expenses ⁽²⁾	\$ 106	\$ 212	\$ 163	\$ 118	\$ 20	\$ 231	\$ 850
Income tax (provision) benefit	\$ (221)	\$ (163)	\$ (83)	\$ (55)	\$ (31)	\$ 76	\$ (477)
Net income (loss) ⁽³⁾	\$ 835	\$ 592	\$ 313	\$ 208	\$ 117	\$ (281)	\$ 1,784
Investment in affiliated companies, at equity	\$ 131	\$ 3	\$ 6		\$ 1	\$ 171	\$ 312
Segment assets ⁽⁴⁾	\$ 8,794	\$ 3,042	\$ 2,176	\$ 1,633	\$ 585	\$ 1,018	\$ 17,248
Capital expenditures	\$ 755	\$ 417	\$ 242	\$ 273	\$ 55	\$ 329	\$ 2,071
For the year ended December 31, 2017							
Segment net sales	\$ 3,137	\$ 3,545	\$ 1,403	\$ 1,106	\$ 879	\$ 188	\$ 10,258
Depreciation ⁽¹⁾	\$ 534	\$ 193	\$ 129	\$ 124	\$ 52	\$ 45	\$ 1,077
Research, development and engineering expenses ⁽²⁾	\$ 88	\$ 174	\$ 152	\$ 113	\$ 22	\$ 211	\$ 760
Income tax (provision) benefit	\$ (234)	\$ (129)	\$ (79)	\$ (44)	\$ (25)	\$ 69	\$ (442)
Net income (loss) ⁽³⁾	\$ 888	\$ 469	\$ 301	\$ 165	\$ 95	\$ (259)	\$ 1,659
Investment in affiliated companies, at equity	\$ 134	\$ 2	\$ 3			\$ 140	\$ 279
Segment assets ⁽⁴⁾	\$ 8,662	\$ 2,599	\$ 2,155	\$ 1,402	\$ 538	\$ 824	\$ 16,180
Capital expenditures	\$ 795	\$ 505	\$ 223	\$ 157	\$ 42	\$ 156	\$ 1,878

(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) 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.

(4) Segment assets include inventory, accounts receivable, property, plant and equipment, net of accumulated depreciation, and associated equity companies and cost investments.

A reconciliation of reportable segments and All Other net sales to consolidated net sales is as follows (in millions):

	Years ended December 31,		
	2019	2018	2017
Net sales of reportable segments and All Other	\$ 11,656	\$ 11,398	\$ 10,258
Constant-currency adjustment ⁽¹⁾	(153)	(108)	(142)
Consolidated net sales	\$ 11,503	\$ 11,290	\$ 10,116

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

A reconciliation of reportable segment net income (loss) to consolidated net income follows (in millions):

	Years ended December 31,		
	2019	2018	2017
Net income of reportable segments	\$ 1,990	\$ 2,065	\$ 1,918
Net loss of All Other	(289)	(281)	(259)
Unallocated amounts:			
Impact of foreign currency movements not included in segment net income (loss)	(115)	(157)	(168)
Gain (loss) on foreign currency hedges related to translated earnings	245	(78)	(121)
Translation loss on Japanese yen-denominated debt	(3)	(18)	(14)
Litigation, regulatory and other legal matters	17	(124)	12
Research, development, and engineering expense	(164)	(134)	(106)
Equity in earnings of affiliated companies ⁽¹⁾	9	390	352
Amortization of intangibles	(113)	(93)	(75)
Interest expense, net	(200)	(149)	(110)
Pension mark to market	(95)	(145)	(22)
Income tax benefit (provision)	195	42	(1,709)
Other corporate items	(517)	(252)	(195)
Net income (loss)	\$ 960	\$ 1,066	\$ (497)

(1) Refer to Note 6 (Investments) to the consolidated financial statements for additional detail.

A reconciliation of reportable segment assets to consolidated total assets follows (in millions):

	December 31,		
	2019	2018	2017
Total assets of reportable segments	\$ 16,998	\$ 16,230	\$ 15,356
Non-reportable segments	891	1,018	824
Unallocated amounts:			
Current assets ⁽¹⁾	3,301	3,065	5,315
Investments ⁽²⁾	180	64	61
Property, plant and equipment, net ⁽³⁾	1,764	1,928	1,628
Other non-current assets ⁽⁴⁾	5,764	5,200	4,310
Total assets	\$ 28,898	\$ 27,505	\$ 27,494

(1) Includes current corporate assets, including cash, other receivables, prepaid expenses and current portion of long-term derivative assets.

(2) Represents corporate equity and cost basis investments. Asset balance does not include equity method affiliate liability balance of \$270 million and \$105 million for HSG in 2019 and 2017.

(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.

Selected financial information concerning the Company's product lines and reportable segments follow (in millions):

Revenues from External Customers	Years ended December 31,		
	2019	2018	2017
Display Technologies	\$ 3,254	\$ 3,276	\$ 3,137
Optical Communications			
Carrier network	2,885	3,084	2,720
Enterprise network	1,179	1,108	825
Total Optical Communications	4,064	4,192	3,545
Specialty Materials			
Corning® Gorilla® Glass	1,180	1,069	1,044
Advanced optics and other specialty glass	414	410	359
Total Specialty Materials	1,594	1,479	1,403
Environmental Technologies			
Automotive and other	907	719	627
Diesel	592	570	479
Total Environmental Technologies	1,499	1,289	1,106
Life Sciences			
Labware	550	536	524
Cell culture products	465	410	355
Total Life Science	1,015	946	879
All Other	230	216	188
Net sales of reportable segments and All Other	11,656	11,398	10,258
Constant-currency adjustment ⁽¹⁾	(153)	(108)	(142)
Consolidated net sales	\$ 11,503	\$ 11,290	\$ 10,116

(1) This amount primarily represents the impact of foreign currency adjustments in the Display Technologies and Environmental Technologies segments. Information concerning principal geographic areas was as follows (in millions):

	2019		2018		2017	
	Net sales ⁽²⁾	Long-lived assets ⁽¹⁾	Net sales ⁽²⁾	Long-lived assets ⁽¹⁾	Net sales ⁽²⁾	Long-lived assets ⁽¹⁾
North America						
United States	\$ 3,760	\$ 7,654	\$ 3,569	\$ 7,538	\$ 3,146	\$ 6,605
Canada	277	126	296	127	287	144
Mexico	55	267	53	200	27	174
Total North America	4,092	8,047	3,918	7,865	3,460	6,923
Asia Pacific						
Japan	441	893	415	1,148	476	1,119
Taiwan	880	2,280	921	2,326	900	2,357
China	3,096	3,816	2,716	2,644	2,247	2,125
Korea	1,051	3,625	1,259	3,736	1,337	3,869
Other	401	86	436	85	378	71
Total Asia Pacific	5,869	10,700	5,747	9,939	5,338	9,541
Europe						
Germany	435	546	451	508	426	236
Other	886	947	905	1,167	701	1,108
Total Europe	1,321	1,493	1,356	1,675	1,127	1,344
All Other	374	38	377	41	333	46
Total	\$ 11,656	\$ 20,278	\$ 11,398	\$ 19,520	\$ 10,258	\$ 17,854

(1) Long-lived assets primarily include investments, plant and equipment, goodwill and other intangible assets.

(2) Net sales are attributed to countries based on location of customer.

Valuation and Qualifying Accounts

(in millions)

Year ended December 31, 2019	Balance at beginning of period	Additions	Net deductions and other	Balance at end of period
Doubtful accounts and allowances	\$ 64	\$ 17		\$ 81
Deferred tax valuation allowance	\$ 317	\$ 10	\$ 112	\$ 215

Year ended December 31, 2018	Balance at beginning of period	Additions	Net deductions and other	Balance at end of period
Doubtful accounts and allowances	\$ 60	\$ 4		\$ 64
Deferred tax valuation allowance	\$ 456	\$ 17	\$ 156	\$ 317

Year ended December 31, 2017	Balance at beginning of period	Additions	Net deductions and other	Balance at end of period
Doubtful accounts and allowances	\$ 59	\$ 1		\$ 60
Deferred tax valuation allowance	\$ 270	\$ 241	\$ 55	\$ 456
Reserves for accrued costs of business restructuring	\$ 5		\$ 5	

Safe Harbor Statement

Annual Meeting

The annual meeting of shareholders will be held on Thursday, April 30, 2020, in Corning, New York. A formal notice of the meeting and a proxy statement will be mailed to shareholders on or about March 20, 2020. The proxy statement can also be accessed electronically through the Investor Relations page of the Corning website at corning.com and at corning.com/2020-proxy. A summary report of the proceedings at the annual meeting will be available without charge upon written request to Linda E. Jolly, Corporate Secretary, Corning Incorporated, One Riverfront Plaza, Corning, NY 14831.

Additional Information

A copy of Corning's 2019 Annual Report on Form 10-K filed with the Securities and Exchange Commission (SEC) is available without charge to shareholders upon written request to Corporate Secretary, Corning Incorporated, One Riverfront Plaza, Corning, NY 14831. The annual report, proxy statement, Form 10-K, and other information can also be accessed electronically through the Investor Relations page of the Corning website at corning.com.

Investor Information

Investment analysts and investors who need additional information may contact Ann Nicholson, Vice President, Investor Relations, Corning Incorporated, One Riverfront Plaza, Corning, NY 14831. Telephone: 607.974.9000.

Common Stock

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

Transfer Agent & Registrar

Computershare Trust Company
P.O. Box 505000
Louisville, KY 40233-5000
Telephone: 800.255.0461
Website: www.computershare.com/contactus

Independent Auditors

PricewaterhouseCoopers LLP
300 Madison Ave., New York, NY 10017

Executive Certifications

Corning submitted its 2019 Annual CEO Certification to the NYSE in compliance with NYSE corporate governance listing standards, and filed with the SEC its Sarbanes Oxley Act 301 Certifications as exhibits to its most recent Form 10-K.

Corning is an equal opportunity employer.

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"Safe Harbor" Statement

Under the Private Securities Litigation Reform Act of 1995

Under the Private Securities Litigation Reform Act of 1995, the statements in this Annual Report that are not historical facts or information are forward-looking statements. These forward-looking statements involve risks and uncertainties that may cause the outcome to be materially different. Such risks and uncertainties include, but are not limited to:

- global business, financial, economic and political conditions;
- tariffs and import duties;
- currency fluctuations between the U.S. dollar and other currencies, primarily the Japanese yen, new Taiwan dollar, euro, Chinese yuan and South Korean won;
- product demand and industry capacity;
- competitive products and pricing;
- availability and costs of critical components and materials;
- 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 due to terrorist activity, cyber-attack, armed conflict, political or financial instability, natural disasters, or major health concerns;
- loss of intellectual property due to theft, cyber-attack, or disruption to our information technology infrastructure;
- unanticipated disruption to equipment, facilities, IT systems or operations;
- effect of regulatory and legal developments;
- ability to pace capital spending to anticipated levels of customer demand;
- 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, most notably in the Display Technologies segment, 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 and regulations including the 2017 Tax Act;
- the impacts of audits by taxing authorities;
- the potential impact of legislation, government regulations, and other government action and investigations; and
- other risks detailed in Corning's SEC filings.

Neither this report nor any statement contained herein is furnished in connection with any offering of securities or for the purpose of promoting or influencing the sale of securities.

Trademarks

A number of Corning trademarks appear throughout this annual report. For a complete listing of Corning's registered trademarks, visit corning.com/worldwide/en/legal-notices.html.

Quality
Integrity
Performance
Leadership
Innovation
Independence
The Individual

Corning is guided by an enduring set of Values that define our relationships with employees, customers, and the communities in which we operate.

CORNING

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