

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION**
Washington, D.C. 20549

Form 10-K

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2021

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE TRANSITION PERIOD FROM TO

Commission file number 1-15399



(Exact Name of Registrant as Specified in its Charter)

Delaware
(State or Other Jurisdiction of
Incorporation or Organization)

1 North Field Court, Lake Forest, Illinois
(Address of Principal Executive Offices)

36-4277050
(I.R.S. Employer
Identification No.)

60045
(Zip Code)

Registrant's telephone number, including area code: (847) 482-3000

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

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value \$0.01 per share	PKG	New York Stock Exchange

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

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

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

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

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

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

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes No

At June 30, 2021, the last day of the Registrant's most recently completed second fiscal quarter, the aggregate market value of Registrant's common equity held by non-affiliates was approximately \$12,670,117,556 based upon the closing sale price as reported on the New York Stock Exchange. This calculation of market value has been made for the purposes of this report only and should not be considered as an admission or conclusion by the Registrant that any person is in fact an affiliate of the Registrant.

On February 18, 2022, there were 93,533,810 shares of Common Stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Specified portions of the Proxy Statement for the Registrant's 2022 Annual Meeting of Stockholders are incorporated by reference to the extent indicated in Part III of this Form 10-K.

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PART I

Item 1. BUSINESS

Packaging Corporation of America (“we,” “us,” “our,” “PCA,” or the “Company”) is the third largest producer of containerboard products and a leading producer of uncoated freesheet (UFS) paper in North America. We operate eight mills and 90 corrugated products plants and related facilities. We are headquartered in Lake Forest, Illinois and operate primarily in the United States.

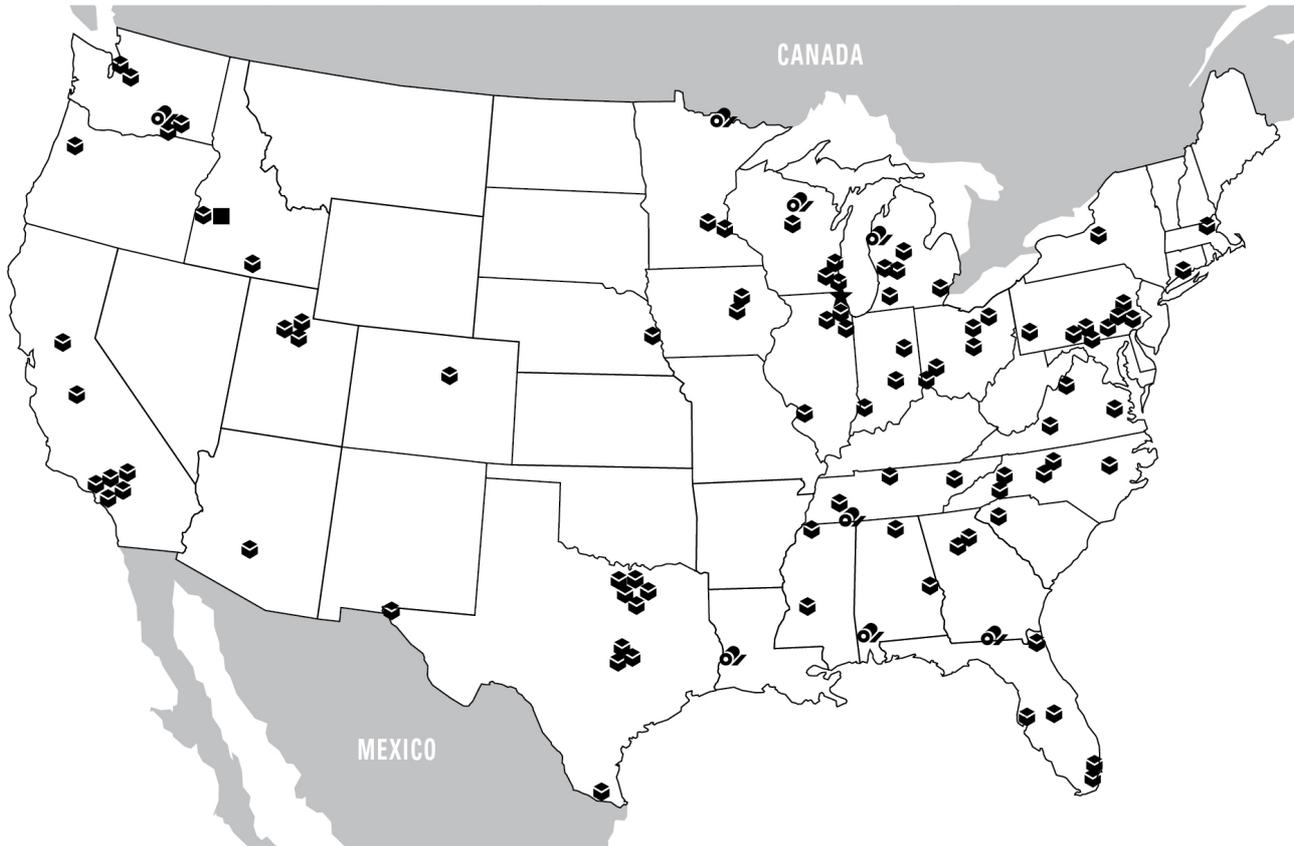
We report in three reportable segments: Packaging, Paper and Corporate and Other. For segment financial information see Note 20, Segment Information, of the Notes to Consolidated Financial Statements in “Part II, Item 8, Financial Statements and Supplementary Data” of this Form 10-K.

Production and Shipments

The following table summarizes the Packaging segment's containerboard production and corrugated products shipments and the Paper segment's UFS production.

		First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Full Year
Containerboard Production	2021	1,195	1,193	1,256	1,243	4,887
(thousand tons)	2020	1,047	1,072	1,048	1,174	4,341
	2019	1,037	1,063	1,070	1,079	4,249
Corrugated Products Shipments (billion square feet)	2021	16.4	16.5	16.4	16.4	65.7
	2020	15.3	15.1	16.0	16.4	62.8
	2019	14.5	14.9	15.1	14.9	59.4
UFS Production	2021	145	149	148	130	572
(thousand tons)	2020	224	148	129	147	648
	2019	239	236	236	236	947

Below is a map of our locations:



- ★ Corporate Headquarters
- 📦 Converting Facilities
- 🏭 Mills
- Administrative Office

Packaging

Packaging Products

Our containerboard mills produce linerboard and corrugating medium, which are papers primarily used in the production of corrugated products. Our corrugated products manufacturing plants produce a wide variety of corrugated packaging products, including conventional shipping containers used to protect and transport manufactured goods, multi-color boxes and displays with strong visual appeal that help to merchandise the packaged product in retail locations, and honeycomb protective packaging. In addition, we are a large producer of packaging for meat, fresh fruit and vegetables, processed food, beverages, and other industrial and consumer products. Our products are sustainable and are produced from renewable raw materials, predominately using energy derived from biogenic fuels in our production processes and are recyclable at end-of-life.

During the year ended December 31, 2021, our Packaging segment produced 4.9 million tons of containerboard at our mills. Our corrugated products manufacturing plants sold 65.7 billion square feet (BSF) of corrugated products. The Packaging segment's net sales to third parties totaled \$7.1 billion in 2021.

Facilities

We manufacture containerboard, which includes a variety of performance and specialty grades, at our containerboard mills. Total annual containerboard capacity was approximately 5.0 million tons as of December 31, 2021. We also produce corrugated and protective packaging products at 90 manufacturing locations. The following provides more details of our primary operating facilities:

Counce. Our Counce, Tennessee mill produces kraft linerboard on two machines. The mill can produce basis weights from 26 lb. to 90 lb.

DeRidder. Our DeRidder, Louisiana mill produces kraft linerboard on its No. 1 machine and kraft linerboard and corrugating medium on its No. 3 machine. The mill can produce linerboard in basis weights of 26 lb. to 69 lb. and medium in basis weights of 23 lb. to 33 lb.

Valdosta. Our Valdosta, Georgia mill produces kraft linerboard on one machine. The mill can produce basis weights from 35 lb. to 96 lb.

Tomahawk. Our Tomahawk, Wisconsin mill produces corrugating medium on two machines. The mill can produce basis weights from 23 lb. to 47 lb.

Filer City. Our Filer City, Michigan mill produces corrugating medium on three machines. The mill can produce basis weights from 20 lb. to 47 lb.

Wallula. Our Wallula, Washington mill produces corrugating medium on its No. 2 machine and kraft linerboard on its No. 3 machine. The mill can produce medium in basis weights from 23 lb. to 33 lb. and linerboard in basis weights from 31 lb. to 52 lb.

Jackson. Our Jackson, Alabama mill produces kraft linerboard on its No. 3 machine and, beginning in the third quarter of 2021, we began producing corrugating medium on its No. 1 machine. Jackson had historically operated as a UFS paper mill, with its results of operations reported in our Paper segment. During the fourth quarter of 2020, in order to meet strong packaging demand and maintain appropriate inventory levels, we temporarily began producing linerboard on the No. 3 machine and, in the first quarter of 2021, we announced the discontinuation of producing uncoated freesheet paper grades on the machine and the permanent conversion of the machine to produce linerboard. Before October 2020, operating results for the Jackson mill were included in the Paper segment. Beginning in October 2020, operating results for the Jackson mill are included in both the Packaging and Paper segments. Jackson remains capable of producing white paper grades on the No. 1 and No. 3 machines.

We operate 90 corrugated manufacturing and protective packaging operations, a technical and development center, 10 regional design centers, a rotogravure printing operation, and a complement of packaging supplies and distribution centers. Of the 90 manufacturing facilities, 59 operate as combining operations, commonly called corrugated plants, which manufacture corrugated sheets and finished corrugated packaging products, 30 are sheet plants, which procure combined sheets and manufacture finished corrugated packaging products, and one is a corrugated sheet-only manufacturer.

Corrugated products plants tend to be located in close proximity to customers to minimize freight costs. Each of our plants serves a market radius of approximately 150 miles. Our sheet plants are generally located in close proximity to our larger corrugated plants, which enables us to offer additional services and converting capabilities such as small volume and quick turnaround items.

Major Raw Materials Used

Fiber supply. Fiber is the largest raw material cost to manufacture containerboard. We consume both virgin wood fiber and recycled fiber in our containerboard mills, and all of our fiber comes from renewable resources. Our mill system has the capability to shift a portion of its fiber consumption between softwood, hardwood, and recycled sources. All of our mills can utilize virgin wood fiber and all of our mills, other than the Valdosta mill, can utilize some recycled fiber in their containerboard production. Our corrugated manufacturing operations generate recycled fiber as a by-product from the manufacturing process, which is consumed by our mills. In 2021, our usage of recycled fiber, net of internal generation, represents 18% of our containerboard production. In order to improve our fiber flexibility and production capabilities, we have invested in additional capacity to process recycled fiber at our DeRidder, Wallula, and Jackson mills.

We procure wood fiber through leases of cutting rights, long-term supply agreements, and market purchases and believe we have adequate sources of fiber supply for the foreseeable future.

As part of our renewable virgin fiber sourcing efforts, we participate in the Sustainable Forestry Initiative® (SFI), the Programme for the Endorsement of Forest Certification (PEFC), as well as the Forest Stewardship Council® (FSC®), and we are certified under their sourcing and chain of custody standards. These standards are aimed at ensuring the long-term health and conservation of forestry resources. We are committed to sourcing wood fiber through environmentally, socially, and economically sustainable practices and promoting resource and conservation stewardship ethics.

Energy supply. Energy at our packaging mills is obtained through self-generated or purchased fuels and electricity. Fuel sources include by-products of the containerboard manufacturing and pulping process (including black liquor and wood waste), natural gas, purchased wood waste, and other purchased fuels. Each of our mills self-generates process steam requirements from by-products (black liquor and wood waste), as well as from the various purchased fuels. The process steam is used throughout the production process and also to generate electricity.

In 2021, our packaging mills consumed about 81 million MMBTUs of fuel to produce both steam and electricity. Of the 81 million MMBTUs consumed, about 61% was from mill-generated biogenic fuels that are by-products of our containerboard manufacturing and pulping process and 39% was from purchased fuels. Of the purchased fuels, 81% was from natural gas, 18% was from purchased wood waste and 1% was from other purchased fuels.

Chemical supply. We consume various chemicals in the production of containerboard, including caustic soda, sulfuric acid, soda ash, and lime. Most of our chemicals are purchased under contracts, which are bid or negotiated periodically.

Sales, Marketing, and Distribution

Our corrugated products are sold through our direct sales and marketing organization, independent brokers, and distribution partners. We have sales representatives and a sales manager at most of our corrugated manufacturing operations and also have corporate account managers who serve customer accounts with a national presence. Additionally, our design centers maintain an on-site dedicated graphics sales force. In addition to direct sales and marketing personnel, we utilize new product development engineers and product graphics and design specialists. These individuals are located at both the corrugated plants and the design centers. General marketing support is located at our corporate headquarters.

Our containerboard sales group is responsible for linerboard and corrugating medium order processing and sales to our corrugated plants, to outside domestic customers, and to export customers. These personnel also coordinate and execute all containerboard trade agreements with other containerboard manufacturers.

Containerboard produced in our mills is shipped by rail or truck. Our corrugated products are delivered by truck due to our large number of customers and their demand for timely service. Our corrugated manufacturing operations typically serve customers within a 150-mile radius. We sometimes use third-party warehouses for short-term storage of corrugated products. We have experienced higher freight costs in 2021 due to truck and driver shortages and limited boxcar availability, as well as fuel surcharges.

Customers

We sell containerboard and corrugated products to approximately 15,000 customers in approximately 33,000 locations. About 70% of our corrugated products sales are to regional and local accounts, which are broadly diversified across industries and geographic locations. The remaining 30% of our customer base consists primarily of national accounts that have multiple locations and are served by a number of PCA plants. No single customer exceeds 10% of segment sales.

The primary end-use markets in the United States for corrugated products are shown below as reported in the 2020 Fibre Box Association annual report:

Food, beverages, and agricultural products	44 %
Retail and wholesale trade	25 %
Paper and other products	12 %
Chemical, plastic, and rubber products	10 %
Miscellaneous manufacturing	9 %

Competition

As of December 31, 2021, we were the third largest producer of containerboard products in North America, according to industry sources and our own estimates. According to industry sources, corrugated products are produced by about 445 U.S. companies operating approximately 1,150 plants. The primary basis for competition for most of our packaging products includes quality, service, price, product design, and innovation. Most corrugated products are manufactured to the customer's specifications. Corrugated producers generally sell within a 150-mile radius of their plants and compete with other corrugated producers in their local region. Competition in our corrugated products operations tends to be regional, although we also face competition from competitors with significant national account presence.

On a national level, our primary competitors are International Paper, WestRock Company, Georgia-Pacific LLC, and Pratt Industries. However, with our strategic focus on regional and local accounts, we also compete with the smaller, independent producers.

Paper

We are a leading producer of UFS in North America, according to industry sources and our own estimates. We manufacture and sell papers, including both commodity and specialty papers, which may have custom or specialized features such as colors, coatings, high brightness, and recycled content. Our papers consist of communication papers, including cut-size office papers, and printing and converting papers. Our products are sustainable and are produced from renewable raw materials, predominately using energy derived from biogenic fuels in our production processes and are recyclable at end-of-life.

Facilities

We currently have two paper mills located in the United States with the capacity to produce 602,000 tons annually. Our operations include the following:

International Falls. Our International Falls, Minnesota mill produces both commodity and specialty papers on two paper machines.

Jackson. Our Jackson, Alabama mill has historically produced UFS and has the capability to produce both commodity and specialty papers on its No. 1 and No. 3 machines. Since October 2020, the mill has also produced containerboard. See "Packaging — Facilities — Jackson" for further information.

Major Raw Materials Used

Fiber supply. Fiber is the largest raw material cost in this segment. We consume wood fiber, recycled fiber, and purchased pulp. We purchase wood fiber through contracts and open-market purchase, and we purchase recycled fiber and pulp from third parties pursuant to contractual agreements.

As part of our renewable virgin fiber sourcing efforts, we participate in the Sustainable Forestry Initiative® (SFI), the Programme for the Endorsement of Forest Certification (PEFC), as well as the Forest Stewardship Council® (FSC®), and we are certified under their sourcing and chain of custody standards. These standards are aimed at ensuring the long-term health and conservation of forestry resources. We are committed to sourcing wood fiber through environmentally, socially, and economically sustainable practices and promoting resource and conservation stewardship ethics.

Energy supply. We obtain energy through self-generated or purchased fuels and electricity. Fuel sources include by-products of the manufacturing and pulping process (including black liquor and wood waste), natural gas, electricity, and purchased wood waste. Each of the paper mills self-generates process steam requirements from by-products (black liquor and wood waste), as well as from the various purchased fuels. The process steam is used throughout the production process and to generate electricity.

In 2021, our paper mills consumed about 12 million MMBTUs of fuel to produce both steam and electricity. Of the 12 million MMBTUs consumed, about 75% was from mill-generated biogenic fuels that are by-products of the manufacturing and pulping process and 25% was from purchased fuels. Of the purchased fuels, 95% was from natural gas and 5% from purchased wood waste.

Chemical supply. We consume various chemicals in the production of white papers, including starch, precipitated calcium carbonate, caustic soda, and sodium chlorate. Most of our chemicals are purchased under contracts, which are bid or negotiated periodically.

Sales, Marketing, and Distribution

Our papers are sold primarily through our sales and marketing organization. We ship to customers both directly from our mills and through distribution centers and a network of outside warehouses by rail or truck. This allows us to respond quickly to customer requirements.

Customers

We have about 100 customers in approximately 350 locations. These customers include office products distributors and retailers, paper merchants, and envelope and other converters. We have established long-term relationships with many of our customers. Office Depot, Inc. is our largest customer in the Paper segment. Effective January 1, 2020, we have a revised agreement with Office Depot in which we will continue to supply commodity and non-commodity office papers to Office Depot through December 31, 2022. Office Depot is not subject to a minimum volume commitment and is entitled to receive rebates for achieving certain volume thresholds. If the agreement is not renewed by the parties, Office Depot's obligation to purchase paper would phase down over a two-year period beginning on January 1, 2023. In 2021, our sales revenue to Office Depot represented 51% of our Paper segment sales revenue and 4% of our consolidated sales revenue.

Competition

The markets in which our Paper segment competes are large and highly competitive. Commodity grades of UFS paper are globally traded, with numerous worldwide manufacturers, and as a result, these products compete primarily on the basis of price. All of our paper manufacturing facilities are located in the United States, and although we compete primarily in the domestic market, we do face competition from foreign producers. In 2016, as a result of a case brought by us and other domestic producers before United States international trade authorities, antidumping and countervailing duties at various levels were imposed on producers of uncoated freesheet papers produced in Australia, Brazil, China, Indonesia, and Portugal. These duties remain in effect after sunset review of duty orders by the U.S. International Trade Commission in January 2022. Other factors influencing competition from overseas producers include domestic and foreign demand and foreign currency exchange rates.

Our largest competitors include Domtar Corporation and Sylvamo Corporation. We also face competition from foreign producers. Although price is the primary basis for competition in most of our paper grades, quality and service are also important competitive determinants. Our papers compete with electronic data transmission, e-readers, electronic document storage alternatives, and paper grades we do not produce. Increasing shifts to these alternatives have had, and are likely to continue to have, an adverse effect on traditional print media and paper usage and lower demand for communication papers.

Corporate and Other

Our Corporate and Other segment includes corporate support staff services and related assets and liabilities. This segment also includes transportation assets, such as rail cars and trucks, which we use to transport some of our products to and from our manufacturing sites, and assets related to a 50% owned variable interest entity, Louisiana Timber Procurement Company, L.L.C. (LTP).

Human Capital

PCA's success depends on a highly engaged, results-oriented workforce operating in an entrepreneurial culture. Our primary objective is to place the right people in the right roles, and empower them to succeed.

Safety is a core value at PCA and we believe that all accidents are preventable and an injury-free environment is achievable. We have implemented a robust occupational health and safety management system to assure accountability throughout the organization for safe work practices. Key components to our system include commitment from management, extensive training of employees, hazard identification and communication and regular safety audits.

During 2021, we were committed to conducting safe operations through the COVID-19 pandemic in accordance with the guidelines of the Center for Disease Control and applicable health and safety regulations. PCA has experienced some labor shortage issues due to labor market conditions in general which has been exacerbated by the pandemic, particularly the recent spread of the Omicron variant. However, PCA has not experienced significant disruptions in its operations and has managed through the issue to maintain adequate availability of its workforce and supply of raw materials and services to continue to serve its customers.

We have extensive recruiting, training and development programs designed to attract and retain a highly talented workforce aligned with our objectives to relentlessly serve our customers and achieve operational excellence throughout our organization. As demand for qualified personnel is increasing, we are expanding our efforts in these critical areas along with efforts to continue to develop, promote and maintain a diverse workforce with a culture and an environment of respect and inclusion. We believe it is essential to hire and promote diverse candidates and employees in order to bring the best ideas to serve our customers. We have established a Diversity, Equity, and Inclusion Council consisting of leaders throughout our organization to hone our strategy and to create a roadmap for inclusive leadership. In 2021, we began to publicly disclose in our annual responsibility report our employee demographics in the form of our annual EEO-1 report. Our responsibility report is available on our website and is not intended to be incorporated by reference herein.

To promote strong and increasing engagement of all PCA employees, we regularly conduct employee engagement surveys and are next scheduled to do so in 2022. We have generally experienced a high survey response rate, assuring us that the survey results strongly represent the feelings and opinions of our employees. Our most recent 2018 employee engagement index trended upward and remained notably above the Global Manufacturing Benchmark index. In their survey responses, our employees reaffirmed our strong safety culture and also overwhelmingly agreed that they enjoy the work they do and that it gives them a sense of personal accomplishment. Our next survey will include diversity, equity and inclusion topics.

As of December 31, 2021, we had approximately 15,200 employees, including 4,400 salaried and 10,800 hourly employees. Approximately 63% of our hourly employees worked pursuant to collective bargaining agreements. The majority of our unionized employees are represented by the United Steel Workers (USW), the International Brotherhood of Teamsters (IBT), the International Association of Machinists (IAM), and the Association of Western Pulp and Paper Workers (AWPPW). We are currently in negotiations to renew or extend union contracts that have recently expired or are expiring in the near future. During 2021, we experienced no work stoppages, and we believe we have satisfactory labor relations with our employees.

Regulatory and Environmental Matters

A discussion of the financial impact of our compliance with environmental laws is presented under the caption “Regulatory and Environmental Matters” in “Part II, Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations” of this Form 10-K.

Executive Officers of the Registrant

Brief statements setting forth the age at February 24, 2022, the principal occupation, employment during the past five years, the year in which such person first became an officer of PCA, and other information concerning each of our executive officers appears below.

Mark W. Kowlzan, 66, Chairman and Chief Executive Officer - Mr. Kowlzan has served as PCA's Chairman since January 2016 and as Chief Executive Officer and a director since July 2010. From 1998 through June 2010, Mr. Kowlzan led the company's containerboard mill system, first as Vice President and General Manager and then as Senior Vice President - Containerboard. From 1996 through 1998, Mr. Kowlzan served in various senior mill-related operating positions with PCA and Tenneco Packaging, including as manager of the Counce linerboard mill. Prior to joining Tenneco Packaging, Mr. Kowlzan spent 15 years at International Paper, a global paper and packaging company, where he held a series of operational and managerial positions within its mill organization. Mr. Kowlzan is a member of the board of American Forest and Paper Association.

Charles J. Carter, 62, Executive Vice President - Mill Operations - Mr. Carter has led our mill operations since January 2011. Prior to this, he served as Vice President – Containerboard Mill Operations since January 2011. From March 2010 to January 2011, Mr. Carter served as PCA's Director of Papermaking Technology. Prior to joining PCA in 2010, Mr. Carter spent 28 years with various pulp and paper companies in managerial and technical positions of increasing responsibility, most recently as Vice President and General Manager of the Calhoun, Tennessee mill of Abitibi Bowater from 2007 to 2010 and as manager of SP Newsprint's Dublin, Georgia mill from 1999 to 2007.

Thomas A. Hassfurther, 66, Executive Vice President - Corrugated Products - Mr. Hassfurther has served as Executive Vice President - Corrugated Products of PCA since September 2009. From February 2005 to September 2009, Mr. Hassfurther served as Senior Vice President - Sales and Marketing, Corrugated Products. Prior to this he held various senior-level management and sales positions at PCA and Tenneco Packaging. Mr. Hassfurther joined the company in 1977.

Robert P. Mundy, 60, Executive Vice President and Chief Financial Officer - Mr. Mundy has served as our Chief Financial Officer since 2015. He previously served as Senior Vice President and Chief Financial Officer of Verso Corporation, a leading North American supplier of coated papers to catalog and magazine publishers, from 2006 to June 2015. Verso Corporation filed for Chapter 11 bankruptcy in January 2016. Prior to that, he worked at International Paper from 1983 to 2006, where he was Director of Finance of the Coated and Supercalendered Papers division from 2002 to 2006, Director of Finance Projects from 2001 to 2002, Controller of Masonite Corporation from 1999 to 2001, and Controller of the Petroleum and Minerals business from 1996 to 1999. He served in various business positions at International Paper from 1983 to 1996.

Pamela A. Barnes, 57, Senior Vice President – Finance and Controller - Ms. Barnes has served as Senior Vice President – Finance and Controller since May 2019. Ms. Barnes previously served as a Vice President in PCA's finance organization from 2012 to 2019. After joining the company in 1992, she has held various positions of increasing responsibility, including serving as PCA's Treasurer since 1999. Before joining PCA, Ms. Barnes worked for Deloitte & Touche.

Jeff S. Kaser, 56, Senior Vice President – Corrugated Products - Mr. Kaser has served as Senior Vice President – Corrugated Products since May 2020. Prior to this, he served as Vice President and Area General Manager of PCA's Midwest Area, Mid-Atlantic Area and Pennsylvania Region. Mr. Kaser joined PCA in 1987 and has also held plant positions in sales, sales management and general management.

Darla J. Olivier, 52, Senior Vice President – Tax, ESG and Government Affairs - Ms. Olivier has led our tax department since 1994 and served as Vice President—Tax from October 2010 to January 2022. In January 2022, she was promoted to Senior Vice President—Tax, ESG and Government Affairs, and leads our sustainability reporting and government affairs functions. Before joining PCA, Ms. Olivier worked for Coopers & Lybrand LLP, Alberto-Culver Company and SPX Corporation.

Kent A. Pflederer, 51, Senior Vice President, General Counsel and Secretary - Mr. Pflederer has served as Senior Vice President, General Counsel and Corporate Secretary since January 2013 and has led our legal department since June 2007. Prior to joining PCA, Mr. Pflederer served as Senior Counsel, Corporate and Securities, at Hospira, Inc. from 2004 to 2007 and served in the corporate and securities practice at Mayer Brown, LLP from 1996 to 2004.

Bruce A. Ridley, 66, Senior Vice President – Environmental Health and Safety and Operational Services - Mr. Ridley has served as Senior Vice President – Environmental Health and Safety and Operational Services since May 2019. Mr. Ridley previously served as Vice President of Operations from 2012 to 2019 and at PCA's Tomahawk, Wisconsin containerboard mill as the Operations Manager and Mill Manager from 1999 to 2011. Before joining PCA, he held several positions of increasing responsibility at multiple locations during his 19 years with International Paper and two years with Champion International.

Robert A. Schneider, 56, Senior Vice President and Chief Information Officer - Mr. Schneider has served as our Chief Information Officer since 2000 and was promoted to Senior Vice President in 2019. Mr. Schneider joined the company in 1989 and has held various management and other positions of increasing responsibility in information systems for PCA.

D. Ray Shirley, 50, Senior Vice President – Corporate Engineering and Process Technology - Mr. Shirley has served as PCA's Senior Vice President – Corporate Engineering and Process Technology since May 2019. Mr. Shirley previously served as PCA's Vice President – Containerboard Mills Engineering and Process Technology from 2012 to 2019 and as Mill Manager at PCA's Counce, Tennessee containerboard mill from 2010 to 2012. He has served in various management roles within the company, including the Operations Manager at the Filer City, Michigan containerboard mill. Before joining PCA in 1996, Mr. Shirley worked for Georgia-Pacific Corporation.

Available Information

PCA's internet website address is www.packagingcorp.com. Our annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934 are available free of charge through our website as soon as reasonably practicable after they are electronically filed with, or furnished to, the Securities and Exchange Commission. In addition, our Code of Ethics may be accessed in the Investor Relations section of PCA's website. PCA's website and the information contained or incorporated therein are not intended to be incorporated into this report.

Item 1A. RISK FACTORS

Some of the statements in this report and, in particular, statements found in Management's Discussion and Analysis of Financial Condition and Results of Operations, that are not historical in nature are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements include statements about our expectations regarding our future liquidity, earnings, expenditures, and financial condition. These statements are often identified by the words "will," "should," "anticipate," "believe," "expect," "intend," "estimate," "hope," or similar expressions. These statements reflect management's current views with respect to future events and are subject to risks and uncertainties. There are important factors that could cause actual results to differ materially from those in forward-looking statements, many of which are beyond our control. These factors, risks and uncertainties include, but are not limited to, the factors described below.

Our actual results, performance, or achievement could differ materially from those expressed in, or implied by, these forward-looking statements, and accordingly, we can give no assurances that any of the events anticipated by the forward-looking statements will transpire or occur, or if any of them do so, what impact they will have on our results of operations or financial condition. In view of these uncertainties, investors are cautioned not to place undue reliance on these forward-looking statements. We expressly disclaim any obligation to publicly revise or otherwise update any forward-looking statements that have been made to reflect the occurrence of events after the date hereof.

In addition to the risks and uncertainties we discuss elsewhere in this Form 10-K (particularly in "Part II, Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations") or in our other filings with the Securities and Exchange Commission (SEC), the following are important factors that could cause our actual results to differ materially from those we project in any forward-looking statement.

Risks Related to the COVID-19 Pandemic

The future effect of the COVID-19 pandemic on our operations is uncertain. Since the onset of the COVID-19 pandemic in 2020, federal, state and local authorities have taken measures to control the outbreak of COVID-19 in the United States, where we primarily operate. These measures have included travel bans and restrictions, quarantines and shelter in place orders, and standards affecting employers such as mask mandates, vaccine mandates and testing protocols. Due to the importance of our products to the continued distribution of food, beverage and other necessities, our operating facilities have remained in operation throughout the pandemic, and we have not experienced material disruptions in operations to date. PCA has experienced some labor shortage issues due to labor market conditions in general, which has been exacerbated by the pandemic, particularly the recent spread of the Omicron variant in late 2021 and early 2022. We have also experienced and may experience in the future higher supply chain and transportation costs, in part, due to the impacts of COVID-19. The impact of future variants of the virus and governmental measures to control the spread of the virus, including vaccine mandates or mandatory testing protocols, are uncertain and may materially restrict or hinder our ability to operate our facilities due to measures we may need to take to assure the health and safety of our employees, lack of available workforce, disruptions in the supply of key materials and services or restrictions due to governmental actions. If our operations are hindered or restricted, we may not be able to serve our customers, which could have a material adverse effect on our business, financial condition and results of operations.

The pandemic resulting from the COVID-19 outbreak, and measures to control the outbreak, have had a negative impact on certain businesses, which could adversely affect demand for our products and our business, financial condition and results of operations. Many businesses in the United States have been required to cease or curtail operations and workers have been laid off or furloughed, and have slowed down economic activity. The severity and duration of the impact on the economy will depend on the future spread of the outbreak, future measures by governmental authorities to control the outbreak, the timing and effectiveness of vaccination efforts, the timing and manner in which normal social and business activities are permitted to resume and the willingness of businesses and citizens to resume those activities and the effectiveness of governmental efforts to mitigate the economic effect of the outbreak, all of which are highly uncertain.

We have experienced significantly lower demand for our uncoated freesheet paper products, due to economic conditions, office closings and school shutdowns associated with the COVID-19 pandemic, which harmed the performance of our Paper segment and was a factor in our decision to permanently convert the No. 3 machine at our Jackson mill to permanently produce containerboard. While we have not experienced lower demand for our containerboard and corrugated packaging products to date, the effect of the pandemic on economic conditions affecting our business and future demand is uncertain. It is uncertain whether, to what extent and for what period of time current favorable demand conditions in the Packaging segment will continue. With the uncertainty of economic conditions, we are unable to determine the impact on our future operating and financial performance. A prolonged period of lower earnings and reduced cash flow could adversely affect our ability to fund operations, capital requirements, and common stock dividend payments and access capital markets.

Risks Related to our Operations, Business and Industry

Industry Cyclicity - Changes in the prices of our products could materially affect our financial condition, results of operations, and liquidity. Macroeconomic conditions and fluctuations in industry capacity can create changes in prices, sales volumes, and margins for most of our products, particularly commodity grades of packaging and paper products. Prices for all of our products are driven by many factors, including demand for our products, industry capacity and decisions made by other producers with respect to capacity and production, and other competitive conditions in our industry. These factors are affected by general global and domestic economic conditions. We have little influence over the timing and extent of price changes of our products, which may be unpredictable and volatile. In addition, as many of our customer contracts include price adjustment provisions based upon published index prices for containerboard or certain grades of UFS papers, our selling prices are influenced by index levels published by trade publications. Changes in how these index levels are determined or maintained may affect our sales prices. If supply exceeds demand, industry operating conditions deteriorate or other factors result in lower prices for our products, our earnings and operating cash flows would be harmed.

Competition - The intensity of competition in the industries in which we operate could result in downward pressure on pricing and volume, which could lower earnings and operating cash flows. Our industries are highly competitive, with no single containerboard, corrugated packaging, or UFS paper producer having a dominant position. Certain containerboard grades and commodity UFS paper products cannot generally be differentiated by producer, which tends to intensify price competition. The corrugated packaging industry is also sensitive to changes in economic conditions, as well as other factors including innovation, design, quality, and service. To the extent that one or more competitors are more successful than we are with respect to any key competitive factor, our business could be adversely affected. Our packaging products also compete, to some extent, with various other packaging materials, including products made of paper, plastics, wood, and various types of metal. If we are unable to successfully compete, we may lose market share or may be required to charge lower sales prices for our products, both of which would reduce our earnings and operating cash flows.

UFS paper products compete with electronic data transmission and document storage alternatives. Increasing shifts to electronic alternatives have had and will continue to have an adverse effect on usage of these products. As a result of such competition, the industry is experiencing decreasing demand for existing UFS paper products. As the use of these alternatives grows, demand for UFS paper products is likely to further decline. Declines in demand for our paper products may adversely affect our earnings and operating cash flows.

Some of our competitors are larger than we are and may have greater financial and other resources, greater manufacturing economies of scale, greater energy self-sufficiency, or lower operating costs, compared to our company. We may be unable to compete effectively with these companies particularly during economic downturns. Some of the factors that may adversely affect our ability to compete in the markets in which we participate include the entry of new competitors into the markets we serve, increased competition from overseas producers, our competitors' pricing strategies, changes in customer preferences, and the cost-efficiency of our facilities.

Cost of Fiber - An increase in the cost of fiber could increase our manufacturing costs and lower our earnings. The market price of wood fiber varies based upon availability, source, and the costs of fuels used in the harvesting and transportation of wood fiber. The cost and availability of wood fiber can also be impacted by weather, general logging conditions, geography, and regulatory activity.

The availability and cost of recycled fiber depends heavily on recycling rates and the domestic and global demand for recycled products. We purchase recycled fiber for use at six of our mills. In 2021, we purchased approximately 860,000 tons of recycled fiber, net of the recycled fiber generated by our corrugated box plants. The amount of recycled fiber purchased each year varies based upon production and the prices of both recycled fiber and wood fiber.

Periods of supply and demand imbalance have created significant price volatility. Periods of higher recycled fiber costs and unusual price volatility have occurred in the past, including during 2021, as demand for domestic recycled fiber remained high. Prices for recycled fiber may continue to fluctuate significantly in the future, which could result in higher costs and lower earnings. A \$10 per ton price increase in recycled fiber for our containerboard mills would result in approximately \$8.6 million of additional expense based on 2021 consumption.

Cost of Purchased Fuels and Chemicals - An increase in the cost of purchased fuels and chemicals could lead to higher manufacturing costs, resulting in reduced earnings. We are experiencing significant cost inflation for key inputs such as fuels and chemicals. We have the ability to use various types of purchased fuels in our manufacturing operations, including natural gas, bark, and other purchased fuels. Fuel prices, in particular prices for oil and natural gas, have fluctuated in the past. New and more stringent environmental regulations may discourage, reduce the availability of, or make more expensive, the use of certain fuels, such as natural gas, which represents the majority of our purchased fuels. In addition, costs for key chemicals used in our manufacturing operations also fluctuate. These fluctuations impact our manufacturing costs and result in earnings volatility. If fuel and chemical prices rise, our production costs and transportation costs will increase and cause higher manufacturing costs and reduced earnings if we are unable to recover such increases through higher prices of our products. A \$0.10 per million MMBTU increase in natural gas prices would result in approximately \$3 million of additional expense, based on 2021 usage.

Customer Concentration - We rely on certain large customers. Our packaging and paper segments each have large customers, the loss of which could adversely affect the segment's sales and profitability. In particular, because our businesses operate in highly competitive industry segments, we regularly bid for new business or for renewal of existing business. The loss of business from our larger customers, or the renewal of business on less favorable terms, may adversely impact our financial results.

Office Depot, Inc. is our largest customer in the Paper segment. Effective January 1, 2020, we have a revised agreement with Office Depot in which we will continue to supply commodity and non-commodity office papers to Office Depot through December 31, 2022. Office Depot is not subject to a minimum volume commitment and is entitled to receive rebates for achieving certain volume thresholds. If the agreement is not renewed by the parties, Office Depot's obligation to purchase paper would phase down over a two-year period beginning on January 1, 2023.

In 2021, sales to Office Depot represented 51% of our Paper segment sales and 4% of our consolidated sales. If these sales are reduced, including if we are unable to renew the agreement at historical volume levels, we would need to find new customers. We may not be able to fully replace any lost sales, and any new sales may be at lower prices or higher costs. Any significant deterioration in the financial condition of Office Depot affecting its ability to pay or any other change that makes Office Depot less willing to purchase our products will harm our business and results of operations.

Transportation Costs - Reduced truck and rail availability could lead to higher costs or poorer service, resulting in lower earnings, and harm our ability to distribute our products. We ship our products primarily by truck and rail. We have experienced lower availability of third-party trucking services, including truck and driver shortages, and service issues, interruptions, and delays in rail services. These issues became more pronounced later in 2021 and continue to persist. While we have generally been able to manage through these issues and have not experienced material disruptions in our ability to serve our customers, these issues have resulted in significantly higher costs for transportation services. If these factors persist, we could experience even higher transportation costs in the future and difficulties shipping our products in a timely manner. We may not be able to recover higher transportation costs through higher prices or otherwise, which would result in lower earnings.

Material Disruption of Manufacturing - A material disruption at one of our manufacturing facilities could prevent us from meeting customer demand, reduce our sales, and/or negatively affect our results of operations and financial condition. Our business depends on continuous operation of our facilities, particularly at our mills. Any of our manufacturing facilities, or any of our machines within such facilities, could cease operations unexpectedly for a significant period of time due to a number of events, including:

- Unscheduled maintenance outages.
- Prolonged power failures.
- Equipment or information system breakdowns or failures.
- Explosion of a boiler or other major facilities.
- Disruption in the supply of raw materials, such as wood fiber, energy, or chemicals.
- A spill or release of pollutants or hazardous substances.
- Closure or curtailment related to environmental concerns.
- Labor difficulties.
- Disruptions in the transportation infrastructure, including roads, bridges, railroad tracks, and tunnels.
- Terrorism or threats of terrorism.
- Other operational problems.

These events could harm our ability to produce our products and serve our customers and may lead to higher costs and reduced earnings.

Extreme Weather Events - Our facilities are susceptible to extreme weather events, which could disrupt our business. Extreme weather events like hurricanes, tornadoes, floods and winter storms have caused disruptions to our business both directly and indirectly in recent history. Climate change may increase the frequency and intensity of these extreme weather events. Certain weather events may cause damage to our facilities and require us to temporarily halt operations. In 2020, Hurricane Laura resulted in widespread damage and power interruption at our DeRidder, Louisiana containerboard mill resulting in a multiple day outage and significant lost production and incremental costs. These types of events may also disrupt our suppliers' operations and their ability to transport materials to our facilities. Disruptions to the supply chain may cause the cost of goods to temporarily increase. Damage to our facilities may cause insurance premiums to increase and also require us to incur additional costs to mitigate future risks.

Reliance on Personnel - We may fail to attract and retain qualified personnel, including key management personnel. Our ability to operate and grow our business depends on our ability to attract and retain employees with the skills necessary to operate and maintain our facilities, produce our products and serve our customers. The increasing demand for qualified personnel may make it more difficult for us to attract and retain qualified employees. Changing demographics and labor work force trends may make it difficult for us to replace retiring employees at our manufacturing and other facilities. U.S. labor market conditions are tight and labor shortages have been exacerbated by the COVID-19 pandemic. We have experienced higher than historical employee turnover in certain of our facilities. These conditions are expected to persist into 2022 and may lead to higher labor costs. If we fail to attract and retain qualified personnel, or if we experience labor shortages, we may experience higher costs and other difficulties, and our business may be adversely impacted.

In addition, we rely on key executive and management personnel to manage our business efficiently and effectively. As our business has grown in size and geographic scope, we have relied on these individuals to manage increasingly complex operations. The loss of any of our key personnel could adversely affect our business.

Cyber Security - Risks related to security breaches of company, customer, employee, and vendor information, as well as the technology that manages our operations and other business processes, could adversely affect our business. We rely on various information technology systems to capture, process, store, and report data and interact with customers, vendors, and employees. Despite careful security and controls design, implementation, updating, and internal and independent third-party assessments, our information technology systems, and those of our third-party providers, could become subject to cyber-attacks or security breaches. Network, system, and data breaches could result in misappropriation of sensitive data or operational disruptions including interruption to systems availability and denial of access to and misuse of applications required by our customers to conduct business with us. Misuse of internal applications; theft of intellectual property, trade secrets, or other corporate assets; and inappropriate disclosure of confidential information could stem from such incidents. Delayed sales, slowed production, or other issues resulting from these disruptions could result in lost sales, business delays, and negative publicity and could have a material adverse effect on our operations, financial condition, or operating cash flows.

Environmental Matters - PCA may incur significant environmental liabilities with respect to both past and future operations. We are subject to, and must comply with, a variety of federal, state and local environmental laws, particularly those relating to air and water quality, waste disposal and the cleanup of contaminated soil and groundwater. Failure to comply with these regulations could result in fines, which may be significant, or other adverse regulatory action. Because environmental regulations are constantly evolving, we have incurred, and will continue to incur, costs to maintain compliance with those laws. See Item 7. "Management's Discussion and Analysis of Financial Condition and Results of Operations - Environmental Matters" for estimates of expenditures we expect to make for environmental compliance in the next few years. New and more stringent environmental regulations may be adopted and may require us to incur additional operating expenses and/or significant additional capital expenditures to modify or replace certain of our boilers and other equipment. In addition, environmental regulations may increase the cost of our raw materials and purchased energy. Although we have established reserves to provide for known environmental liabilities, these reserves may change over time due to the enactment of new environmental laws or regulations or changes in existing laws or regulations, which might require additional significant environmental expenditures.

Labor Relations- If we experience strikes or other work stoppages, our business will be harmed. Our workforce is highly unionized and operates under various collective bargaining agreements. We must negotiate to renew or extend any union contracts that have recently expired or are expiring in the near future. While we believe that we have satisfactory labor relations, we may not be able to successfully negotiate new agreements without work stoppages or labor difficulties in the future or renegotiate them on favorable terms. If we are unable to successfully renegotiate the terms of any of these agreements, or if we experience any extended interruption of operations at any of our facilities as a result of strikes or other work stoppages, our business, results of operations and financial condition may be harmed.

Financial Risks

General Economic Conditions - If business, political, and economic conditions change in an adverse manner, our business, results of operations, liquidity, and financial position may be harmed. General global and domestic economic conditions directly affect the levels of demand and production of consumer goods, levels of employment, the availability and cost of credit, and ultimately, the profitability of our business. If economic conditions deteriorate and result in higher unemployment rates, lower disposable income, persistent inflation, unfavorable currency exchange rates, lower corporate earnings, lower business investment, and lower consumer spending, we may experience lower demand for our products, which is largely driven by demand for products of our customers which utilize our products. The U.S. economy is experiencing the highest levels of inflation in decades, and we are experiencing cost inflation across our business. Persistent inflation will result in continued higher production and transportation costs, which we may not be able to recover through higher prices charged to our customers or otherwise. In addition, changes in trade policy, including renegotiating or potentially terminating existing bilateral or multilateral agreements as well as the imposition of tariffs, could impact global markets and demand for our and our customers' products and the costs associated with certain of our capital investments. Further changes in tax laws or tax rates may have a material impact on our future cash taxes, effective tax rate or deferred tax assets and liabilities. These conditions are beyond our control and may have a material impact on our business, results of operations, liquidity, and financial position.

Inflation and Other General Cost Increases - We may not be able to offset higher costs. We are subject to both contractual, inflationary, and other general cost increases, including with regard to our labor costs and purchases of raw materials and transportation services. General economic conditions have resulted in higher inflation, which has led to higher costs across our business. If we are unable to offset these cost increases by price increases, growth, and/or cost reductions in our operations, these inflationary and other general cost increases could have a material adverse effect on our operating cash flows, profitability, and liquidity.

In 2021, our total company costs including cost of sales (COS) and selling, general, and administrative expenses (SG&A) was \$6.4 billion, and excluding non-cash costs (depreciation, depletion and amortization, pension and postretirement expense, and share-based compensation expense) was \$6.0 billion. A 1% increase in COS and SG&A costs would increase costs by \$64 million and cash costs by \$60 million.

Debt obligations - Our debt service obligations may reduce our operating flexibility. At December 31, 2021, we had \$2.5 billion of debt outstanding and a \$323.2 million undrawn revolving credit facility, after deducting letters of credit. All debt is comprised of fixed-rate senior notes. We and our subsidiaries are not restricted from incurring, and may incur, additional indebtedness in the future.

Our current borrowings, plus any future borrowings, may affect our ability to operate our business, including, without limitation:

- Result in significant cash requirements to make interest and maturity payments on our outstanding indebtedness;
- Increase our vulnerability to adverse changes in our business or industry conditions;
- Increase our vulnerability to increases in interest rates;
- Limit our ability to obtain additional financing for working capital, capital expenditures, general corporate, and other purposes;
- Limit our flexibility in planning for, or reacting to, changes in our business and our industry; and
- Limit our flexibility to make acquisitions.

Further, if we cannot service our indebtedness, we may have to take actions to secure additional cash by selling assets, seeking additional equity or reducing investments, which may not be achievable on acceptable terms or at all.

Pension Plans - Our pension plans may require additional funding. We record a liability associated with our pensions equal to the excess of the benefit obligations over the fair value of the assets funding the plans. The actual required amounts and timing of future cash contributions will be sensitive to changes in the applicable discount rates and returns on plan assets, and could also be impacted by future changes in the laws and regulations applicable to plan funding. Fluctuations in the market performance of our plan assets will affect our pension plan costs in future periods. Changes in assumptions regarding expected long-term rate of return on plan assets, our discount rate, expected compensation levels, or mortality will also increase or decrease pension costs.

Market Price of our Common Stock - The market price of our common stock may be volatile, which could cause the value of the stock to decline. Securities markets worldwide periodically experience significant price declines and volume fluctuations due to macroeconomic factors and other factors beyond our control. This market volatility, as well as general economic, market, or political conditions, could reduce the market price of our common stock with little regard to our operating performance. In addition, our operating results could be below the expectations of public market analysts and investors, and in response, the market price of our common stock could decrease significantly.

Item 1B. UNRESOLVED STAFF COMMENTS

None.

Item 2. PROPERTIES

We own and lease properties in our business. Primarily all of our leases are non-cancelable and are accounted for as operating leases. These leases are not subject to early termination except for standard nonperformance clauses.

Information regarding our principal operating facilities, the segments that use those facilities, and a map of geographical locations is presented in “Part I, Item 1. Business” of this Form 10-K. We assess the condition and capacity of our manufacturing, distribution, and other facilities needed to meet our operating requirements. Our properties have been generally well maintained and are in good operating condition. In general, our facilities have sufficient capacity and are adequate for our production and distribution requirements.

We currently own buildings and land for our eight mills. Additionally, we have 90 corrugated manufacturing operations, of which the buildings and land for 53 are owned, including 45 combining operations, or corrugated plants, one corrugated sheet-only manufacturer, and seven sheet plants. We lease the buildings for 14 corrugated plants and 23 sheet plants. We own warehouses and miscellaneous other properties, including sales offices and woodlands management offices. We lease space for regional design centers and numerous other distribution centers, warehouses, and facilities. The equipment in these leased facilities is, in virtually all cases, owned by us, except for forklifts and other rolling stock, which are generally leased.

We own our corporate headquarters building, which is located in Lake Forest, Illinois.

Item 3. LEGAL PROCEEDINGS

Information concerning legal proceedings can be found in Note 21, Commitments, Guarantees, Indemnifications, and Legal Proceedings, of the Notes to Consolidated Financial Statements in “Part II, Item 8. Financial Statements and Supplementary Data” of this Form 10-K.

Item 4. MINE SAFETY DISCLOSURE

Not applicable.

PART II

Item 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS, AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information

PCA's common stock is listed on the New York Stock Exchange (NYSE) under the symbol "PKG".

Stockholders

On February 18, 2022, there were 137 holders of record of our common stock.

Purchases of Equity Securities

Stock Repurchase Program

On January 26, 2022, PCA announced that its Board of Directors authorized the repurchase of \$1 billion of the Company's outstanding common stock from time to time in open market or privately negotiated transactions in accordance with applicable securities laws. At the time of the announcement, there was no remaining authority under previously announced programs. Repurchases may be made from time to time in open market or privately negotiated transactions in accordance with applicable securities regulations. The timing and amount of repurchases will be determined by the Company in its discretion based on factors such as PCA's stock price and market and business conditions.

During the fourth quarter of 2021, we paid \$193.0 million to repurchase 1.4 million shares of common stock, which was the entire remaining amount of repurchase authority we had under previously announced share repurchase programs. All shares repurchased have been retired. The Company did not repurchase any shares of its common stock during the years ended December 31, 2020 and 2019.

Pursuant to its equity incentive plan, the Company withholds shares from vesting employee equity awards to cover employee tax liabilities. Total shares withheld in 2021 were 95,437 to cover \$12.9 million in employee tax liabilities. Total shares withheld in 2020 were 107,627 to cover \$10.5 million in employee tax liabilities. Total shares withheld in 2019 were 87,668 to cover \$8.2 million of employee tax liabilities.

The following table presents information related to our repurchases of common stock made under repurchase plans authorized by PCA's Board of Directors, and shares withheld to cover taxes on vesting of equity awards, during the three months ended December 31, 2021:

Issuer Purchases of Equity Securities					
Period	Total Number of Shares Purchased		Average Price Paid Per Share (b)	Total 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 (in millions)
October 1-31, 2021	—		\$ —	—	\$ 193.0
November 1-30, 2021	1,209,317 (a)		133.91	1,206,612	31.4
December 1-31, 2021	240,765 (a)		133.17	235,999	—
Total	1,450,082		\$ 133.78	1,442,611	\$ —

(a) 7,471 shares were withheld from employees to cover income and payroll taxes on equity awards that vested during the period.

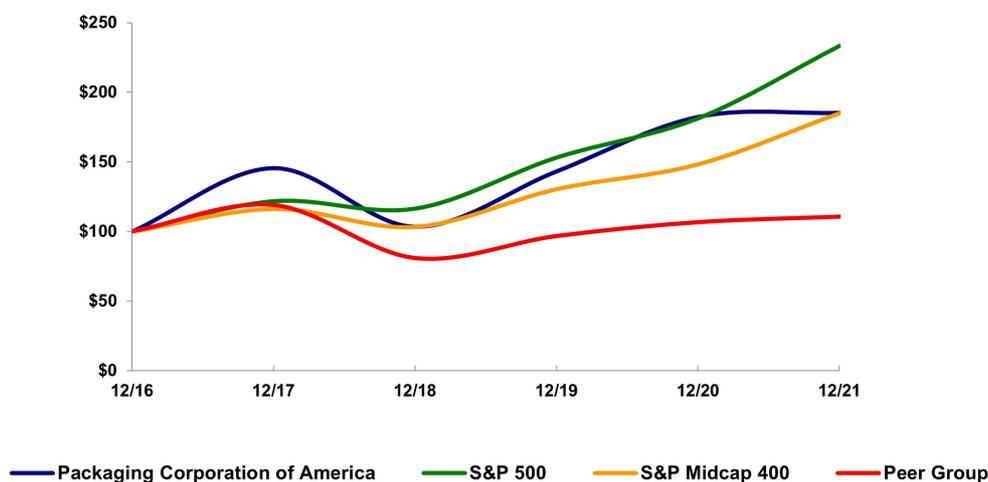
(b) Excludes commissions.

Performance Graph

The graph below compares PCA's cumulative 5-year total shareholder return on common stock with the cumulative total returns of the S&P 500 index; the S&P Midcap 400 index; and a customized peer group of two companies that includes: International Paper and WestRock Company. Domtar Corporation, which was included in the peer group in prior years, is no longer actively traded due to a recent acquisition. As a result, Domtar Corporation was subsequently removed from the peer group for the 2021 analysis. The graph tracks the performance of a \$100 investment (including the reinvestment of all dividends) in our common stock, in each index, and in each peer group's common stock from December 31, 2016 through December 31, 2021. The stock price performance included in this graph is not necessarily indicative of future stock price performance.

COMPARISON OF 5 YEAR CUMULATIVE TOTAL RETURN*

Among Packaging Corporation of America, the S&P 500 Index, the S&P Midcap 400 Index, and a Peer Group



*\$100 invested on 12/31/16 in stock or index, including reinvestment of dividends. Fiscal year ending December 31.

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	Cumulative Total Return					
	December 31,					
	2016	2017	2018	2019	2020	2021
Packaging Corporation of America	\$ 100.00	\$ 145.49	\$ 103.50	\$ 143.19	\$ 182.23	\$ 185.17
S&P 500	100.00	121.83	116.49	153.17	181.35	233.41
S&P Midcap 400	100.00	116.24	103.36	130.44	148.26	184.96
Peer Group	100.00	118.91	80.79	96.62	106.57	110.53

The information in the graph and table above is not deemed "filed" with the Securities and Exchange Commission and is not to be incorporated by reference in any of PCA's filings under the Securities Act of 1933 or the Securities Exchange Act of 1934, whether made before or after the date of this Annual Report on Form 10-K, except to the extent that PCA specifically incorporates such information by reference.

Item 6. [RESERVED]

Item 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis of historical results of operations and financial condition should be read in conjunction with the audited financial statements and the notes thereto which appear elsewhere in this Form 10-K. This discussion includes forward-looking statements regarding our expectations with respect to our future performance, liquidity, and capital resources. Such statements, along with any other non-historical statements in the discussion, are forward-looking. See our discussion regarding forward-looking statements included under "Part I, Item 1A. Risk Factors" of this Form 10-K. For our discussion and analysis of our results of operations, financial condition and cash flows for the year ended December 31, 2019, the earliest of the years presented in the accompanying audited financial statements included in Item 8 herein, please refer to our Annual Report on Form 10-K for the year ended December 31, 2020, filed with the Securities and Exchange Commission on February 24, 2021. Such information is presented in Item 7 of such report under the subcaptions "Results of Operations —Year Ended December 31, 2020, Compared with Year Ended December 31, 2019" and "Liquidity and Capital Resources" and is incorporated by reference herein.

Overview

PCA is the third largest producer of containerboard products and a leading producer of uncoated freesheet paper in North America. We operate eight mills and 90 corrugated products manufacturing plants. Our containerboard mills produce linerboard and corrugating medium, which are papers primarily used in the production of corrugated products. Our corrugated products manufacturing plants produce a wide variety of corrugated packaging products, including conventional shipping containers used to protect and transport manufactured goods, multi-color boxes and displays with strong visual appeal that help to merchandise the packaged product in retail locations, and honeycomb protective packaging. In addition, we are a large producer of packaging for meat, fresh fruit and vegetables, processed food, beverages, and other industrial and consumer products. We also manufacture and sell UFS papers, including both commodity and specialty papers, which may have custom or specialized features such as colors, coatings, high brightness, and recycled content. We are headquartered in Lake Forest, Illinois and operate primarily in the United States.

Executive Summary

Net sales were \$7.73 billion for the year ended December 31, 2021 and \$6.66 billion in 2020. We reported \$841 million of net income, or \$8.83 per diluted share, in 2021, compared to \$461 million, or \$4.84 per diluted share, in 2020. Net income included \$53 million of expense for special items in 2021, compared to \$89 million of expense for special items in 2020. Special items in both periods are described later in this section. Excluding special items, we recorded \$894 million of net income, or \$9.39 per diluted share, in 2021, compared to \$550 million, or \$5.78 per diluted share, in 2020. The increase was driven primarily by higher prices and mix in our Packaging and Paper segments and higher volumes in our Packaging segment, partially offset by higher operating and converting costs, higher annual outage expense, lower volumes in our Paper segment, and higher freight and logistic expense. For additional detail on special items included in reported GAAP results, as well as segment income (loss) excluding special items, earnings before non-operating pension expense, interest, income taxes, and depreciation, amortization, and depletion (EBITDA), and EBITDA excluding special items, see "Item 7. Reconciliations of Non-GAAP Financial Measures to Reported Amounts." PCA ended the year with \$765 million of cash and marketable debt securities and, including borrowing availability under its revolving credit facility, \$1.1 billion in liquidity.

Packaging segment income from operations was \$1,306 million in 2021, compared to \$830 million in 2020. Packaging segment EBITDA excluding special items was \$1,688 million in 2021, compared to \$1,229 million in 2020. The increase was driven primarily by higher containerboard and corrugated products prices and mix and higher sales and production volumes, partially offset by higher operating and converting costs, higher annual outage expense, and higher freight and logistic expenses. Demand for Packaging segment products remained strong throughout the year, with record-setting shipments from our corrugated products and record containerboard production. We also continued to experience cost inflation across our business, including in the areas of labor and benefits, recycled fiber, energy, repairs, materials, and supplies, as well as higher transportation costs, driven by higher fuel costs, tight rail supply, driver and truck shortages, and higher spot prices. We have experienced some workforce availability issues late in the year and early in 2022 due to the spread of the Omicron variant, as well as effects from supply chain and transportation service disruptions, but we have generally been able to manage through these issues such that our operations have not been materially disrupted. We continue to deploy capital to improve productivity and efficiencies at our facilities and believe that our success in doing so is helping us to manage cost inflation and better serve our customers.

Paper segment income from operations was \$39 million in 2021, compared to a loss of \$20 million in 2020. Paper segment EBITDA excluding special items was \$72 million in 2021, compared to \$73 million in 2020. The decrease was due primarily to lower sales and production volumes and higher freight and logistic expenses, partially offset by lower operating costs, lower annual outage expense, and higher paper prices and mix. As described in Note 9, Goodwill and Intangible Assets included in Item 8 of this Annual Report on Form 10-K, we incurred a charge of \$55.2 million during 2020 associated with the full impairment of goodwill within the Paper segment.

Sales and production volumes in the Paper segment significantly declined after the first quarter of 2020 as the COVID-19 pandemic caused lower demand for our paper products. During the second and third quarters of 2020, in response to such lower demand, we temporarily idled both machines at our Jackson, Alabama mill. During the fourth quarter of 2020, in order to meet strong packaging demand and maintain appropriate inventory levels in the Packaging segment, we temporarily began producing linerboard on the No. 3 machine at the mill, and we have produced linerboard on the machine since that time. In the first quarter of 2021, we announced the discontinuation of production of uncoated freesheet paper grades on the machine and the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities. Demand for paper products has improved since the beginning of the pandemic, but our sales and production in the Paper segment will remain below pre-pandemic levels as we will no longer be producing paper products on the machine. Later in 2021, we began to produce corrugating medium on the No. 1 machine at the Jackson mill (which had produced uncoated freesheet paper in the past) to help satisfy our demand for containerboard, build necessary inventories, and evaluate the capability of the machine to produce containerboard on a cost-effective basis. We expect to continue to produce corrugating medium on the machine for the foreseeable future. Before October 2020, operating results for the Jackson mill were included in the Paper segment. Beginning in October 2020, operating results for the Jackson mill are included in both the Packaging and Paper segments.

On December 10, 2021, we completed the acquisition of the assets of Advance Packaging Corporation, an independent corrugated products producer, for a cash purchase price of \$195 million, including a purchase price adjustment based upon net working capital. Advance Packaging is a full-service producer of corrugated packaging products, including graphics, retail displays, sustainable shipping containers, and protective packaging. Advance Packaging owns and operates a 500,000 square foot corrugated products facility in Grand Rapids, Michigan. The operating results of Advance Packaging are included in PCA's results after the date of acquisition. The acquisition is consistent with our historical growth strategy and will provide additional integration of containerboard we produce into our own corrugated products facilities.

Special Items and Earnings per Diluted Share, Excluding Special Items

Earnings per diluted share, excluding special items, in 2021 and 2020 were as follows:

	Year Ended December 31,	
	2021	2020
Earnings per diluted share	\$ 8.83	\$ 4.84
Special items:		
Facilities closure and other costs (income) (a)	(0.03)	0.23
Debt refinancing (b)	0.47	—
Jackson mill conversion-related activities (c)	0.11	—
Acquisition and integration related costs (d)	0.01	—
Goodwill impairment (e)	—	0.58
Hurricane Laura impact (f)	—	0.08
Incremental costs for COVID-19 (g)	—	0.05
Total special items expense	0.56	0.94
Earnings per diluted share, excluding special items	<u>\$ 9.39</u>	<u>\$ 5.78</u>

- (a) For 2021, includes \$3.6 million of income primarily consisting of an adjustment of the required asset retirement obligation related to the 2020 closure of the San Lorenzo, California facility, a gain on sale of transportation assets and corrugated products facilities, and insurance proceeds received for a natural disaster at one of the corrugated products facilities, partially offset by closure costs related to corrugated products facilities. For 2020, includes \$28.1 million of restructuring costs for paper administrative functions and closure costs related to corrugated products facilities, substantially all of which relates to the previously announced closure of the San Lorenzo, California facility during the second quarter of 2020, partially offset by income related to the sale of a corrugated products facility during the second quarter of 2020.
- (b) Includes \$58.9 million of costs related to the Company's debt refinancing completed in October 2021, which included a redemption premium and the write-off of the remaining balance of unamortized debt issuance costs.
- (c) Includes \$14.0 million of charges related to the announced discontinuation of production of uncoated freesheet paper grades on the No. 3 machine at the Jackson, Alabama mill associated with the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities.
- (d) Includes \$0.9 million of charges for acquisition and integration costs related to the December 2021 Advance Packaging Corporation acquisition.

- (e) During the second quarter of 2020, with the exacerbated deterioration in uncoated freesheet market conditions and the estimated impact on our Paper reporting unit arising from the COVID-19 pandemic, as well as projected future results of operations, we identified a triggering event indicating possible impairment of goodwill within our Paper reporting unit. The Company performed an interim quantitative impairment analysis as of May 31, 2020, and, based on the evaluation performed, we determined that goodwill was fully impaired for the Paper reporting unit and recognized a non-cash impairment charge of \$55.2 million.
- (f) Includes \$10.0 million of charges related to the impact of Hurricane Laura at our DeRidder, Louisiana mill, including unabsorbed costs related to lost production, excess purchased containerboard and freight costs, repair expenses, rental and supplies costs, and other recovery expenses.
- (g) Includes \$6.9 million of incremental, out-of-pocket costs related to COVID-19, including supplies, cleaning and sick pay. Beginning in July 2020, all corresponding COVID-19 related expenses were included in normalized costs.

Management excludes special items, as it believes these items are not necessarily reflective of the ongoing results of operations of our business. We present these measures because they provide a means to evaluate the performance of our segments and our company on an ongoing basis using the same measures that are used by our management, because these measures assist in providing a meaningful comparison between periods presented and because these measures are frequently used by investors and other interested parties in the evaluation of companies and the performance of their segments. A reconciliation of diluted earnings per share to diluted earnings per share excluding special items is included above and the reconciliations of other non-GAAP measures used in this Management's Discussion and Analysis of Financial Condition and Results of Operations, to the most comparable measure reported in accordance with GAAP, are included later in Item 7 under "Reconciliations of Non-GAAP Financial Measures to Reported Amounts." Any analysis of non-GAAP financial measures should be done in conjunction with results presented in accordance with GAAP. The non-GAAP measures are not intended to be substitutes for GAAP financial measures and should not be used as such.

Industry and Business Conditions

Trade publications reported North American industry-wide corrugated products shipments per workday were up 2.8% during 2021, compared to 2020. Reported industry containerboard production increased 5.6% compared to 2020, and reported industry containerboard inventories at the end of 2021 were approximately 2.8 million tons, up 19.5% compared to 2020. Reported containerboard export shipments increased 9.9% compared to 2020. Prices reported by trade publications increased by \$20 per ton for linerboard and \$30 per ton for corrugating medium in March 2021, \$40 per ton for linerboard and corrugating medium in April 2021, and a further \$50 per ton for linerboard and \$60 per ton for corrugating medium in August 2021.

The market for communication papers competes heavily with electronic data transmission and document storage alternatives. Increasing shifts to these alternatives have reduced usage of traditional print media and communication papers. Trade publications reported North American uncoated freesheet paper shipments were down 0.4% in 2021, compared to 2020. Average prices reported by a trade publication for cut size office papers increased \$20 per ton in March 2021, \$40 per ton in April 2021, \$30 per ton in June 2021, \$30 per ton in July 2021, and \$80 per ton in November 2021.

Outlook

For the first quarter of 2022, in the Packaging segment, we expect higher corrugated products volume than the fourth quarter of 2021, driven by continued strong demand and three additional shipping days, along with slightly higher domestic and export containerboard sale prices and mix. Earlier in the first quarter, we notified our customers of a \$70 per ton price increase for all of our linerboard and corrugating grades. We do not expect to realize significant benefits of this price increase during the first quarter of 2022.

In our Paper segment, we expect higher prices and mix from price increases previously communicated to customers during the fourth quarter and earlier in the first quarter of 2022.

We expect maintenance outage expenses in the first quarter to be lower than the fourth quarter. We also expect continued cost inflation to persist at higher than historical levels across our mills, converting plants, and other operations as well as freight and logistics expenses. In addition to the effect of cost inflation, labor and benefits costs will also be higher due to timing-related increases such as annual wage increases, and seasonally colder weather is expected to increase energy and wood fiber costs. The effect of higher costs is expected to offset any sequential benefit of higher corrugated products volume and more favorable prices and mix in our Packaging and Paper segments. Considering these items, and excluding the effect of any special items, we expect first quarter earnings to be lower than our earnings for the fourth quarter of 2021.

Results of Operations

Year Ended December 31, 2021, Compared with Year Ended December 31, 2020

The historical results of operations of PCA for the years ended December 31, 2021 and 2020 are set forth below (dollars in millions):

	Year Ended December 31,		Change
	2021	2020	
Packaging	\$ 7,052.6	\$ 5,919.5	\$ 1,133.1
Paper	599.7	674.8	(75.1)
Corporate and other and eliminations	78.0	63.9	14.1
Net sales	\$ 7,730.3	\$ 6,658.2	\$ 1,072.1
Packaging	\$ 1,306.0	\$ 829.5	\$ 476.5
Paper	39.1	(20.0)	59.1
Corporate and other	(103.7)	(85.6)	(18.1)
Income from operations	1,241.4	723.9	517.5
Non-operating pension income	19.7	2.3	17.4
Interest expense, net	(152.4)	(93.5)	(58.9)
Income before taxes	1,108.7	632.7	476.0
Income tax expense	(267.6)	(171.7)	(95.9)
Net income	\$ 841.1	\$ 461.0	\$ 380.1
Net income excluding special items (a)	\$ 893.8	\$ 550.0	\$ 343.8
EBITDA (a)	\$ 1,658.9	\$ 1,133.9	\$ 525.0
EBITDA excluding special items (a)	\$ 1,665.4	\$ 1,225.0	\$ 440.4

- (a) See "Reconciliations of Non-GAAP Financial Measures to Reported Amounts" included in this Item 7 for a reconciliation of non-GAAP measures to the most comparable GAAP measure.

Net Sales

Net sales increased \$1,072 million, or 16.1%, to \$7,730 million in 2021, compared to \$6,658 million in 2020.

Packaging. Net sales increased \$1,133 million, or 19.1%, to \$7,053 million, compared to \$5,920 million in 2020, due to higher prices and mix (\$699 million) and increased volumes (\$435 million), primarily due to higher containerboard and corrugated products shipments and strong demand. In 2021, our domestic containerboard prices increased 17.2% and export prices increased 40.7% compared to 2020. Our containerboard outside shipments increased 38.2%, and total corrugated products shipments were up 4.5% in total and 5.0% per workday, compared to 2020, driven by strong demand.

Paper. Net sales decreased \$75 million, or 11.1%, to \$600 million, compared to \$675 million in 2020. The decrease was due to lower volume (\$85 million), primarily related to the discontinuation of producing UFS on the Jackson No. 3 machine, partially offset by higher prices and mix (\$10 million).

Gross Profit

Gross profit increased \$504 million in 2021, compared to 2020. The increase was driven primarily by higher prices and mix in our Packaging and Paper segments and higher volumes in our Packaging segment, partially offset by higher operating and converting costs, higher annual outage expense, lower volumes in our Paper segment, and higher freight and logistic expense. In 2021, gross profit included \$7 million of special items expense related to Jackson mill conversion-related activities, corrugated facility closure costs, and corrugated facility acquisition costs, compared to \$21 million of special items expense related to the impact of Hurricane Laura at our DeRidder, Louisiana mill, incremental out-of-pocket costs related to COVID-19, and facility closure costs in 2020.

Selling, General, and Administrative Expenses

Selling, general, and administrative expenses (SG&A) increased \$37 million in 2021 compared to 2020. The increase was primarily due to higher employee salaries and fringe benefits.

Goodwill Impairment

During 2020, with the exacerbated deterioration in uncoated freesheet market conditions and the estimated impact on our Paper reporting unit arising from the COVID-19 pandemic, as well as projected future results of operations, we identified a triggering event indicating possible impairment of goodwill within our Paper reporting unit. The Company performed an interim quantitative impairment analysis as of May 31, 2020, and, based on the evaluation performed, we determined that goodwill was fully impaired for the Paper reporting unit and recognized a non-cash impairment charge of \$55 million. For more information, see Note 9, Goodwill and Intangible Assets, of the Condensed Notes to the Consolidated Financial Statements in “Part II, Item 8. Financial Statements” of this Form 10-K.

Other Expense, Net

Other expense, net for the years ended December 31, 2021 and 2020 are set forth below (dollars in millions):

	Year Ended December 31,	
	2021	2020
Asset disposals and write-offs	\$ (38.9)	\$ (26.5)
Facilities closure and other income (costs)	6.5	(19.1)
Jackson mill conversion-related activities	(8.9)	—
Acquisition and integration related costs	(0.6)	—
Other	(12.9)	(5.1)
Total	<u>\$ (54.8)</u>	<u>\$ (50.7)</u>

We discuss these items in more detail in Note 7, Other Expense, Net of the Condensed Notes to the Consolidated Financial Statements in “Part II, Item 8. Financial Statements” of this Form 10-K.

Income from Operations

Income from operations increased \$518 million, or 71.5%, for the year ended December 31, 2021, compared to 2020. Income from operations in 2021 included \$11 million of expense for special items compared to \$100 million in 2020. Special items in 2021 consisted of \$14 million of expense for Jackson mill conversion-related costs and other paper-to-containerboard conversion-related activities, \$1 million of expense related to the acquisition of Advance Packaging, and \$4 million of income related to corrugated products facility closures. 2020 special items included \$55 million of expense for the Paper reporting unit goodwill impairment; \$28 million of restructuring costs for closure costs related to corrugated products facilities and paper administrative functions; \$10 million related to the impact of Hurricane Laura at our DeRidder, Louisiana mill; and \$7 million of incremental, out-of-pocket costs related to COVID-19 that were incurred in the first half of 2020.

Packaging. Segment income from operations increased \$477 million to \$1,306 million, compared to \$829 million in 2020. The increase in 2021 related primarily to higher containerboard and corrugated products prices and mix (\$646 million) and higher containerboard and corrugated products sales and production volumes (\$278 million), partially offset by higher operating and converting costs (\$340 million), higher freight expense (\$72 million), higher annual outage expense (\$56 million), and higher depreciation expense (\$24 million). Special items in 2021 included \$4 million of expense for Jackson mill conversion-related activities, \$1 million of expense related to the acquisition of Advanced Packaging, and \$3 million of income related to corrugated products facility closures. Special items in 2020 included \$27 million of closure costs for corrugated products facilities, \$10 million of charges related to the impact of Hurricane Laura at our DeRidder, Louisiana mill, and \$6 million of incremental, out-of-pocket costs related to COVID-19.

Paper. Segment income from operations increased \$59 million to \$39 million, compared to a loss of \$20 million in 2020. The increase, excluding special items, primarily related to higher paper prices and mix (\$11 million), lower operating costs (\$37 million), lower annual outage expense (\$23 million), and lower depreciation expense (\$13 million), partially offset by lower sales and production volumes (\$42 million), higher freight expense (\$28 million), and other fixed costs (\$3 million). Special items in the Paper segment in 2021 included \$9 million of expense for Jackson mill conversion-related activities, compared to \$55 million related to goodwill impairment, \$1 million of restructuring costs for paper administrative functions, and \$1 million of incremental, out-of-pocket costs related to COVID-19 in 2020.

Non-Operating Pension Expense, Interest Expense, Net and Income Taxes

During 2021, non-operating pension income increased \$17 million compared to 2020. The increase in non-operating pension expense was primarily related to the favorable 2020 asset performance, partially offset by assumption changes.

Interest expense, net, during 2021 increased \$59 million compared to 2020. The increase is related to the \$59 million of charges from the Company's debt refinancing completed in October 2021.

During 2021, we recorded \$268 million of income tax expense, compared with \$172 million of income tax expense during 2020. The effective tax rate for 2021 and 2020 was 24.1% and 27.1%, respectively. The higher effective tax rate for 2020 was primarily due to the nondeductible goodwill impairment charge associated with our Paper reporting unit with no corresponding charge during 2021.

Liquidity and Capital Resources

Sources and Uses of Cash

Our primary sources of liquidity are net cash provided by operating activities and available borrowing capacity under our revolving credit facility. We ended the year with \$619 million of cash and cash equivalents, \$146 million of marketable debt securities, and \$323 million of unused borrowing capacity under the revolving credit facility, net of letters of credit. On October 8, 2021, we redeemed our \$700 million of outstanding 4.50% notes due November 1, 2023, using the proceeds of new notes we issued in September 2021 and cash-on-hand. See Note 11, Debt, of the Condensed Notes to the Consolidated Financial Statements in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K as well as the information provided below under "--Financing Activities" for further information.

Currently, our primary uses of cash are for operations, capital expenditures, acquisitions, debt service, common stock dividends, and repurchases of common stock. We believe that net cash generated from operating activities, cash on hand, available borrowings under our revolving credit facility and available capital through access to capital markets will be adequate to meet our liquidity and capital requirements, including payments of any declared common stock dividends, for the foreseeable future. As our debt or credit facilities become due, we will need to repay, extend or replace such facilities. Our ability to do so will be subject to future economic conditions and financial, business, and other factors, many of which are beyond our control.

Below is a summary table of our cash flows, followed by a discussion of our sources and uses of cash through operating activities, investing activities, and financing activities (dollars in millions):

	Year Ended December 31,	
	2021	2020
Net cash provided by (used for):		
Operating activities	\$ 1,094.1	\$ 1,032.8
Investing activities	(794.4)	(426.1)
Financing activities	(655.6)	(311.6)
Net (decrease) increase in cash and cash equivalents	<u>\$ (355.9)</u>	<u>\$ 295.1</u>

Operating Activities

Our operating cash flow is primarily driven by our earnings and changes in operating assets and liabilities, such as accounts receivable, inventories, accounts payable and other accrued liabilities, as well as other factors described below. Cash requirements for operating activities are subject to PCA's operating needs and the timing of collection of receivables and payments of payables and expenses.

During 2021, net cash provided by operating activities was \$1,094 million, compared to \$1,033 million for 2020, an increase of \$61 million. Cash from operations excluding changes in cash used for operating assets and liabilities increased \$426 million, primarily due to higher income from operations as discussed above. Cash decreased by \$365 million due to changes in operating assets and liabilities, primarily due to the following:

- a) an increase in accounts receivable levels in 2021 compared to 2020 due to higher sales volumes and pricing in the Packaging segment and higher pricing partially offset by lower sales volumes in the Paper segment in 2021;
- b) an increase in inventories in 2021 compared to 2020 primarily related to an increase in containerboard and finished goods in the Packaging segment due to the need to service stronger demand;
- c) an unfavorable change in accounts payable in 2021 compared to 2020 related to the timing of payments; and
- d) higher income tax payments in 2021 due to higher income levels in 2021 as compared to 2020.

These changes were partially offset by an increase in accrued liabilities in 2021 compared to 2020 due to higher accruals for employee compensation and benefits liabilities as well as higher accruals for customer volume rebates in 2021.

Investing Activities

We used \$794 million for investing activities in 2021, compared to \$426 million in 2020. In 2021, we spent \$605 million for internal capital investments, compared to \$421 million in 2020. During 2021, we acquired Advance Packaging Corporation for \$195 million, including a purchase price adjustment based upon net working capital. We did not acquire any businesses in 2020.

The details of capital expenditures for property and equipment, excluding acquisitions, by segment for the years ended December 31, 2021 and 2020 are included in the table below (dollars in millions).

	Year Ended December 31,	
	2021	2020
Packaging	\$ 562.5	\$ 395.2
Paper	30.1	19.7
Corporate and Other	12.5	6.3
	<u>\$ 605.1</u>	<u>\$ 421.2</u>

We expect capital investments in 2022 to be about \$800 million, including capital spending related to the conversion of the No. 3 paper machine to containerboard at our Jackson mill. These expenditures could increase or decrease as a result of a number of factors, including our financial results, strategic opportunities, future economic conditions, and our regulatory compliance requirements. We currently estimate capital expenditures to comply with environmental regulations will be about \$17 million in 2022. Our estimated environmental expenditures could vary significantly depending upon the enactment of new environmental laws and regulations. For additional information, see "Environmental Matters" in this Management's Discussion and Analysis of Financial Condition and Results of Operations.

At December 31, 2021, the Company had commitments for capital expenditures of \$785 million. The Company believes that cash-on-hand combined with cash flow from operations will be sufficient to fund these commitments.

Financing Activities

In 2021, net cash used for financing activities was \$656 million, compared to \$312 million of cash used for financing activities in 2020, an increase of \$344 million. We paid \$380 million in dividends on our common stock in 2021, compared to \$300 million paid in 2020. We repurchased and retired 1.4 million shares of the Company's common stock for \$193 million in 2021. We had no share repurchases in 2020. In 2021, we issued \$700 million of 3.05% Senior Notes due 2051 (the "New Notes") through a registered public offering and notified the holders of our \$700 million 4.50% Senior Notes due November 1, 2023 (the "Old Notes") that we would redeem those notes in October 2021. On October 8, 2021, we completed the redemption of the Old Notes for \$770 million, which included a redemption premium of \$56 million and \$14 million of accrued and unpaid interest. We used the proceeds of the offering of the New Notes and cash-on-hand to fund the redemption and the \$8 million of debt issuance costs associated with the New Notes.

In addition to the \$8 million of issuance costs associated with the debt refinancing, we paid an additional \$1 million of issuance costs related to the New Revolving Credit Agreement that was entered into June 8, 2021.

See Note 11, Debt, of the Consolidated Financial Statements included in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K for more information on the debt refinancing.

Commitments

Contractual Obligations

Our cash requirements greater than twelve months from contractual obligations and commitments include:

- *Debt obligations and interest payments.* See Note 11, Debt, of the Consolidated Financial Statements included in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K for more information on our debt obligations and interest payments and the timing of expected future payments.
- *Operating and finance leases.* See Note 3, Leases, of the Consolidated Financial Statements included in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K for more information on our lease obligations and the timing of expected future payments.
- *Asset retirement obligations.* See Note 14, Asset Retirement Obligations, of the Consolidated Financial Statements included in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K for more information on our asset retirement obligation at the end of the period.
- *Capital commitments.* See Note 21, Commitments, Guarantees, Indemnifications, and Legal Proceedings, of the Consolidated Financial Statements included in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K for more information on our capital commitments in connection with the expansion and replacement of existing facilities and equipment.
- *Purchase commitments.* Purchase commitments relate to various purchase agreements for items such as minimum amounts of energy and fiber purchases. See Note 21, Commitments, Guarantees, Indemnifications, and Legal Proceedings, of the Consolidated Financial Statements included in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K for more information on our purchase commitments and the timing of expected future payments.
- *Employee benefit obligations.* See Note 13, Employee Benefits Plans and Other Postretirement Benefits, of the Consolidated Financial Statements included in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K for more information on our employee benefit obligations and the timing of expected future benefit payments under our pension plans and postretirement plans.

Off-Balance Sheet Arrangements

The Company does not have any off-balance sheet arrangements as of December 31, 2021.

Inflation and Other General Cost Increases

We are subject to both contractual, inflation, and other general cost increases. If we are unable to offset these cost increases by price increases, growth, and/or cost reductions in our operations, these inflation and other general cost increases could have a material adverse effect on our operating cash flows, profitability, and liquidity.

In 2021, our total company costs including cost of sales (COS) and selling, general, and administrative expenses (SG&A) was \$6.4 billion, and excluding non-cash costs (depreciation, depletion and amortization, pension and postretirement expense, and share-based compensation expense) was \$6.0 billion. A 1% increase in COS and SG&A costs would increase costs by \$64 million and cash costs by \$60 million.

Certain items of product input costs have historically been subject to more cost volatility including fiber, purchased energy, and chemicals.

Energy

In 2021, our mills, including both packaging and paper mills, consumed about 93 million MMBTUs of fuel, including internally generated and externally purchased, to produce both steam and electricity. The following table for 2021 provides the total MMBTUs purchased externally by fuel type each quarter and the average cost per MMBTU by fuel type for the year. Our mills represent about 90% of our total purchased fuel costs. The cost per MMBTU includes the cost of the fuel plus our transportation and delivery costs.

Fuel Type	2021 Fuel Purchased (millions of MMBTUs)					2021 Avg. Cost / MMBTU
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Full Year	
Natural gas	7.93	6.73	6.44	7.15	28.25	\$ 3.54
Purchased bark	1.15	1.36	1.56	1.60	5.67	2.31
Other purchased fuels	0.13	0.16	0.17	0.10	0.56	5.47
Total mills	9.21	8.25	8.17	8.85	34.48	\$ 3.37

In addition, the mills purchased 23.29 million CkWh (hundred kilowatt-hours) of electricity in 2021. The purchases by quarter and the average cost per CkWh were as follows:

Purchased electricity	2021 Purchased Electricity (millions of CkWh)					2021 Avg. Cost / CkWh
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Full Year	
Purchased electricity	5.80	5.61	5.84	6.04	23.29	\$ 5.65

Regulatory and Environmental Matters

Our operations are subject to our compliance with the laws and regulations in the jurisdictions in which we operate, primarily in the United States. Of particular importance are laws and regulations relating to the environment and health and safety matters.

Environmental compliance requirements are a significant factor affecting our business. We employ processes in the manufacture of containerboard, paper, and pulp, which result in various discharges, emissions and waste disposal. These processes are subject to numerous federal, state, local and foreign governmental laws and regulations. We operate and expect to continue to operate, under environmental permits and similar authorizations from various governmental authorities that regulate such discharges, emissions, and waste disposal. The most significant of these laws affecting the Company are:

- Resource Conservation and Recovery Act (RCRA);
- Clean Water Act (CWA);
- Clean Air Act (CAA);
- The Emergency Planning and Community Right-to-Know-Act (EPCRA);
- Toxic Substance Control Act (TSCA); and
- Safe Drinking Water Act (SDWA).

We believe that we are currently in material compliance with these and all applicable environmental rules and regulations. Because environmental regulations are constantly evolving, the Company has incurred, and will continue to incur, costs to maintain compliance with these and other environmental laws. The Company works diligently to anticipate and budget for the impact of applicable environmental regulations, and does not currently expect that future environmental compliance obligations will materially affect its business or financial condition. For both the years ended December 31, 2021 and 2020, we spent \$44 million, and for 2019, we spent \$41 million, to comply with the requirements of these and other environmental laws. Additionally, we had \$10 million of environmental capital expenditures in 2021 and \$9 million in both 2020 and 2019.

In January 2013, the U.S. Environmental Protection Agency (the "EPA") established a three-year deadline for compliance with the Boiler MACT regulations, establishing air emissions standards and certain other requirements for industrial boilers. PCA's compliance actions involved modifying or replacing certain boilers, and all PCA mills are in full compliance with Boiler MACT requirements. On July 29, 2016, the U.S. Court of Appeals for the District of Columbia Circuit issued a ruling on the consolidated cases challenging Boiler MACT. The court vacated key portions of the rule, including emission limits for certain subcategories of solid fuel boilers, and remanded issues to the EPA for further rulemaking. At this time, we cannot predict with certainty how this decision will impact our existing Boiler MACT compliance efforts or whether we will incur additional costs to comply with any revised standards.

As is the case with any industrial operation, PCA has, in the past, incurred costs associated with the remediation of soil or groundwater contamination, as required by the federal Comprehensive Environmental Response, Compensation and Liability Act, commonly known as the federal “Superfund” law, and analogous state laws. Cleanup requirements arise with respect to properties the Company currently owns or operates, former facilities and off-site facilities where the Company has disposed of hazardous substances. As part of the sale to PCA of the containerboard and corrugated products business of Pactiv Corporation in April 1999, Pactiv agreed to retain all liability for all former facilities and all sites associated with pre-closing off-site waste disposal. Pactiv also retained environmentally impaired real property in Filer City, Michigan unrelated to current mill operations. In addition, OfficeMax (now an indirect, wholly owned subsidiary of Office Depot) retains responsibility for certain environmental liabilities related to some of the businesses, facilities, and assets we acquired from Boise. Generally, this responsibility relates to hazardous substance releases and other environmental incidents that arose before 2004. Some of these liabilities could be significant; however, Office Depot may not have sufficient funds to satisfy its indemnification obligations, and in some cases, we may not be entitled to such indemnification.

Because liability for remediation costs under environmental laws is strict, meaning that liability is imposed without fault, joint and several, meaning that liability is imposed on each party without regard to contribution, and retroactive, PCA could receive notifications of cleanup liability in the future and this liability could be material. From 2006 through 2021, there were no significant environmental remediation costs at PCA's mills and corrugated plants. As of December 31, 2021, we maintained an environmental reserve of \$24.3 million relating to on-site landfills and surface impoundments as well as ongoing and anticipated remedial projects. The Company believes that it is not reasonably possible that future environmental expenses above the \$24.3 million accrued at December 31, 2021, will have a material impact on its financial condition, results of operations, and cash flows.

While legislation regarding the regulation of greenhouse gas emissions has been proposed at the federal level, it is uncertain whether such legislation will be passed and, if so, what the breadth and scope of such legislation will be. The result of the regulation of greenhouse gas emissions could be an increase in our future environmental compliance costs, through caps, carbon or other taxes, or additional capital expenditures to modify facilities, which may be material. However, climate change legislation and the resulting future energy policy could also provide us with opportunities if the use of renewable energy is encouraged. We currently self-generate the majority of our power requirements at our mills using renewable biogenic fuel such as bark, black liquor and biomass, which are derived from renewable resources. While we believe we are well-positioned to take advantage of any renewable energy incentives, it is uncertain what the ultimate costs and opportunities of any climate change legislation will be and how our business and industry will be affected.

We and our industry support the goal of a 50% reduction in Scope 1 and Scope 2 greenhouse gas emissions intensity by 2030 from a 2005 baseline. We have established a carbon neutrality team, consisting of a cross-functional group of key operational, engineering, technology and sustainability personnel to lead our efforts. Our strategy to achieve greenhouse gas emissions reductions is premised upon the carbon neutrality of the biogenic fuels used in our operations and we believe that meaningful reductions in greenhouse gas emissions can be achieved through investment in more efficient operations utilizing carbon-neutral fuels. We work constantly to identify and implement high-return projects that will improve our efficiency. To what extent and when we embark upon major capital projects to reduce emissions will depend in part upon emerging regulatory and tax policy involving greenhouse gas emissions and incentives to invest in projects that reduce emissions. We also regularly assess the use of alternative, non-emitting energy sources at our own facilities (such as solar) where feasible to do so and partnering with utilities to procure carbon-free power where opportunities exist. We annually report key data to our stakeholders regarding our greenhouse gas emissions, among other things, in our responsibility report. Our responsibility report is available on our website and is not intended to be incorporated by reference herein.

We are also subject to extensive federal, state and local laws related to workplace health and safety, and our safety management system includes measures to assure compliance with these laws and regulations. We do not believe that future compliance with health and safety laws and regulations will have a material adverse effect on our financial condition, results of operations or cash flows.

Critical Accounting Policies and Estimates

Management's discussion and analysis of financial condition and results of operations are based upon the Company's consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosures of contingent assets and liabilities. On an ongoing basis, PCA evaluates its estimates, including those related to business combinations, goodwill and intangible assets, pensions and other postretirement benefits, environmental liabilities, income taxes, and long-lived asset impairment, among others. PCA bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

Critical accounting estimates are those that are most important to the portrayal of our financial condition and results. These estimates require management's most difficult, subjective, or complex judgments. We review the development, selection, and disclosure of our critical accounting estimates with the Audit Committee of our Board of Directors. The Company believes that of its significant accounting policies, the following involve a higher degree of judgment and/or complexity:

Pensions

The Company accounts for defined benefit pension plans in accordance with Accounting Standards Codification ("ASC") 715, *Compensation - Retirement Benefits*. The calculation of pension expense and pension liabilities requires decisions about a number of key assumptions that can significantly affect expense and liability amounts, including discount rates, expected return on plan assets, expected rate of compensation increases, longevity and service lives of participants, expected contributions, and other factors. The pension assumptions used to measure pension expense and liabilities are discussed in Note 13, Employee Benefit Plans and Other Postretirement Benefits, of the Notes to Consolidated Financial Statements in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K.

We recognize the funded status of our pension plans on our Consolidated Balance Sheet and recognize the actuarial and experience gains and losses and the prior service costs and credits as a component of "Accumulated Other Comprehensive Loss" in our Consolidated Statement of Changes in Stockholders' Equity. Actual results that differ from assumptions are accumulated and amortized over future periods and, therefore, generally affect recognized expense in future periods. At December 31, 2021, we had approximately \$74.8 million of actuarial losses and prior service costs, net of tax, recorded in "Accumulated other comprehensive loss" on our Consolidated Balance Sheet. Accumulated losses in excess of 10% of the greater of the projected benefit obligation or the market-related value of assets will be recognized on a straight-line basis over the average remaining service period of active employees in PCA plans (which is between six and nine years) and over the average remaining lifetime of inactive participants of Boise plans (which is between 22 and 26 years), to the extent that losses are not offset by gains in subsequent years. While we believe that the assumptions used to measure our pension obligations are reasonable, differences in actual experience or changes in assumptions may materially affect our pension obligations and future expense.

We believe that the accounting estimate related to pensions is a critical accounting estimate because it is highly susceptible to change from period to period. As discussed above, the future effects of pension plans on our financial position and results of operations will depend on economic conditions, employee demographics, mortality rates, retirement rates, investment performance, and funding decisions, among other factors. The following table presents selected assumptions used and expected to be used in the measurement of pension expense in the following periods (dollars in millions):

	Year Ending December 31,		Year Ended December 31,			
	2022		2021	2020		
Pension expense	\$	5.7	\$	2.1	\$	21.1
Assumptions						
Discount rate		2.89%		2.57%		3.25%
Expected rate of return on plan assets		4.08%		4.91%		5.29%

A change of 0.25% in either direction to the discount rate or the expected rate of return on plan assets would have had the following effect on 2021 and 2022 pension expense (dollars in millions):

	Base Expense	Increase (Decrease) in Pension Expense(a)				
		0.25% Increase	0.25% Decrease			
2021						
Discount rate	\$	2.1	\$	(1.9)	\$	2.2
Expected rate of return on plan assets		2.1		(3.2)		3.2
2022						
Discount rate	\$	5.7	\$	—	\$	1.8
Expected rate of return on plan assets		5.7		(3.4)		3.4

(a) The sensitivities shown above are specific to 2021 and 2022. The sensitivities may not be additive, so the impact of changing multiple factors simultaneously cannot be calculated by combining the individual sensitivities shown.

For more information related to our pension benefit plans, see Note 13, Employee Benefit Plans and Other Postretirement Benefits, of the Notes to Consolidated Financial Statements in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K.

Goodwill Impairment

Goodwill represents the excess of the cost of an acquired business over the fair value of the identifiable tangible and intangible assets acquired and liabilities assumed in a business combination. At December 31, 2021, we had \$923.5 million of goodwill, all of which was recorded in the Packaging segment. Of the \$923.5 million of goodwill, \$60.0 million was recorded in connection with the acquisition of Advance Packaging. The amount of goodwill associated with the Advance Packaging acquisition continues to be preliminary, as estimates and assumptions are subject to change as more information becomes available.

We test goodwill for impairment annually in the fourth quarter or sooner if events or changes in circumstances indicate that the carrying value of the asset may exceed fair value.

During the second quarter of 2020, with the exacerbated deterioration in uncoated freesheet market conditions arising from the COVID-19 pandemic and the estimated impact on our Paper segment and its projected future results of operations, we identified a triggering event indicating possible impairment of goodwill within our Paper reporting unit and performed an interim quantitative impairment analysis as of May 31, 2020. For additional information, see Note 9, Goodwill and Intangible Assets, of the Notes to Consolidated Financial Statements in "Part II, Item 8. Financial Statements and Supplementary Data" of this Form 10-K.

Based on the evaluation performed, we determined that the carrying value of the Paper reporting unit exceeded its fair value, which resulted in a goodwill impairment charge totaling \$55.2 million, the full amount of goodwill associated with the Paper reporting unit. At December 31, 2021 and 2020, we had \$0 million of goodwill recorded in the Paper segment.

Under ASU 2017-04 (Topic 350), *Intangibles - Goodwill and Other – Simplifying the Test for Goodwill Impairment*, companies are no longer required to determine the fair value of individual assets and liabilities of a reporting unit to measure goodwill impairment, thus eliminating Step Two of the analysis that was required under the prior guidance. Under ASU 2017-04, goodwill impairment testing is performed by comparing the fair value of the reporting unit with its carrying amount and recognizing an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value. The Company adopted this ASU prospectively beginning with its annual goodwill impairment test in the fourth quarter of 2017.

The update to the standard does not eliminate the optional qualitative assessment of goodwill impairment that is often used to determine if the quantitative assessment is necessary. The qualitative assessment requires the evaluation of certain events and circumstances such as macroeconomic conditions, industry and market considerations, cost factors and overall financial performance, as well as company and reporting unit specific items. If, after assessing these qualitative factors, the Company determines that it is more likely than not that the carrying value of the reporting unit is less than its fair value, then no further testing is required. Otherwise, the Company would perform a quantitative analysis.

The quantitative analysis requires companies to compare the fair value of the reporting units to which goodwill was assigned to their respective carrying values. In calculating fair value, we use the income approach as our primary indicator of fair value. Under the income approach, we calculate the fair value of a reporting unit based on the present value of estimated future cash flows (Level 3 measurement). These estimates are based on a number of factors including industry experience, business expectations and the economic environment. If the fair value exceeds the carrying value, no further work is required and no impairment loss is recognized. If the carrying value exceeds the fair value, the goodwill of the reporting unit is potentially impaired, and the carrying value of goodwill is then reduced to the implied value, or to zero if the fair value of the assets exceeds the fair value of the reporting unit, through an impairment charge.

During the annual goodwill impairment test performed in the fourth quarter of 2021, we assessed qualitative factors to determine whether it was more likely than not that the fair value of the Packaging reporting unit was less than its carrying value. Based on the results of the qualitative impairment test, we determined that it was more likely than not that the carrying value was less than the fair value of the Packaging reporting unit.

If management's estimates of future operating results materially change or if there are changes to other assumptions, the estimated fair value of our goodwill could change significantly. Such change could result in impairment charges in future periods, which could have a significant noncash impact on our operating results and financial condition. We cannot predict the occurrence of future events that might adversely affect the reported value of our goodwill. As additional information becomes known, we may change our estimates.

Long-Lived Asset Impairment

An impairment of a long-lived asset exists when the carrying value of an asset is not recoverable through future undiscounted cash flows from operations and when the carrying value of the asset exceeds its fair value. Long-lived asset impairment is a critical accounting estimate, as it is susceptible to change from period to period.

During the second quarter of 2020, with the exacerbated deterioration in uncoated freesheet market conditions arising from the COVID-19 pandemic and the estimated impact on our Paper segment and its projected future results of operations, we identified a triggering event indicating possible impairment of our long lived assets within our Paper segment, including property, plant, and equipment, and performed a recoverability test on the Paper reporting unit long lived assets as of May 31, 2020. The recoverability test was based on forecasts of undiscounted cash flows. The results of the recoverability test indicated that the long lived assets within our Paper segment, inclusive of property, plant, and equipment, were 100% recoverable.

We review the carrying value of long-lived assets, including intangible assets, for impairment when events or changes in circumstances indicate that the carrying amount of assets may not be recoverable. For purposes of testing for impairment, we group our long-lived assets at the lowest level for which identifiable cash flows are largely independent of the cash flows from other assets and liabilities. Our asset groupings vary based on the related business in which the long-lived asset is employed and the interrelationship between those long-lived assets in producing net cash flows. Asset groupings could change in the future if changes in the operations of the business or business environment affect the way particular long-lived assets are employed or the interrelationships between assets. To estimate whether the carrying value of an asset or asset group is impaired, we estimate the undiscounted cash flows that could be generated under a range of possible outcomes. To measure future cash flows, we are required to make assumptions about future production volumes, future product pricing, and future expenses to be incurred. In addition, estimates of future cash flows may change based on the availability of fiber, environmental requirements, capital spending, and other strategic management decisions. We estimate the fair value of an asset or asset group based on quoted market prices for similar assets and liabilities or inputs that are observable either directly (Level 1 measurement) or indirectly (the amount for which the asset(s) could be bought or sold in a current transaction with a third party) when available (Level 2 measurement). When quoted market prices are not available, we use a discounted cash flow model to estimate fair value (Level 3 measurement).

We periodically assess the estimated useful lives of our assets. Changes in circumstances, such as changes to our operational or capital strategy, changes in regulation, or technological advances, may result in the actual useful lives differing from our estimates. Revisions to the estimated useful lives of assets requires judgment and constitutes a change in accounting estimate, which is accounted for prospectively by adjusting or accelerating depreciation and amortization rates. In 2021 and 2020, we recognized incremental depreciation expense of \$4.7 million and \$4.5 million, respectively. The incremental depreciation expense for 2021 related to Jackson mill conversion-related activities and closures of corrugated products facilities, while the incremental depreciation expense for 2020 related to closures of corrugated products facilities.

New and Recently Adopted Accounting Standards

For a listing of our new and recently adopted accounting standards, see Note 2, Summary of Significant Accounting Policies, of the Notes to Consolidated Financial Statements in “Part II, Item 8. Financial Statements and Supplementary Data” of this Form 10-K.

Reconciliations of Non-GAAP Financial Measures to Reported Amounts

Net income excluding special items, EBITDA, and EBITDA excluding special items are non-GAAP financial measures. Management excludes special items, as it believes that these items are not necessarily reflective of the ongoing operations of our business. These measures are presented because they provide a means to evaluate the performance of our segments and our Company on an ongoing basis using the same measures that are used by our management, because these measures assist in providing a meaningful comparison between periods and because these measures are frequently used by investors and other interested parties in the evaluation of companies and the performance of their segments. Any analysis of non-GAAP financial measures should be done in conjunction with results presented in accordance with GAAP. The non-GAAP measures are not intended to be substitutes for GAAP financial measures and should not be used as such. Reconciliations of the non-GAAP measures to the most comparable measure reported in accordance with GAAP for the years ended December 31, 2021 and 2020 follow (dollars in millions):

	Year Ended December 31,					
	2021			2020		
	Income before Taxes	Income Taxes	Net Income	Income before Taxes	Income Taxes	Net Income
As reported in accordance with GAAP	\$ 1,108.7	\$ (267.6)	\$ 841.1	\$ 632.7	\$ (171.7)	\$ 461.0
Special items:						
Facilities closure and other costs (income) (a)	(3.6)	0.9	(2.7)	28.1	(7.0)	21.1
Debt refinancing (b)	58.9	(14.7)	44.2	—	—	—
Jackson mill conversion-related activities (c)	14.0	(3.5)	10.5	—	—	—
Acquisition and integration related costs (d)	0.9	(0.2)	0.7	—	—	—
Goodwill impairment (e)	—	—	—	55.2	—	55.2
Hurricane Laura impact (f)	—	—	—	10.0	(2.5)	7.5
Incremental costs for COVID-19 (g)	—	—	—	6.9	(1.7)	5.2
Total special items	70.2	(17.5)	52.7	100.2	(11.2)	89.0
Excluding special items	\$ 1,178.9	\$ (285.1)	\$ 893.8	\$ 732.9	\$ (182.9)	\$ 550.0

- (a) For 2021, includes income primarily consisting of an adjustment of the required asset retirement obligation related to the 2020 closure of the San Lorenzo, California facility, a gain on sale of transportation assets and corrugated products facilities, and insurance proceeds received for a natural disaster at one of the corrugated products facilities, partially offset by closure costs related to corrugated products facilities. For 2020, includes charges consisting of restructuring costs for paper administrative functions and closure costs related to corrugated products facilities, substantially all of which relates to the previously announced closure of the San Lorenzo, California facility during the second quarter, partially offset by income related to the sale of a corrugated products facility during the second quarter.
- (b) Includes costs related to the Company's debt refinancing completed in October 2021, which included a redemption premium and the write-off of the remaining balance of unamortized debt issuance costs.
- (c) Includes charges related to the announced discontinuation of producing uncoated freesheet paper grades on the No. 3 machine at the Jackson, Alabama mill in the first quarter of 2021 associated with the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities.
- (d) Includes charges for acquisition and integration costs related to the December 2021 Advance Packaging Corporation acquisition.
- (e) During the second quarter of 2020, with the exacerbated deterioration in uncoated freesheet market conditions and the estimated impact on our Paper reporting unit arising from the COVID-19 pandemic, as well as projected future results of operations, we identified a triggering event indicating possible impairment of goodwill within our Paper reporting unit. The Company performed an interim quantitative impairment analysis as of May 31, 2020, and, based on the evaluation performed, we determined that goodwill was fully impaired for the Paper reporting unit and recognized a non-cash impairment charge of \$55.2 million.
- (f) Includes charges related to the impact of Hurricane Laura at our DeRidder, Louisiana mill, including unabsorbed costs related to lost production, excess purchased containerboard and freight costs, repair expenses, rental and supplies costs, and other recovery expenses.
- (g) Includes incremental, out-of-pocket costs related to COVID-19, including supplies, cleaning and sick pay. Beginning in July 2020, all corresponding COVID-19 expenses were included in normalized costs.

The following table reconciles net income to EBITDA and EBITDA excluding special items for the periods indicated (dollars in millions):

	Year Ended December 31,	
	2021	2020
Net income	\$ 841.1	\$ 461.0
Non-operating pension income	(19.7)	(2.3)
Interest expense, net	152.4	93.5
Provision for income taxes	267.6	171.7
Depreciation, amortization, and depletion	417.5	410.0
EBITDA	\$ 1,658.9	\$ 1,133.9
Special items:		
Facilities closure and other costs (income)	\$ (4.3)	\$ 19.0
Jackson mill conversion-related activities	9.9	—
Acquisition and integration related costs	0.9	—
Goodwill impairment	—	55.2
Hurricane Laura impact	—	10.0
Incremental costs for COVID-19	—	6.9
EBITDA excluding special items	\$ 1,665.4	\$ 1,225.0

The following table reconciles segment income (loss) to EBITDA and EBITDA excluding special items (dollars in millions):

	Year Ended December 31,	
	2021	2020
Packaging		
Segment income	\$ 1,306.0	\$ 829.5
Depreciation, amortization, and depletion	381.0	365.2
EBITDA	1,687.0	1,194.7
Facilities closure and other costs (income)	(3.5)	18.2
Jackson mill conversion-related activities	4.3	—
Acquisition and integration related costs	0.4	—
Hurricane Laura impact	—	10.0
Incremental costs for COVID-19	—	6.3
EBITDA excluding special items	\$ 1,688.2	\$ 1,229.2
Paper		
Segment income (loss)	\$ 39.1	\$ (20.0)
Depreciation, amortization, and depletion	27.4	36.5
EBITDA	66.5	16.5
Jackson mill conversion-related activities	5.2	—
Goodwill impairment	—	55.2
Facilities closure and other costs	—	0.8
Incremental costs for COVID-19	—	0.6
EBITDA excluding special items	\$ 71.7	\$ 73.1
Corporate and Other		
Segment loss	\$ (103.7)	\$ (85.6)
Depreciation, amortization, and depletion	9.1	8.3
EBITDA	(94.6)	(77.3)
Acquisition and integration related costs	0.5	—
Jackson mill conversion-related activities	0.4	—
Facilities closure and other income	(0.8)	—
EBITDA excluding special items	\$ (94.5)	\$ (77.3)
EBITDA	\$ 1,658.9	\$ 1,133.9
EBITDA excluding special items	\$ 1,665.4	\$ 1,225.0

Item 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

PCA is exposed to the impact of interest rate changes and changes in the market value of its financial instruments. PCA periodically enters into derivatives in order to minimize these risks, but not for trading purposes. We were not party to any derivative-based arrangements at December 31, 2021. For a discussion of derivatives and hedging activities, see Note 16, Derivative Instruments and Hedging Activities, of the Notes to Consolidated Financial Statements in “Part II, Item 8. Financial Statements and Supplementary Data” of this Form 10-K.

At December 31, 2021, the interest rates on 100% of PCA’s outstanding debt are fixed.

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Stockholders and Board of Directors

Packaging Corporation of America:

Opinions on the Consolidated Financial Statements and Internal Control Over Financial Reporting

We have audited the accompanying consolidated balance sheets of Packaging Corporation of America and subsidiaries (the Company) as of December 31, 2021 and 2020, the related consolidated statements of income and comprehensive income, changes in stockholders' equity, and cash flows for each of the years in the three-year period ended December 31, 2021, and the related notes (collectively, the consolidated financial statements). We also have audited the Company's internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission.

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

The Company acquired Advance Packaging Corporation during 2021, and management excluded from its assessment of the effectiveness of the Company's internal control over financial reporting as of December 31, 2021, Advance Packaging Corporation's internal control over financial reporting associated with approximately 3% of the Company's consolidated total assets and less than 1% of consolidated net sales included in the consolidated financial statements of the Company as of and for the year ended December 31, 2021. Our audit of internal control over financial reporting of the Company also excluded an evaluation of the internal control over financial reporting of Advance Packaging Corporation.

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 the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's consolidated financial statements and an opinion 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 (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) 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 (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

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

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of a critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Evaluation of the value of the pension benefit obligation

As discussed in Note 13 to the consolidated financial statements, the Company's estimated pension benefit obligation totaled \$1,504 million as of December 31, 2021. The pension benefit obligation is measured at the actuarial present value as of a date of all benefits attributed by the pension benefit formula to employee service rendered before that date. The determination of the Company's pension benefit obligation is dependent, in part, on the selection of certain actuarial assumptions, including the discount rate.

We identified the evaluation of the value of the pension benefit obligation as a critical audit matter because of the specialized skills required to evaluate the measurement of the pension benefit obligation. In addition, the measurement of the pension benefit obligation is sensitive to minor changes in the discount rate assumption.

The following are primary procedures we performed to address this critical audit matter. We evaluated the design and tested the operating effectiveness of certain internal controls over the Company's pension benefit obligation valuation process, including a control related to the development of the discount rate. We involved an actuarial professional with specialized skills and knowledge, who assisted in understanding and assessing the actuarial methods and assumptions used to measure the pension benefit obligation. In addition, the actuarial professional assisted with our evaluation of the discount rate by assessing:

- changes in the discount rate from the prior year against changes in published indices;
- the pattern of cash flows, including consideration of the plan type and plan provisions; and
- the selected yield curve and its consistency with the prior year and spot rates.

/s/ KPMG LLP

We have served as the Company's auditor since 2014.

Chicago, Illinois
February 24, 2022

Packaging Corporation of America

Consolidated Statements of Income and Comprehensive Income
(dollars in millions, except per-share data)

	Year Ended December 31,		
	2021	2020	2019
Statements of Income			
Net sales	\$ 7,730.3	\$ 6,658.2	\$ 6,964.3
Cost of sales	(5,857.3)	(5,288.8)	(5,320.3)
Gross profit	1,873.0	1,369.4	1,644.0
Selling and administrative expenses	(576.8)	(539.6)	(557.6)
Goodwill impairment	—	(55.2)	—
Other expense, net	(54.8)	(50.7)	(32.7)
Income from operations	1,241.4	723.9	1,053.7
Non-operating pension income (expense)	19.7	2.3	(7.9)
Interest expense, net	(152.4)	(93.5)	(128.8)
Income before taxes	1,108.7	632.7	917.0
Provision for income taxes	(267.6)	(171.7)	(220.6)
Net income	\$ 841.1	\$ 461.0	\$ 696.4
Net income per common share:			
Basic	\$ 8.87	\$ 4.86	\$ 7.36
Diluted	\$ 8.83	\$ 4.84	\$ 7.34
Dividends declared per common share	\$ 4.00	\$ 3.37	\$ 3.16
Statements of Comprehensive Income:			
Net income	\$ 841.1	\$ 461.0	\$ 696.4
Other comprehensive income (loss), net of tax:			
Foreign currency translation adjustment	\$ 0.4	\$ —	\$ —
Reclassification adjustments to cash flow hedges included in net income, net of tax of \$0.0 million, \$0.0 million, and (\$7.9) million for 2021, 2020, and 2019, respectively	—	—	10.2
Changes in unrealized (losses) gains on marketable debt securities, net of tax of \$0.2 million, (\$0.1) million, and \$0.0 million for 2021, 2020, and 2019, respectively	(0.5)	0.3	—
Amortization of pension and postretirement plans actuarial loss and prior service cost, net of tax of (\$3.3) million, (\$3.6) million, and (\$3.2) million for 2021, 2020, and 2019, respectively	10.0	10.7	9.6
Changes in unfunded employee benefit obligations, net of tax of (\$19.9) million, (\$1.3) million, and \$13.6 million for 2021, 2020, and 2019, respectively	59.4	4.0	(40.5)
Other comprehensive income (loss)	69.3	15.0	(20.7)
Comprehensive income	\$ 910.4	\$ 476.0	\$ 675.7

See notes to consolidated financial statements.

Packaging Corporation of America

Consolidated Balance Sheets
(dollars and shares in millions, except per-share data)

	December 31,	
	2021	2020
ASSETS		
Current assets:		
Cash and cash equivalents	\$ 618.7	\$ 974.6
Short-term marketable debt securities	86.1	105.6
Accounts receivable, net of allowance for credit losses and customer deductions of \$14.3 million and \$10.6 million as of December 31, 2021 and 2020, respectively	1,071.0	832.4
Inventories	902.5	787.9
Prepaid expenses and other current assets	47.0	44.7
Federal and state income taxes receivable	7.4	5.1
Total current assets	2,732.7	2,750.3
Property, plant and equipment, net	3,529.0	3,193.4
Goodwill	923.5	863.5
Other intangible assets, net	308.4	295.9
Operating lease right-of-use assets	238.3	234.2
Long-term marketable debt securities	60.0	42.7
Other long-term assets	44.9	53.2
Total assets	\$ 7,836.8	\$ 7,433.2
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Operating lease obligations	\$ 67.1	\$ 68.9
Finance lease obligations	1.7	1.6
Accounts payable	452.4	387.0
Dividends payable	96.3	97.0
Accrued liabilities	255.0	216.2
Accrued interest	12.3	11.9
Total current liabilities	884.8	782.6
Long-term liabilities:		
Long-term debt	2,471.5	2,479.4
Operating lease obligations	179.3	173.6
Finance lease obligations	12.7	14.4
Deferred income taxes	465.9	379.4
Compensation and benefits	157.4	298.3
Other long-term liabilities	58.0	59.2
Total long-term liabilities	3,344.8	3,404.3
Commitments and contingent liabilities (Note 21)		
Stockholders' equity:		
Common stock, par value \$0.01 per share, 300.0 million shares authorized, 93.5 million and 94.8 million shares issued as of December 31, 2021 and 2020, respectively	0.9	0.9
Additional paid in capital	579.4	554.4
Retained earnings	3,102.1	2,835.5
Accumulated other comprehensive loss	(75.2)	(144.5)
Total stockholders' equity	3,607.2	3,246.3
Total liabilities and stockholders' equity	\$ 7,836.8	\$ 7,433.2

See notes to consolidated financial statements.

Packaging Corporation of America
Consolidated Statements of Cash Flows
(dollars in millions)

	Year Ended December 31,		
	2021	2020	2019
Cash Flows from Operating Activities:			
Net income	\$ 841.1	\$ 461.0	\$ 696.4
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation, depletion, and amortization of intangibles	417.5	409.9	387.5
Amortization of deferred financing costs	4.4	2.6	23.4
Loss on early extinguishment of debt	56.1	—	22.2
Share-based compensation expense	35.5	30.0	30.4
Deferred income tax provision	59.4	34.7	60.3
Goodwill impairment	—	55.2	—
Net loss on asset disposals	6.1	6.8	8.2
Pension and post-retirement benefits expense, net of contributions	(50.5)	(63.4)	(26.9)
Other, net	11.9	18.2	(3.4)
Changes in operating assets and liabilities, net of acquisitions:			
(Increase) decrease in assets —			
Accounts receivable	(227.2)	13.2	56.4
Inventories	(105.5)	6.3	1.4
Prepaid expenses and other current assets	(2.7)	0.4	(6.9)
Increase (decrease) in liabilities —			
Accounts payable	12.2	39.7	(32.4)
Accrued liabilities	37.9	(3.2)	(0.1)
Federal and state income tax payable / receivable	(2.1)	21.4	(9.1)
Net cash provided by operating activities	1,094.1	1,032.8	1,207.4
Cash Flows from Investing Activities:			
Additions to property, plant, and equipment	(605.1)	(421.2)	(399.5)
Acquisition of business, net of cash acquired	(194.9)	—	—
Additions to other long-term assets	(1.8)	(6.4)	(3.8)
Proceeds from asset disposals	7.9	4.6	4.1
Purchases of marketable debt securities	(127.4)	(110.1)	(157.0)
Proceeds from sales of marketable debt securities	26.7	24.2	10.9
Proceeds from maturities of marketable debt securities	100.2	82.8	—
Other, net	—	—	(1.3)
Net cash used for investing activities	(794.4)	(426.1)	(546.6)
Cash Flows from Financing Activities:			
Net proceeds received from issuance of debt	690.2	—	889.0
Repayments of debt and finance lease obligations	(757.7)	(1.5)	(923.4)
Financing costs paid	(2.4)	—	(1.5)
Common stock dividends paid	(379.8)	(299.6)	(298.7)
Repurchases of common stock	(193.0)	—	—
Shares withheld to cover employee restricted stock taxes	(12.9)	(10.5)	(8.2)
Net cash used for financing activities	(655.6)	(311.6)	(342.8)
Net (decrease) increase in cash and cash equivalents	(355.9)	295.1	318.0
Cash and cash equivalents, beginning of year	974.6	679.5	361.5
Cash and cash equivalents, end of year	\$ 618.7	\$ 974.6	\$ 679.5

See notes to consolidated financial statements.

Packaging Corporation of America

Consolidated Statements of Changes in Stockholders' Equity
(dollars in millions and shares in thousands)

	Common Stock		Additional Paid in Capital	Retained Earnings	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount				
Balance at January 1, 2019	94,497	\$ 0.9	\$ 494.5	\$ 2,315.8	\$ (138.8)	\$ 2,672.4
Common stock withheld and retired to cover taxes on vested stock awards	(87)	—	(0.7)	(7.5)	—	(8.2)
Common stock dividends declared	—	—	—	(299.7)	—	(299.7)
Share-based compensation	245	—	31.0	—	—	31.0
Other	—	—	—	(0.2)	—	(0.2)
Comprehensive income	—	—	—	696.4	(20.7)	675.7
Balance at December 31, 2019	94,655	0.9	524.8	2,704.8	(159.5)	3,071.0
Common stock withheld and retired to cover taxes on vested stock awards	(108)	—	(0.8)	(9.7)	—	(10.5)
Common stock dividends declared	—	—	—	(320.9)	—	(320.9)
Share-based compensation	283	—	30.8	—	—	30.8
Other	—	—	(0.4)	0.3	—	(0.1)
Comprehensive income	—	—	—	461.0	15.0	476.0
Balance at December 31, 2020	94,830	0.9	554.4	2,835.5	(144.5)	3,246.3
Common stock repurchases and retirements	(1,443)	—	(11.5)	(181.5)	—	(193.0)
Common stock withheld and retired to cover taxes on vested stock awards	(95)	—	(0.8)	(12.1)	—	(12.9)
Common stock dividends declared	—	—	—	(379.9)	—	(379.9)
Share-based compensation	247	—	36.3	—	—	36.3
Other	—	—	1.0	(1.0)	—	—
Comprehensive income	—	—	—	841.1	69.3	910.4
Balance at December 31, 2021	93,539	\$ 0.9	\$ 579.4	\$ 3,102.1	\$ (75.2)	\$ 3,607.2

See notes to consolidated financial statements.

Notes to Consolidated Financial Statements

1. Nature of Operations and Basis of Presentation

Packaging Corporation of America (“we,” “us,” “our,” “PCA,” or the “Company”) was incorporated on January 25, 1999. In April 1999, PCA acquired the containerboard and corrugated packaging products business of Pactiv Corporation (Pactiv), formerly known as Tenneco Packaging, Inc., a wholly owned subsidiary of Tenneco Inc. We are a large, diverse manufacturer of both packaging and paper products. We are headquartered in Lake Forest, Illinois and we operate primarily in the United States. We have approximately 15,200 employees.

We report our business in three reportable segments: Packaging, Paper, and Corporate and Other. Our Packaging segment produces a wide variety of containerboard and corrugated packaging products. The Paper segment manufactures and sells a range of communication-based papers.

Our Jackson, Alabama mill had historically operated as a UFS mill, with its results of operations reported in our Paper segment. During the fourth quarter of 2020, in order to meet strong packaging demand and maintain appropriate inventory levels, we temporarily began producing linerboard on the No. 3 machine at our Jackson, Alabama mill. In the first quarter of 2021, we announced the discontinuation of production of uncoated freesheet paper grades on the machine and the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities. Before October 2020, operating results for the Jackson mill were included in the Paper segment. Beginning in October 2020, operating results for the Jackson mill are included in both the Packaging and Paper segments.

Corporate and other includes support staff services and related assets and liabilities, transportation assets, and activity related to other ancillary support operations. For more information about our segments, see Note 20, Segment Information.

In these consolidated financial statements, certain amounts in prior periods' consolidated financial statements have been reclassified to conform with the current period presentation.

The consolidated financial statements include the accounts of PCA and its majority-owned subsidiaries after elimination of intercompany balances and transactions.

2. Summary of Significant Accounting Policies

Use of Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires management to make estimates and assumptions about future events. These estimates and the underlying assumptions affect the amounts of assets and liabilities reported, disclosures about contingent assets and liabilities, and reported amounts of revenues and expenses. These estimates and assumptions are based on management's best estimates and judgment. Management evaluates its estimates and assumptions on an ongoing basis using historical experience and other factors, including the current economic environment. We adjust such estimates and assumptions when facts and circumstances dictate. As future events and their effects cannot be determined with precision, actual results could differ significantly from these estimates. Changes in these estimates will be reflected in the consolidated financial statements in future periods.

Revenue Recognition

In accordance with ASU 2014-09 (Topic 606): *Revenue from Contracts with Customers*, we recognize revenue when control of the promised goods or services is transferred to customers in an amount that reflects the consideration expected to be received in exchange for those goods or services. The timing of revenue recognition for most goods and services occurs when performance obligations under the terms of a contract with a customer are satisfied. This occurs with the transfer of control of our products at a specific point in time. For most packaging and paper products, revenue is recognized when the product is shipped from the mill or from our manufacturing facility to our customer. Shipping and handling fees billed to a customer are recorded on a gross basis in “Net sales”, with the corresponding shipping and handling costs included in “Cost of sales” in the concurrent period as the revenue is recorded. We present taxes collected from customers and remitted to governmental authorities on a net basis in our Consolidated Statements of Income. See Note 4, Revenue, for more information.

Planned Major Maintenance Costs

The Company accounts for its planned major maintenance activities in accordance with ASC 360, *Property, Plant, and Equipment*, using the deferral method. All maintenance costs incurred during the year are expensed in the year in which the maintenance activity occurs.

Share-Based Compensation

We recognize compensation expense for awards granted under the PCA long-term equity incentive plans based on the fair value on the grant date. We recognize the cost of the equity awards expected to vest over the period the awards vest. See Note 15, Share-Based Compensation, for more information.

Research and Development

Research and development costs are expensed as incurred. The amount charged to expense was \$14.5 million, \$15.5 million, and \$16.0 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Cash and Cash Equivalents

Cash and cash equivalents include all cash balances and highly liquid investments with original maturities of three months or less at the date of purchase. Cash equivalents are stated at cost, which approximates market. Cash and cash equivalents totaled \$618.7 million and \$974.6 million at December 31, 2021 and 2020, respectively, which included cash equivalents of \$532.9 million and \$662.2 million, respectively. At December 31, 2021 and 2020, we had \$1.2 million and \$2.2 million, respectively, of cash at our operations outside the United States.

Marketable Debt Securities

The Company's marketable debt securities have been classified and accounted for as available-for-sale (AFS) marketable debt securities in accordance with ASU 2016-13, *Financial Instruments – Credit Losses* (Topic 326). The Company reports its marketable debt securities at fair value, and they are classified as short-term or long-term based on each security's underlying contractual maturity date.

The Company's marketable debt securities are analyzed at the individual debt security level. Changes in the fair value of the debt security have the potential to impact accumulated other comprehensive income (loss) (AOCI), the Company's earnings, or both.

The Company regularly reviews its investment portfolio to determine if any debt security is impaired. A decline in the fair value of the debt security below its amortized cost results in an impairment of the debt security. If there is an intent to sell the debt security, or if it is more likely than not that the debt security will be sold prior to recovering the amortized cost basis, the Company recognizes the impairment as a realized loss in earnings by writing down the debt security's amortized cost basis.

Additional analysis is required if there is not an intent to sell the debt security, or if a recovery of the amortized cost basis is expected to be made prior to the sale of the security. If any portion of the impairment is the result of a credit loss, the Company recognizes this portion in earnings through an allowance for credit losses, with the remainder recognized as unrealized loss in AOCI. Subsequent improvements in credit losses are recognized as a reduction in the allowance. Any impairment not attributed to credit loss is recognized as an unrealized loss in AOCI in its entirety.

The Company considers several factors when determining if a portion of an impairment is the result of a credit loss including, but not limited to, adverse conditions related to the financial health and future outlook of the issuer; the credit quality of the issuer, as reported by credit rating agencies; trends present in the issuer's industry in which it operates; and general market conditions.

For the years ended December 31, 2021 and 2020, we do not consider any of the impairments related to our marketable debt securities to be the result of credit losses. See Note 12, Cash, Cash Equivalents, and Marketable Debt Securities, for more information.

Trade Accounts Receivable, Allowances, and Customer Deductions

Trade accounts receivable are recorded at amortized cost and represent a contractual right to receive payment from a customer. The Company's trade accounts receivable are short-term receivables, with most requiring payment within 30 to 60 days, and represent the primary class of financing receivables utilized by the Company.

The Company has entered into a number of customer-based supply chain financing programs to accelerate the receipt of payments for outstanding accounts receivable from certain customers. Receivables transferred under these programs meet the requirements to be accounted for as sales in accordance with guidance under Financial Accounting Standards Board (“FASB”) ASC 860, *Transfers and Servicing*. The receivables are sold without recourse and are reflected as a reduction of accounts receivable on the Consolidated Balance Sheets at the time of sale. The corresponding proceeds are reflected in cash flows from operating activities within the Consolidated Statements of Cash Flows. Receivables involved with these programs constituted less than 5% of our 2021 net sales.

In accordance with ASU 2016-13, *Financial Instruments – Credit Losses* (Topic 326), the Company established an allowance for credit losses, which is a valuation account that estimates the expected credit loss over the lifetime of the asset and is deducted from, or added to, the amortized cost basis of the trade accounts receivable. The allowance for credit losses is based upon a combination of factors such as historical collection experience, aged receivables, current economic conditions, and reasonable and supportable forecasts on future economic conditions. Expected recoveries of amounts previously written off, not to exceed the aggregate of the amount previously written off, are also considered when determining the necessary allowance at the balance sheet date. When determining the allowance for credit losses, management also considers specific customer accounts that may be considered higher risk or uncollectible due to customer industry trends, bankruptcy filings, or substantial downgrades of credit scores.

Current period estimates for the allowance for credit losses are compared against the allowance previously recorded, and all required adjustments are reported as credit loss expense (for expected losses or write offs) or a reversal of credit loss expense (for expected recoveries) in net income. Outstanding trade accounts receivable balances are written off when deemed uncollectible after undergoing reasonable collection efforts. At December 31, 2021 and 2020, the allowance for credit losses was \$4.9 million and \$3.0 million, respectively.

The customer deductions reserve represents the estimated amount required for customer returns, allowances, and earned discounts. Based on the Company’s experience, customer returns, allowances, and earned discounts have averaged approximately 1% of gross selling price. Accordingly, PCA reserves 1% of its open customer accounts receivable balance for these items. The reserves for customer deductions of \$9.4 million and \$7.6 million at December 31, 2021 and 2020, respectively, are also included as a reduction of the accounts receivable balance.

Derivative Instruments and Hedging Activities

The Company records its derivatives, if any, in accordance with ASC 815, *Derivatives and Hedging*. The guidance requires the Company to recognize derivative instruments as either assets or liabilities on the balance sheet at fair value. The accounting for changes in the fair value of a derivative depends on the intended use and designation of the derivative instrument. For a derivative designated as a fair value hedge, the gain or loss on the derivative is recognized in earnings in the period of change at fair value together with the offsetting gain or loss on the hedged item. For a derivative instrument designated as a cash flow hedge, the effective portion of the derivative’s gain or loss is initially reported as a component of AOCI and is subsequently recognized in earnings when the hedged exposure affects earnings. The ineffective portion of the gain or loss is recognized in earnings. We were not party to any derivative-based arrangements at December 31, 2021 and 2020.

Fair Value Measurements

PCA measures the fair value of its financial instruments and marketable debt securities in accordance with ASC 820, *Fair Value Measurements and Disclosures*. The guidance defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants. It is determined based on assumptions that market participants would use in pricing an asset or liability. As a basis for considering such assumptions, ASC 820 establishes the following hierarchy that prioritizes the inputs to valuation methodologies used to measure fair value:

Level 1 — Valuations based on quoted prices for identical assets and liabilities in active markets.

Level 2 — Valuations based on observable inputs other than quoted prices included in Level 1, such as quoted prices for similar assets and liabilities in active markets, quoted prices for identical or similar assets and liabilities in markets that are not active, or other inputs that are observable or can be corroborated by observable market data.

Level 3 — Valuations based on unobservable inputs in which there is little or no market data, which require the reporting entity to develop its own assumptions.

Assets that are measured at fair value using the net asset value (NAV) per share as a practical expedient are not categorized within the fair value hierarchy.

Financial instruments and marketable debt securities measured at fair value on a recurring basis include the fair values of our marketable debt securities and our pension and postretirement benefit assets and liabilities. The valuation techniques used to measure the fair value of the Company's marketable debt securities and pension and postretirement benefit assets and liabilities, which generally have counterparties with high credit ratings, are based on quoted market prices or model-driven valuations using significant inputs derived from or corroborated by observable market data. See Note 12, Cash, Cash Equivalents, and Marketable Debt Securities, and Note 13, Employee Benefit Plans and Other Postretirement Benefits, for more information.

Other assets and liabilities measured and recognized at fair value on a nonrecurring basis include assets acquired and liabilities assumed in acquisitions and our asset retirement obligations. Given the nature of these assets and liabilities, evaluating their fair value from the perspective of a market participant is inherently complex. Assumptions and estimates about future values can be affected by a variety of internal and external factors. Changes in these factors may require us to revise our estimates and could require us to retroactively adjust provisional amounts that we recorded for the fair values of assets acquired and liabilities assumed in connection with business combinations. These adjustments could have a material effect on our financial condition and results of operations. See Note 5, Acquisitions, and Note 14, Asset Retirement Obligations, for more information.

Inventory Valuation

We value our raw materials, work in process, and finished goods inventories using lower of cost, as determined by the average cost method, or net realizable value. Supplies and materials are valued at the first-in, first-out (FIFO) or average cost methods.

The components of inventories were as follows (dollars in millions):

	December 31,	
	2021	2020
Raw materials	\$ 324.2	\$ 263.5
Work in process	16.2	11.6
Finished goods	201.0	183.6
Supplies and materials	361.1	329.2
Inventories	<u>\$ 902.5</u>	<u>\$ 787.9</u>

Property, Plant, and Equipment

Property, plant, and equipment are recorded at cost. Cost includes expenditures for major improvements and replacements and the amount of interest cost associated with significant capital additions. Repairs and maintenance costs are expensed as incurred. When property and equipment are retired, sold, or otherwise disposed of, the asset's carrying amount and related accumulated depreciation are removed from the accounts and any gain or loss is included in "Net income" in our Consolidated Statements of Income.

Property, plant, and equipment consisted of the following (dollars in millions):

	December 31,	
	2021	2020
Land and land improvements	\$ 189.8	\$ 179.6
Buildings	938.7	858.5
Machinery and equipment	6,159.1	5,826.6
Construction in progress	481.0	360.0
Other	102.9	88.8
Property, plant and equipment, at cost	7,871.5	7,313.5
Less accumulated depreciation	(4,342.5)	(4,120.1)
Property, plant and equipment, net	<u>\$ 3,529.0</u>	<u>\$ 3,193.4</u>

The amount of interest capitalized from construction in progress was \$3.8 million, \$3.7 million, and \$3.4 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Depreciation is computed on the straight-line basis over the estimated useful lives of the related assets. Assets under finance leases are depreciated on the straight-line method over the term of the lease or the useful life, if shorter. The following lives are used for the various categories of assets:

Buildings and land improvements	5 to 40 years
Machinery and equipment	3 to 25 years
Trucks and automobiles	3 to 10 years
Furniture and fixtures	3 to 20 years
Computers and hardware	3 to 10 years
Leasehold improvements	Period of the lease or useful life, if shorter

The amount of depreciation expense was \$376.0 million, \$362.5 million, and \$346.8 million for the years ended December 31, 2021, 2020, and 2019, respectively. In 2021, 2020, and 2019, we recognized incremental depreciation expense of \$4.7 million, \$4.5 million, and \$0.3 million, respectively. The incremental depreciation expense for 2021 related to Jackson mill conversion-related activities and closures of corrugated products facilities. For 2020, the incremental depreciation expense related to closures of corrugated products facilities, while the incremental depreciation expense for 2019 primarily related to the second quarter 2018 discontinuation of paper grades at the Wallula, Washington mill associated with the conversion of the No. 3 paper machine to produce virgin kraft linerboard.

Pursuant to the terms of an industrial revenue bond, title to certain property, plant, and equipment was transferred to a municipal development authority in 2009 in order to receive a property tax abatement. The title of these assets will revert back to PCA upon retirement or cancellation of the bond. The assets are included in the consolidated balance sheets under the caption "Property, plant, and equipment, net", as all risks and rewards remain with the Company.

Leases

We determine if an arrangement is, or contains, a lease at the inception date based on the presence of identified assets and our right to obtain substantially all of the economic benefit from or to direct the use of such assets. When we determine a lease exists, we record a right-of-use asset and corresponding lease liability on our consolidated balance sheets. Right-of-use assets represent our right to use an underlying asset for the lease term. Lease liabilities represent our obligation to make lease payments arising from the lease. Right-of-use assets are recognized at commencement date at the value of the lease liability and are adjusted for any prepayments, lease incentives received, and initial direct costs incurred. Lease liabilities are recognized at lease commencement date based on the present value of remaining lease payments over the lease term. As the discount rate implicit in the lease is not readily determinable in most of our leases, we use our incremental borrowing rate based on the information available at commencement date in determining the present value of lease payments. Our lease terms include options to extend or terminate the lease when it is reasonably certain that we will exercise that option.

Operating lease balances are included in Operating lease right-of-use assets with the related liabilities included in Current operating lease obligations and Long-term operating lease obligations. Assets under finance leases are included in Property, plant and equipment, net, with the related liabilities included in Current finance lease obligations and Long-term finance lease obligations.

We do not record lease contracts with a term of 12 months or less on our consolidated balance sheets.

We recognize fixed lease expense for operating leases on a straight-line basis over the lease term. For finance leases, we recognize amortization expense on the right-of-use asset and interest expense on the lease liability over the lease term.

We have lease agreements with non-lease components that relate to lease components (e.g., common area maintenance such as cleaning or landscaping, insurance, etc.). We account for each lease and any non-lease components associated with that lease as a single lease component for all underlying asset classes. Accordingly, all costs associated with a lease contract are accounted for as lease costs.

Long-Lived Asset Impairment

Long-lived assets other than goodwill and other intangibles are reviewed for impairment in accordance with provisions of ASC 360, *Property, Plant and Equipment*. In the event that facts and circumstances indicate that the carrying amount of any long-lived assets may be impaired, an evaluation of recoverability is performed. If an evaluation is required, the estimated future undiscounted cash flows associated with the asset (or group of assets) is compared to the assets (or group of assets) carrying amount to determine if a write-down to fair value is required.

During the second quarter of 2020, with the exacerbated deterioration in uncoated freesheet market conditions arising from the COVID-19 pandemic and the estimated impact on our Paper segment and its projected future results of operations, we identified a triggering event indicating possible impairment of our long-lived assets within our Paper reporting unit, including property, plant, and equipment, and performed a recoverability test on the Paper reporting unit long-lived assets as of May 31, 2020. The recoverability test was based on forecasts of undiscounted cash flows. The results of the recoverability test indicated that the long-lived assets within our Paper segment, inclusive of property, plant, and equipment, were 100% recoverable.

Goodwill and Intangible Assets

The Company has capitalized certain intangible assets, primarily goodwill, customer relationships, and trademarks and trade names, based on their estimated fair value at the date of acquisition. Amortization is provided for customer relationships on a straight-line basis over periods ranging from ten to 40 years, and trademarks and trade names over periods ranging from five to 20 years.

Goodwill, which amounted to \$923.5 million and \$863.5 million for the years ended December 31, 2021 and 2020, respectively, is not amortized but is subject to an annual impairment test in accordance with ASC 350, *Intangibles – Goodwill and Other*. We test goodwill for impairment annually in the fourth quarter or sooner if events or changes in circumstances indicate that the carrying value of the asset may exceed fair value. Additionally, we evaluate the remaining useful lives of our finite-lived purchased intangible assets to determine whether any adjustments to the useful lives are necessary.

During the second quarter of 2020, with the exacerbated deterioration in uncoated freesheet market conditions arising from the COVID-19 pandemic and the estimated impact on our Paper segment and its projected future results of operations, we identified a triggering event indicating possible impairment of goodwill within our Paper reporting unit and performed an interim quantitative impairment analysis as of May 31, 2020. Based on the evaluation performed, we determined that the carrying value of the Paper reporting unit exceeded its fair value, which resulted in a goodwill impairment charge totaling \$55.2 million.

The Company concluded that none of the goodwill or intangible assets were impaired during the 2021, 2020, and 2019 annual impairment tests. See Note 9, Goodwill and Intangible Assets, for additional information.

Pension and Postretirement Benefits

Several estimates and assumptions are required to record pension costs and liabilities, including discount rate, return on assets, and longevity and service lives of employees. We review and update these assumptions annually unless a plan curtailment or other event occurs, requiring that we update the estimates on an interim basis. While we believe the assumptions used to measure our pension and postretirement benefit obligations are reasonable, differences in actual experience or changes in assumptions may materially affect our pension and postretirement benefit obligations and future expense. See Note 13, Employee Benefit Plans and Other Postretirement Benefits, for additional information.

For postretirement health care plan accounting, the Company reviews external data and its own historical trends for health care costs to determine the health care cost trend rate assumption.

Environmental Matters

Environmental expenditures that extend the life of the related property or mitigate or prevent future environmental contamination are capitalized. Liabilities are recorded for environmental contingencies when such costs are probable and reasonably estimable. These liabilities are adjusted as further information develops or circumstances change. Environmental expenditures related to existing conditions resulting from past or current operations from which no current or future benefit is discernible are expensed as incurred.

Asset Retirement Obligations

The Company accounts for its retirement obligations related predominantly to landfill closure, wastewater treatment pond dredging, closed-site monitoring costs, and certain leasehold improvements under ASC 410, *Asset Retirement and Environmental Obligations*, which requires recognition of legal obligations associated with the retirement of long-lived assets whether these assets are owned or leased. These legal obligations are recognized at fair value at the time that the obligations are incurred. When we record the liability, we capitalize the cost by increasing the carrying amount of the related long-lived asset, which is amortized to expense over the useful life of the asset. See Note 14, *Asset Retirement Obligations*, for additional information.

Deferred Debt Issuance Costs

PCA has capitalized certain costs related to obtaining its financing. These costs are amortized to interest expense using the effective interest rate method over the terms of the related financing, which range from 10 to 30 years. At December 31, 2021 and 2020, deferred debt issuance costs were \$19.5 million and \$14.3 million, respectively, and were recorded in “Long-Term Debt” on our Consolidated Balance Sheets.

Cutting Rights and Fiber Farms

We lease the cutting rights to approximately 65,000 acres of timberland. For our cutting rights, we capitalize the annual lease payments and reforestation costs associated with these leases. Costs are recorded as depletion when the timber or fiber is harvested and used in operations or sold to customers. Capitalized long-term lease costs for our cutting rights, primarily recorded in “Other long-term assets” on our Consolidated Balance Sheets, were \$21.0 million and \$20.3 million as of December 31, 2021 and 2020, respectively. The amount of depletion expense was \$2.0 million, \$3.1 million, and \$2.7 million for the years ended December 31, 2021, 2020, and 2019, respectively.

Deferred Software Costs

PCA capitalizes costs related to the purchase and development of software, which is used in its business operations. The costs attributable to these software systems are amortized over their estimated useful lives based on various factors such as the effects of obsolescence, technology, and other economic factors. Net capitalized software costs recorded in “Other long-term assets” on our Consolidated Balance Sheets were \$3.3 million and \$4.8 million for the years ended December 31, 2021 and 2020, respectively. Software amortization expense was \$1.6 million, \$1.1 million, and \$0.9 million for the years ended December 31, 2021, 2020, and 2019, respectively.

During 2019, the Company early adopted ASU 2018-15, *Intangibles – Goodwill and Other – Internal Use Software (Subtopic 350-40): Customer’s Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract*, which includes amendments to align the accounting for costs incurred to implement a cloud computing arrangement that is a service contract with the guidance on capitalizing costs associated with developing or obtaining internal-use software. As of December 31, 2021 and 2020, capitalized costs associated with cloud computing arrangements were \$2.8 million and \$4.0 million, respectively.

Income Taxes

PCA utilizes the liability method of accounting for income taxes whereby it recognizes deferred tax assets and liabilities for the future tax consequences of temporary differences between the tax basis of assets and liabilities and the reported amounts in the financial statements. Deferred tax assets will be reduced by a valuation allowance if, based upon management’s estimates, it is more likely than not that a portion of the deferred tax assets will not be realized in a future period. The estimates utilized in the recognition of deferred tax assets are subject to revision in future periods based on new facts or circumstances. PCA’s practice is to recognize interest and penalties related to unrecognized tax benefits in income tax expense.

Trade Agreements

PCA regularly trades containerboard with other manufacturers primarily to reduce shipping costs. These agreements are entered into with other producers on an annual basis, pursuant to which both parties agree to ship an identical number of tons of containerboard to each other within the agreement period. These agreements lower transportation costs by allowing each party's containerboard mills to ship containerboard to the other party's closer corrugated products plant. PCA tracks each shipment to ensure that the other party's shipments to PCA match PCA's shipments to the other party during the agreement period. Such transfers are possible because certain grades of containerboard are commodity products with no distinguishing product characteristics. These transactions are accounted for at carrying value, and revenue is not recorded as the transactions do not represent the culmination of an earnings process. The transactions are recorded into inventory accounts, and no sale or income is recorded until such inventory is converted to a finished product and sold to an end-use customer.

Business Combinations

The Company accounts for acquisitions under ASC 805, *Business Combinations* and ASU 2017-01 (Topic 805): *Clarifying the Definition of a Business*. ASC 805 requires separate recognition of assets acquired and liabilities assumed from goodwill at the acquisition date fair values. ASU 2017-01 (Topic 805) provides additional guidance to assist entities with evaluating whether transfers of assets and activities should be accounted for as acquisitions of assets or businesses. Goodwill as of the acquisition date is measured as the excess of consideration transferred over the net of the acquisition date fair values of the assets acquired and liabilities assumed. During the measurement period, which may be up to one year from the acquisition date, the Company records adjustments to the assets acquired and liabilities assumed with the corresponding offset to goodwill. Upon the conclusion of the measurement period or final determination of the values of assets acquired or liabilities assumed, whichever comes first, any subsequent adjustments are recorded to the consolidated financial statements.

Recently Adopted Accounting Standards

The Company did not adopt any new accounting standards during 2021.

New Accounting Standards Not Yet Adopted

In October 2021, the FASB issued ASU 2021-08, *Business Combinations (Topic 805): Accounting for Contract Assets and Contract Liabilities from Contracts with Customers*. ASU 2021-08 requires contract assets and contract liabilities acquired in a business combination to be recognized and measured by the acquirer on the acquisition date in accordance with ASC 606, *Revenue from Contracts with Customers*. Under current business combination guidance in ASC 805, *Business Combinations*, such assets and liabilities are recognized by the acquirer at fair value on the acquisition date, whereas the new guidance requires the acquirer to recognize such assets and liabilities as if it had originated the contracts. The ASU is effective for annual periods beginning after December 15, 2022, and interim periods within those annual periods, with early adoption permitted. The amended guidance should be applied on a prospective basis to any business combinations that occur on or after the adoption date. The Company is currently evaluating the impact of this guidance but does not expect the guidance to have a significant impact on the Company's financial position, results of operations, or cash flow.

In March 2020, the FASB issued ASU 2020-04, *Reference Rate Reform (Topic 848): Facilitation of the Effects of Reference Rate Reform on Financial Reporting*. ASU 2020-04 provides optional guidance for a limited period of time to ease the potential burden in accounting for, or recognizing the effects of, reference rate reform on financial reporting. The amendments in this Update are elective and apply to all entities, subject to meeting certain criteria, that have contracts, hedging relationships, and other transactions that reference LIBOR or another reference rate expected to be discontinued because of reference rate reform. In January 2021, the FASB issued ASU 2021-01, which extends some of the optional expedients under Topic 848 to include derivative contracts impacted by discounting transition. Companies can apply the ASU immediately. The ASU can be adopted on a full retrospective basis as of any date from the beginning of an interim period that includes or is subsequent to March 12, 2020, or on a prospective basis to any new modification from any date within an interim period that includes or is subsequent to the date of the issuance of a final Update, up to the date that financial statements are available to be issued. The optional guidance will only be available until December 31, 2022. While the Company's fixed-rate outstanding debt will not be impacted by the reference rate reform, the Company is still evaluating the impact of this guidance on its revolving credit facility, as the interest rate associated with any future borrowings against the revolving credit facility is based on LIBOR. Overall, the Company does not expect the guidance to have a significant impact on its financial position or related disclosures.

There were no other accounting standards recently issued that had or are expected to have a material impact on our financial position or results of operations.

3. Leases

We group our leases into two primary lease types, real estate and equipment, and into various asset classes within each type. Real estate leases primarily include manufacturing locations, office space, warehouses, and design centers, while equipment leases primarily include manufacturing equipment.

Leases with an initial term of 12 months or less and certain month-to-month leases are not recorded on the balance sheet. The lease expense for these types of leases is recognized on a straight-line basis over the lease term.

To determine the lease term, we include the non-cancellable period of the lease together with the following: all periods covered by an option to extend the lease if we are reasonably certain to exercise that option; any periods covered by an option to terminate the lease if we are reasonably certain not to exercise that option; and any periods covered by an option to extend or not to terminate the lease that are controlled by the lessor. The exercising of lease renewal options is based on whether future economic benefit is expected to be derived from the renewal. Most of our real estate leases contain at least one renewal option. Renewal options generally range from 1 to 5 years. Although equipment leases may also contain renewal options, we typically do not expect to extend and/or exercise these renewal options unless a compelling business reason is provided to management.

Our leases may contain fixed and variable costs. Fixed costs determine the right-of-use asset. Variable costs are those costs which will vary month to month and are excluded from the calculation of the right-of-use asset. Variable lease costs are recorded to lease expense in the period in which they are incurred.

Our leases do not provide an implicit borrowing rate of return. Therefore, we use our incremental borrowing rate to calculate the present value of lease payments at inception of the lease or when a lease is modified.

Supplemental balance sheet information related to our operating leases was as follows (dollars in millions):

	Year Ended December 31,	
	2021	2020
Operating lease right-of-use assets	\$ 238.3	\$ 234.2
Current portion of operating lease obligations	\$ 67.1	\$ 68.9
Long-term portion of operating lease obligations	179.3	173.6
Total operating lease obligations	\$ 246.4	\$ 242.5

Supplemental balance sheet information related to our finance leases was as follows (dollars in millions):

	Year Ended December 31,	
	2021	2020
Buildings	\$ 0.3	\$ 0.3
Machinery and equipment	28.5	28.5
Total	28.8	28.8
Less accumulated amortization	(21.1)	(19.6)
Total	\$ 7.7	\$ 9.2
Current portion of finance lease obligations	\$ 1.7	\$ 1.6
Long-term portion of finance lease obligations	12.7	14.4
Total finance lease obligations	\$ 14.4	\$ 16.0

The Company was obligated under finance leases covering buildings and machinery and equipment in the amount of \$14.4 million and \$16.0 million at December 31, 2021 and 2020, respectively. Amortization of assets under finance lease obligations is included in depreciation expense.

For both operating and finance leases, the weighted average remaining lease term in years and weighted average discount rates were as follows:

	Year Ended December 31,	
	2021	2020
Weighted-average remaining lease term (years):		
Operating leases	5.4	5.3
Finance leases	6.8	7.8
Weighted-average discount rate:		
Operating leases	3.08 %	3.79 %
Finance leases	6.66 %	6.66 %

The components of lease expense were as follows (dollars in millions):

	Year Ended December 31,		
	2021	2020	2019
Finance lease cost:			
Amortization of finance lease assets	\$ 1.5	\$ 1.5	\$ 1.5
Interest on lease liabilities	1.0	1.1	1.2
Total finance lease cost	2.5	2.6	2.7
Operating lease cost	77.0	74.4	70.2
Short-term lease cost	22.7	18.0	19.2
Variable lease cost	19.4	12.9	13.7
Total lease cost	\$ 121.6	\$ 107.9	\$ 105.8

We had an insignificant amount of sublease rental income for the years ended December 31, 2021, 2020, and 2019.

Supplemental cash flow information related to leases was as follows (dollars in millions):

	Year Ended December 31,		
	2021	2020	2019
Cash paid for amounts included in the measurement of lease liabilities:			
Operating cash flows for operating leases	\$ (71.7)	\$ (68.2)	\$ (60.0)
Operating cash flows for finance leases	(1.5)	(1.5)	(1.5)
Financing cash flows for finance leases	(1.0)	(1.1)	(1.2)
Right-of-use assets obtained in exchange for new lease obligations:			
Operating leases	\$ (44.4)	\$ (35.7)	\$ (27.7)
Finance leases	—	—	—
Supplemental non-cash information on changes in lease liabilities	\$ 31.3	\$ 34.8	\$ 44.5
Supplemental non-cash information on changes in right-of-use assets	\$ 40.3	\$ 35.8	\$ 21.4

The future minimum payments under operating and finance lease liabilities at December 31, 2021 were as follows (dollars in millions):

	Operating Leases	Finance Leases
2022	\$ 73.6	\$ 2.7
2023	59.4	2.7
2024	44.9	2.7
2025	33.2	2.7
2026	20.1	2.7
Thereafter	38.4	4.4
Total lease payments	269.6	17.9
Less imputed interest (a)	(23.2)	(3.5)
Present value of lease liabilities	\$ 246.4	\$ 14.4

(a) Calculated using the incremental borrowing rate for each lease applied to the future payments.

4. Revenue

Revenue Recognition

Revenue is recognized when control of the promised goods or services is transferred to customers in an amount that reflects the consideration expected to be received in exchange for those goods or services. Sales, value added, and other taxes collected concurrently with revenue-producing activities are excluded from revenue.

The following table presents our revenues disaggregated by product line (dollars in millions):

	Year Ended December 31,		
	2021	2020	2019
Packaging	\$ 7,052.6	\$ 5,919.5	\$ 5,932.2
Paper	599.7	674.8	964.3
Corporate and Other	78.0	63.9	67.8
Total revenue	<u>\$ 7,730.3</u>	<u>\$ 6,658.2</u>	<u>\$ 6,964.3</u>

Packaging Revenue

Our containerboard mills produce linerboard and corrugating medium which are papers primarily used in the production of corrugated products. The majority of our containerboard production is used internally by our corrugated products manufacturing facilities. The remaining containerboard is sold to outside domestic and export customers. Our corrugated products manufacturing plants produce a wide variety of corrugated packaging products and retail merchandise displays. We sell corrugated products to national, regional and local accounts, which are broadly diversified across industries and geographic locations.

The Company recognizes revenue for its packaging products when performance obligations under the terms of a contract with a customer are satisfied. This occurs with the transfer of control of our products at a specific point in time. Based on our express terms and conditions of the sale of products to our customers, as well as terms included in contractual arrangements with our customers, we do not have an enforceable right of payment that includes a reasonable profit throughout the duration of the contract for products that do not have an alternative use. Revenue is recognized when the product is shipped from the mill or from our manufacturing facility to our customer. Certain customers may receive volume-based incentives, which are accounted for as variable consideration. We estimate these amounts based on the expected amount to be provided to customers and reduce revenue recognized.

Certain customers receive a portion of their packaging products as consigned inventory with billing triggered once the customer uses or consumes the designated product. Prior to invoicing, these amounts are handled as unbilled receivables. Total unbilled receivables, which are immaterial in amount, are included in the accounts receivable financial statement caption.

Paper Revenue

We manufacture and sell a range of communication-based papers. Communication papers consist of cut-size office papers, and printing and converting papers.

The Company recognizes revenue for its paper products when performance obligations under the terms of a contract with a customer are satisfied. This occurs with the transfer of control of our products at a specific point in time. Revenue is recognized when the product is shipped from the mill or from our manufacturing facility or distribution center to our customer. Certain customers may receive volume-based incentives, which are accounted for as variable consideration. We estimate these amounts based on the expected amount to be provided to customers and reduce revenue recognized.

Corporate and Other Revenue

Revenue in this segment primarily relates to Louisiana Timber Procurement Company, L.L.C. (LTP), a variable-interest entity that is 50% owned by PCA and 50% owned by Boise Cascade Company (Boise Cascade). PCA is the primary beneficiary of LTP and has the power to direct the activities that most significantly affect the economic performance of LTP. Therefore, we consolidate 100% of LTP in our financial statements. See Note 19, Transactions With Related Parties, for more information related to LTP.

The Company recognizes revenue within this segment when performance obligations under the terms of a contract with a customer are satisfied. This occurs with the transfer of control of our products at a specific point in time.

Practical Expedients and Exemption

Shipping and handling fees billed to a customer are recorded on a gross basis in "Net sales" with the corresponding shipping and handling costs included in "Cost of sales" in the concurrent period as the revenue is recorded. We expense sales commissions when incurred because the amortization period is one year or less. Sales commissions are recorded in "Selling, general, and administrative expenses".

We do not disclose the value of unsatisfied performance obligations for contracts with an original expected duration of one year or less.

5. Acquisitions

Advance Packaging Acquisition

On December 11, 2021, PCA acquired the assets of Advance Packaging Corporation ("Advance Packaging"), an independent corrugated products producer, for \$194.9 million, including working capital adjustments. Assets acquired include full-line corrugated products operations in Grand Rapids, Michigan. Advance Packaging is a full-service producer of corrugated packaging products, including graphics, retail displays, sustainable shipping containers, and protective packaging. Advance Packaging's financial results are included in the Packaging segment from the date of acquisition. We have estimated the allocation of the purchase price to the assets acquired and liabilities assumed based on estimates of the fair value at the date of acquisition, of which \$66.7 million was allocated to property, plant, and equipment, \$60.0 million was allocated to goodwill (which is deductible for tax purposes) and \$50.2 million to intangible assets (to be amortized over a weighted average life of approximately 9.7 years), primarily customer relationships, in the Packaging segment. The purchase price continues to be preliminary, as estimates and assumptions are subject to change as more information becomes available. Had the acquisition occurred at the beginning of 2020, the Company's net sales would have been \$7.8 billion and \$6.8 billion for 2021 and 2020, respectively.

6. Earnings Per Share

The following table sets forth the computation of basic and diluted income per common share for the periods presented (dollars and shares in millions, except per share data).

	Year Ended December 31,		
	2021	2020	2019
Numerator:			
Net income	\$ 841.1	\$ 461.0	\$ 696.4
Less: distributed and undistributed earnings allocated to participating securities	(6.4)	(3.6)	(5.2)
Net income attributable to common stockholders	<u>\$ 834.7</u>	<u>\$ 457.4</u>	<u>\$ 691.2</u>
Denominator:			
Weighted average common shares outstanding	94.1	94.1	93.8
Effect of dilutive securities	0.4	0.3	0.3
Diluted common shares outstanding	<u>94.5</u>	<u>94.4</u>	<u>94.1</u>
Basic income per common share	\$ 8.87	\$ 4.86	\$ 7.36
Diluted income per common share	\$ 8.83	\$ 4.84	\$ 7.34

7. Other Expense, Net

The components of other expense, net, were as follows (dollars in millions):

	Year Ended December 31,		
	2021	2020	2019
Asset disposals and write-offs	\$ (38.9)	\$ (26.5)	\$ (25.0)
Facilities closure and other income (costs) (a)	6.5	(19.1)	(0.3)
Jackson mill conversion-related activities (b)	(8.9)	—	—
Acquisition and integration related costs (c)	(0.6)	—	—
Wallula mill restructuring (d)	—	—	(0.7)
Other	(12.9)	(5.1)	(6.7)
Total	<u>\$ (54.8)</u>	<u>\$ (50.7)</u>	<u>\$ (32.7)</u>

- (a) For 2021, includes income primarily consisting of an adjustment of the required asset retirement obligation related to the 2020 closure of the San Lorenzo, California facility, a gain on sale of transportation assets and corrugated products facilities, and insurance proceeds received for a natural disaster at one of the corrugated products facilities, partially offset by closure costs related to corrugated products facilities. For 2020, includes charges consisting of restructuring costs for paper administrative functions and closure costs related to corrugated products facilities, substantially all of which relates to the previously announced closure of the San Lorenzo, California facility during the second quarter of 2020, partially offset by income related

to the sale of a closed corrugated products facility during the second quarter of 2020. For 2019, includes charges consisting of closure costs related to corrugated products facilities, partially offset by income from the sale of a building related to a closed corrugated products facility.

- (b) Includes charges related to the announced discontinuation of production of uncoated freesheet paper grades on the No. 3 machine at the Jackson, Alabama mill in the first quarter of 2021 associated with the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities.
- (c) Includes charges related to the December 2021 Advance Packaging Corporation acquisition.
- (d) Includes charges related to the discontinuation of production of uncoated free sheet and coated one-side white paper grades at the Wallula, Washington mill in the second quarter of 2018 and the conversion of the No. 3 paper machine to produce virgin kraft linerboard.

8. Income Taxes

The following is an analysis of the components of the consolidated income tax provision (dollars in millions):

	Year Ended December 31,		
	2021	2020	2019
Current income tax provision -			
U.S. federal	\$ 158.0	\$ 109.4	\$ 123.2
State and local	50.1	27.5	37.0
Foreign	0.1	0.1	0.1
Total current provision for taxes	<u>208.2</u>	<u>137.0</u>	<u>160.3</u>
Deferred income tax provision (benefit) -			
U.S. federal	62.1	26.8	55.3
State and local	(2.6)	8.0	5.0
Foreign	(0.1)	(0.1)	—
Total deferred provision (benefit) for taxes	<u>59.4</u>	<u>34.7</u>	<u>60.3</u>
Total provision for taxes	<u>\$ 267.6</u>	<u>\$ 171.7</u>	<u>\$ 220.6</u>

The effective tax rate varies from the U.S. federal statutory tax rate principally due to the following (dollars in millions):

	2021	2020	2019
Provision computed at U.S. federal statutory rate of 21%	\$ 232.8	\$ 132.9	\$ 192.6
State and local taxes, net of federal benefit	42.6	28.4	35.7
Goodwill impairment (a)	—	11.6	—
Other	(7.8)	(1.2)	(7.7)
Total	<u>\$ 267.6</u>	<u>\$ 171.7</u>	<u>\$ 220.6</u>

- (a) For additional information regarding the impairment of goodwill within our Paper reporting unit, see Note 9, Goodwill and Intangible Assets.

The following details the scheduled expiration dates of our tax effected net operating loss (NOL) and other tax carryforwards at December 31, 2021 (dollars in millions):

	2022 Through 2031	2032 Through 2041	Indefinite	Total
U.S. federal NOLs	\$ 22.2	\$ —	\$ —	\$ 22.2
State taxing jurisdiction NOLs	1.1	0.1	—	1.2
U.S. federal tax credit carryforwards	0.1	—	—	0.1
U.S. federal and non-U.S. capital loss carryforwards	0.6	—	0.1	0.7
Total	<u>\$ 24.0</u>	<u>\$ 0.1</u>	<u>\$ 0.1</u>	<u>\$ 24.2</u>

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts for income tax purposes. Deferred income tax assets and liabilities at December 31 are summarized as follows (dollars in millions):

	December 31,	
	2021	2020
Deferred tax assets:		
Lease obligations	\$ 61.4	\$ 60.6
Employee benefits and compensation	44.7	39.3
Pension and postretirement benefits	33.8	70.1
Net operating loss carryforwards	23.4	27.2
Restricted stock and performance units	8.5	9.6
Inventories	6.8	5.9
Accrued liabilities	6.3	5.3
Capital loss and general business credit carryforwards	0.7	0.6
Derivatives	0.1	0.1
Gross deferred tax assets	185.7	218.7
Valuation allowance (b)	(0.6)	(0.5)
Net deferred tax assets	<u>\$ 185.1</u>	<u>\$ 218.2</u>
Deferred tax liabilities:		
Property, plant and equipment	\$ (518.0)	\$ (465.6)
Goodwill and intangible assets	(73.3)	(72.7)
Right-of-use assets	(59.7)	(59.3)
Total deferred tax liabilities	<u>\$ (651.0)</u>	<u>\$ (597.6)</u>
Net deferred tax liabilities (c)	<u>\$ (465.9)</u>	<u>\$ (379.4)</u>

- (b) Deferred tax assets are reduced by a valuation allowance when it is more likely than not that some portion of the deferred tax assets will not be realized. Both the 2021 and 2020 valuation allowance relate to capital losses. We do not expect to generate capital gains before the capital losses expire. If or when recognized, the tax benefits relating to the reversal of any or all of the valuation allowance would be recognized as a benefit to income tax expense.
- (c) As of December 31, 2021, we did not recognize U.S. deferred income taxes on our cumulative total of undistributed foreign earnings for our foreign subsidiaries. We indefinitely reinvest our earnings in operations outside the United States. It is not practicable to determine the amount of unrecognized deferred tax liability on these undistributed earnings because the actual tax liability, if any, is dependent on circumstances existing when the repatriation occurs.

Cash payments for federal, state, and foreign income taxes were \$210.5 million, \$115.6 million, and \$172.7 million for the years ended December 31, 2021, 2020, and 2019, respectively.

The following table summarizes the changes related to PCA's gross unrecognized tax benefits excluding interest and penalties (dollars in millions):

	2021	2020	2019
Balance as of January 1	\$ (5.2)	\$ (4.8)	\$ (4.6)
Increases related to prior years' tax positions	—	—	(0.1)
Increases related to current year tax positions	(0.3)	(0.4)	(0.4)
Decreases related to prior years' tax positions	0.2	—	—
Settlements with taxing authorities	3.0	—	—
Expiration of the statute of limitations	0.4	—	0.3
Balance at December 31	<u>\$ (1.9)</u>	<u>\$ (5.2)</u>	<u>\$ (4.8)</u>

At December 31, 2021, PCA had recorded a \$1.9 million gross reserve for unrecognized tax benefits, excluding interest and penalties. Of the total, \$1.9 million (net of the federal benefit for state taxes) would impact the effective tax rate if recognized.

PCA recognizes interest accrued related to unrecognized tax benefits and penalties as income tax expense. For the years ended December 31, 2021 and 2020, we had \$0.2 million and \$1.2 million, respectively, of interest and penalties recorded for unrecognized tax benefits. PCA does not expect the unrecognized tax benefits to change significantly over the next 12 months.

PCA is subject to income taxation in the United States, various state and local jurisdictions, Canada and Hong Kong. A federal examination of the 2016 tax year concluded in March 2021. The tax years 2018 - 2021 remain open to federal examination. The tax years 2017 - 2021 remain open to state examinations. Some foreign tax jurisdictions are open to examination for the 2009 tax year forward. Through the Boise acquisition, PCA recorded net operating losses and credit carryforwards from 2008 through 2011 and 2013 that are subject to examinations and adjustments for at least three years following the year in which utilized.

9. Goodwill and Intangible Assets

Goodwill

Goodwill represents the excess of the cost of an acquired business over the fair value of the identifiable tangible and intangible assets acquired and liabilities assumed in a business combination. At December 31, 2021 and 2020, we had \$923.5 million and \$863.5 million of goodwill recorded in our Packaging segment on our Consolidated Balance Sheets. At December 31, 2021 and 2020, we had no goodwill recorded in our Paper segment on our Consolidated Balance Sheets.

Changes in the carrying amount of our goodwill were as follows (dollars in millions):

	Packaging	Paper	Total Goodwill
Balance at January 1, 2020	\$ 863.5	\$ 55.2	\$ 918.7
Impairment of Paper segment	—	(55.2)	(55.2)
Balance at December 31, 2020	863.5	—	863.5
Acquisition (a)	60.0	—	60.0
Balance at December 31, 2021	\$ 923.5	\$ —	\$ 923.5

(a) In connection with the December 2021 acquisition of Advance Packaging, the Company recorded \$60.0 million of goodwill in the Packaging segment.

See Note 5, Acquisitions, for more information.

Goodwill Impairment

During the second quarter of 2020, with the exacerbated deterioration in uncoated freesheet market conditions arising from the COVID-19 pandemic and the estimated impact on our Paper segment and its projected future results of operations, we identified a triggering event indicating possible impairment of goodwill and our long-lived assets within our Paper reporting unit. An interim quantitative impairment analysis was performed as of May 31, 2020 for the Paper reporting unit, which is the same as our Paper reportable segment. We estimated the fair value of the Paper reporting unit using a combination of the income approach and the market approach, as further described below. Based on the evaluation performed, we determined that the carrying value of the Paper reporting unit exceeded its fair value, which resulted in a goodwill impairment charge totaling \$55.2 million. The impairment charge is included in "Goodwill impairment" on our Consolidated Statements of Income and Comprehensive Income and is not tax deductible.

For purposes of our goodwill impairment analysis, we estimated the fair value of the Paper reporting unit using a combination of the income approach and the market approach applying an equal weighting. The income approach incorporated the estimated future cash flows and a terminal value discounted to their present value using an appropriate risk-adjusted discount rate. The estimated future cash flows and terminal value were based on internal forecasts and industry trends, including the long-term outlook for the paper industry. Our expected cash flows include assumptions about industry pricing, expected paper demand, and anticipated input and conversion costs. The discount rate utilized in the income approach was 9%, which was derived using a capital asset pricing model based on relevant industry data to estimate the cost of equity financing. The discount rate is commensurate with the risks and uncertainties inherent in the business and the cash flow forecasts, updated for recent events. The market approach estimated the fair value of the Paper reporting unit by using valuation metrics of publicly traded companies or historically completed transactions of comparable businesses.

The valuation of our Paper reporting unit requires significant judgment in evaluating recent indicators of market activity and estimated future cash flows, discount rates, and other factors. Our impairment analysis contains inherent uncertainties due to uncontrollable events that could positively or negatively impact anticipated future economic and operating conditions. In making these estimates, the weighted-average cost of capital is utilized to calculate the present value of future cash flows and terminal value. Many variables go into estimating future cash flows, including estimates of our future revenue growth and operating results. When estimating our projected revenue growth and future operating results, we considered industry trends, economic data, and our competitive situation.

Intangible Assets

Intangible assets are comprised of customer relationships and trademarks and trade names. As a result of the triggering event described above, we also performed a recoverability test on our long-lived assets within the Paper segment, including long lived intangible assets, as of May 31, 2020. The recoverability test was based on forecasts of undiscounted cash flows. The results of the recoverability test indicated that the long-lived assets within our Paper segment, inclusive of the long lived intangible assets, were 100% recoverable.

The weighted average useful life, gross carrying amount, and accumulated amortization of our intangible assets were as follows (dollars in millions):

	As of December 31, 2021			As of December 31, 2020		
	Weighted Average Remaining Useful Life (in Years)	Gross Carrying Amount	Accumulated Amortization	Weighted Average Remaining Useful Life (in Years)	Gross Carrying Amount	Accumulated Amortization
Customer relationships (b)(c)	8.5	\$ 551.1	\$ 254.9	9.1	\$ 503.8	\$ 220.2
Trademarks and trade names (b)	8.4	37.6	25.5	9.3	34.8	23.0
Other (b)	2.2	4.4	4.3	1.2	4.3	3.8
Total intangible assets (excluding goodwill)	8.5	\$ 593.1	\$ 284.7	9.1	\$ 542.9	\$ 247.0

- (b) In connection with the December 2021 acquisition of Advance Packaging, the Company recorded intangible assets of \$47.3 million for customer relationships, \$2.8 million for trade names, and \$0.1 million for other intangibles.
- (c) During the second quarter of 2020, the Company recorded a \$4.5 million adjustment to decrease the remaining book value of the customer relationships intangible asset as a result of the closure of the San Lorenzo, California corrugated products facility.

Amortization expense was \$37.7 million, \$42.9 million (including the \$4.5 million adjustment to the customer relationships intangible asset related to the San Lorenzo, California facility closure, which was written off to amortization expense), and \$38.6 million for the years ended December 31, 2021, 2020, and 2019, respectively. Estimated amortization expense of intangible assets over the next five years is expected to approximate \$40.2 million (2022), \$39.2 million (2023), \$38.7 million (2024), and \$38.5 million (2025 and 2026).

Impairment Testing

We test goodwill for impairment annually in the fourth quarter or sooner if events or changes in circumstances indicate that the carrying value of the asset may exceed fair value. Additionally, when we experience changes to our business or operating environment, we evaluate the remaining useful lives and recoverability of our finite-lived purchased intangible assets to determine whether any adjustments to the useful lives or impairment are necessary. We completed our annual qualitative assessment in the fourth quarter, and there was no indication of goodwill or intangible asset impairment.

10. Accrued Liabilities

The components of accrued liabilities were as follows (dollars in millions):

	December 31,	
	2021	2020
Compensation and benefits	\$ 157.1	\$ 126.5
Customer rebates and other credits	36.9	27.1
Medical insurance and workers' compensation	26.9	25.5
Franchise, property, sales and use taxes	17.6	16.5
Environmental liabilities and asset retirement obligations	4.0	4.6
Severance, retention, and relocation	2.7	4.1
Other	9.8	11.9
Total	\$ 255.0	\$ 216.2

11. Debt

At December 31, 2021 and 2020, our long-term debt and interest rates on that debt were as follows (dollars in millions):

	December 31, 2021	December 31, 2020
	Amount	Amount
Revolving Credit Facility	\$ —	\$ —
4.50% Senior Notes, net of discount of \$0.6 million as of December 31, 2020, due November 2023	—	699.4
3.65% Senior Notes, net of discount of \$0.4 million and \$0.5 million as of December 31, 2021 and 2020, respectively, due September 2024	399.6	399.5
3.40% Senior Notes, net of discount of \$1.0 million and \$1.2 million as of December 31, 2021 and 2020, respectively, due December 2027	499.0	498.8
3.00% Senior Notes, net of discount of \$0.5 million and \$0.6 million as of December 31, 2021 and 2020, respectively, due December 2029	499.5	499.4
4.05% Senior Notes, net of discount of \$3.4 million as of both December 31, 2021 and 2020, due December 2049	396.6	396.6
3.05% Senior Notes, net of discount of \$3.7 million as of December 31, 2021, due October 2051	696.3	—
Total	2,491.0	2,493.7
Less unamortized debt issuance costs	19.5	14.3
Total long-term debt	<u>\$ 2,471.5</u>	<u>\$ 2,479.4</u>

On September 21, 2021, the Company issued \$700.0 million of 3.05% senior notes due 2051 through a registered public offering, for the purpose of refinancing its \$700.0 million of 4.50% notes due November 1, 2023. On October 8, 2021, the Company completed the redemption of the old 4.50% notes for \$769.8 million, which included a redemption premium of \$56.1 million and \$13.7 million of accrued and unpaid interest. The redemption of the old 4.50% notes also included a \$1.4 million write-off of the remaining balance of unamortized debt issuance costs and a \$0.5 million write-off of the remaining balance of unamortized debt discount. PCA used the proceeds of the offering of the new 3.05% notes and cash on hand to fund the redemption and the \$7.7 million of debt issuance costs associated with the new notes. The debt issuance costs are amortized to interest expense using the effective interest method over the term of the notes.

As of December 31, 2021, the details of our borrowings were as follows:

- *Senior Unsecured Credit Agreement.* On June 8, 2021, we entered into a revolving credit agreement with various financial institutions (the "New Revolving Credit Agreement"), which replaced the old Credit Agreement, dated August 29, 2016 (the "Old Credit Agreement"). The Old Credit Agreement was scheduled to terminate on August 29, 2021. Loans under the New Revolving Credit Agreement bear interest at LIBOR plus an applicable margin based upon the public ratings of PCA's senior long-term unsecured debt or PCA's gross leverage ratio. The New Revolving Credit Agreement is a \$350 million unsecured revolving credit facility, which has a five-year term and is available for borrowings on a revolving basis for general corporate purposes. At December 31, 2021, unused borrowing capacity was \$323.2 million, which includes various outstanding letters of credit. The outstanding letters of credit were primarily for workers compensation. We are required to pay commitment fees on the unused portions of the credit facility.
- *4.50% Senior Notes.* On October 22, 2013, we issued \$700.0 million of 4.50% senior notes due November 1, 2023, through a registered public offering. The senior notes were paid off on October 8, 2021 with the proceeds received from the September 2021 offering discussed above and cash on hand.
- *3.65% Senior Notes.* On September 5, 2014, we issued \$400.0 million of 3.65% senior notes due September 15, 2024, through a registered public offering.
- *3.40% Senior Notes.* On December 13, 2017, we issued \$500.0 million of 3.40% senior notes due December 15, 2027, through a registered public offering.
- *3.00% Senior Notes.* On November 21, 2019, we issued \$500.0 million of 3.00% senior notes due December 15, 2029, through a registered public offering.
- *4.05% Senior Notes.* On November 21, 2019, we issued \$400.0 million of 4.05% senior notes due December 15, 2049, through a registered public offering.

- **3.05% Senior Notes.** On September 21, 2021, we issued \$700.0 million of 3.05% senior notes due October 1, 2051, through a registered public offering.

The instruments governing our indebtedness contain financial and other covenants that limit the ability of PCA and its subsidiaries to enter into sale and leaseback transactions, incur liens, incur indebtedness at the subsidiary level, enter into certain transactions with affiliates, merge or consolidate with any other person or sell or otherwise dispose of all or substantially all of our assets. Our credit facility also requires us to comply with certain financial covenants, including maintaining a minimum interest coverage ratio and a maximum leverage ratio. A failure to comply with these restrictions could lead to an event of default, which could result in an acceleration of any outstanding indebtedness and/or prohibit us from drawing on the revolving credit facility. An acceleration under the revolving credit facility may also constitute an event of default under the senior notes indenture. At December 31, 2021, we were in compliance with these covenants.

At December 31, 2021, we have \$2,491.0 million of fixed-rate senior notes outstanding. At December 31, 2021, the fair value of our fixed-rate debt was estimated to be \$2,650.1 million. The difference between the book value and fair value is due to the difference between the period-end market interest rate and the stated rate of our fixed-rate debt. We estimated the fair value of our fixed-rate debt using quoted market prices (Level 2 inputs), discussed further in Note 2, Summary of Significant Accounting Policies.

Repayments, Interest, and Other

In October 2021, we used the net proceeds from the September 2021 offering of the new 3.05% notes and cash on hand to redeem the 4.50% notes. We completed the redemption of the old 4.50% notes for \$769.8 million, which included a redemption premium and accrued and unpaid interest.

In 2020, we did not repay any outstanding debt, as we did not have any maturities of our Senior Notes during 2020.

In December 2019, we used the net proceeds from the November 2019 offering of the new 3.00% and 4.05% notes and cash on hand to redeem the two series of old notes (aggregate principal amount of \$900 million) outstanding at the time. We completed the redemption of those old notes for \$928.4 million, which included redemption premiums and accrued and unpaid interest.

As of December 31, 2021, annual principal maturities for debt, excluding unamortized debt discount, are: none for 2022 through 2023, \$400.0 million for 2024; none for 2025; and \$2.1 billion for 2026 and thereafter.

Interest payments paid in connection with the Company's debt obligations for the years ended December 31, 2021, 2020, and 2019 were \$149.6 million (including redemption premiums of \$56.1 million), \$97.0 million, and \$114.0 million (including redemption premiums of \$22.2 million), respectively. As of December 31, 2021, the estimated future interest payments for the Company's debt obligations are: \$84.7 million for 2022; \$84.2 million for 2023 and 2024; \$69.6 million for 2025; and \$1.0 billion for 2026 and thereafter.

Included in interest expense, net, are amortization of financing costs and, for 2019, amortization of treasury lock settlements. Amortization of financing costs in 2021, 2020, and 2019 was \$3.4 million (including a \$1.4 million write-off of deferred debt issuance costs related to the October 2021 debt refinancing), \$2.0 million, and \$4.5 million (including a \$1.8 million write-off of deferred debt issuance costs related to the November 2019 debt refinancing), respectively. Amortization of treasury lock settlements was an \$18.2 million net loss in 2019 (including a \$13.1 million write-off of the remaining balance for treasury locks related to the November 2019 debt refinancing).

12. Cash, Cash Equivalents, and Marketable Debt Securities

The following table shows the Company's cash and available-for-sale (AFS) debt securities by major asset category at December 31, 2021 and 2020 (in millions):

	December 31, 2021						
	Adjusted Cost Basis	Unrealized Gain	Unrealized Loss	Fair Value	Cash and Cash Equivalents	Short-Term Marketable Debt Securities	Long-Term Marketable Debt Securities
Cash and cash equivalents	\$ 612.3	\$ —	\$ —	\$ 612.3	\$ 612.3	\$ —	\$ —
Level 1 ^(a) :							
U.S. Treasury securities	26.4	—	(0.1)	26.3	2.0	14.7	9.6
Money market funds	0.9	—	—	0.9	0.9	—	—
Subtotal	27.3	—	(0.1)	27.2	2.9	14.7	9.6
Level 2 ^(b) :							
Corporate debt securities	118.9	—	(0.3)	118.6	3.5	66.0	49.1
U.S. government agency securities	4.8	—	—	4.8	—	3.5	1.3
Certificates of deposit	1.9	—	—	1.9	—	1.9	—
Subtotal	125.6	—	(0.3)	125.3	3.5	71.4	50.4
Total	\$ 765.2	\$ —	\$ (0.4)	\$ 764.8	\$ 618.7	\$ 86.1	\$ 60.0

	December 31, 2020						
	Adjusted Cost Basis	Unrealized Gain	Unrealized Loss	Fair Value	Cash and Cash Equivalents	Short-Term Marketable Debt Securities	Long-Term Marketable Debt Securities
Cash and cash equivalents	\$ 970.5	—	—	\$ 970.5	\$ 970.5	\$ —	\$ —
Level 1 ^(a) :							
U.S. Treasury securities	28.1	0.2	—	28.3	—	18.9	9.4
Money market funds	0.6	—	—	0.6	0.6	—	—
Subtotal	28.7	0.2	—	28.9	0.6	18.9	9.4
Level 2 ^(b) :							
Corporate debt securities	107.5	0.3	—	107.8	1.4	77.1	29.3
U.S. government agency securities	6.6	—	—	6.6	—	2.6	4.0
Certificates of deposit	5.9	—	—	5.9	1.1	4.8	—
Commercial paper	3.2	—	—	3.2	1.0	2.2	—
Subtotal	123.2	0.3	—	123.5	3.5	86.7	33.3
Total	\$ 1,122.4	\$ 0.5	\$ —	\$ 1,122.9	\$ 974.6	\$ 105.6	\$ 42.7

(a) Valuations based on quoted prices for identical assets and liabilities in active markets.

(b) Valuations based on observable inputs other than quoted prices included in Level 1, such as quoted prices for similar assets and liabilities in active markets, quoted prices for identical or similar assets and liabilities in markets that are not active, or other inputs that are observable or can be corroborated by observable market data.

For the years ended December 31, 2021, 2020 and 2019, net realized gains and losses on the sales and maturities of certain marketable debt securities were insignificant.

The Company invests in highly rated securities, with the primary objective of minimizing the potential risk of principal loss. The Company's investment policy requires securities to be investment grade and limits the amount of credit exposure to any one issuer. The maturities of the Company's long-term marketable debt securities generally range from one to two years.

Fair values were determined for each individual marketable debt security in the investment portfolio. When evaluating a marketable debt security for other-than-temporary impairment, PCA reviews factors such as the duration and extent to which the fair value of the marketable debt security is less than its cost, the financial condition of the issuer and any changes thereto, the general market condition in which the issuer operates, and PCA's intent to sell or whether it will be more likely than not be required to sell, the marketable debt security before recovery of its amortized cost basis.

As of December 31, 2021 and 2020, we do not consider any of the impairments related to our marketable debt securities to be the result of credit losses. Therefore, we have not recorded an allowance for credit losses related to our marketable debt securities. All unrealized gains and losses were recorded in other comprehensive income (OCI).

The following table provides information about the Company's marketable debt securities that have been in a continuous loss position as of December 31, 2021 and 2020 (in millions, except number of marketable debt securities in a loss position):

	December 31, 2021			December 31, 2020		
	Fair Value of Marketable Debt Securities	Number of Marketable Debt Securities in a Loss Position	Unrealized Losses	Fair Value of Marketable Debt Securities	Number of Marketable Debt Securities in a Loss Position	Unrealized Losses (c)
Corporate debt securities	\$ 106.9	153	\$ 0.3	\$ 42.9	56	\$ —
U.S. Treasury securities	22.4	27	0.1	1.7	3	—
Certificates of deposit	0.5	1	—	1.3	2	—
U.S. government agency securities	4.8	6	—	—	—	—
Commercial paper	—	—	—	2.2	1	—
	<u>\$ 134.6</u>	<u>187</u>	<u>\$ 0.4</u>	<u>\$ 48.1</u>	<u>62</u>	<u>\$ —</u>

(c) Unrealized losses were insignificant for the period ended December 31, 2020.

13. Employee Benefit Plans and Other Postretirement Benefits

PCA has defined pension benefit plans for both salaried and hourly employees. The plans covering salaried employees are closed to new entrants with only certain current active participants still accruing benefits. The plans covering certain hourly employees are closed to new participants. We also have a Supplemental Executive Retirement Plan (SERP) and other nonqualified defined benefit pension plans that provide unfunded supplemental retirement benefits to certain of our current and former management employees. The SERP provides for incremental pension benefits in excess of those offered in our principal pension plans.

Other Postretirement Benefits

PCA provides postretirement medical benefits for certain retired salaried employees and postretirement medical and life insurance benefits for certain hourly employees. The plan covering salaried employees is closed to new participants.

Obligations and Funded Status of Defined Benefit Pension and Other Postretirement Benefits Plans

The funded status of PCA's plans change from year to year based on the plan asset investment return, contributions, benefit payments, the discount rate used to measure the liability, and expected participant longevity. The following table, which includes only company-sponsored defined benefit and other postretirement benefit plans, reconciles the beginning and ending balances of the projected benefit obligation and the fair value of plan assets. We recognize the unfunded status of these plans on the Consolidated Balance Sheets, and we recognize changes in funded status in the year changes occur through the Consolidated Statements of Comprehensive Income (dollars in millions):

	Pension Plans		Postretirement Plans	
	Year Ended December 31		Year Ended December 31	
	2021	2020	2021	2020
Change in Benefit Obligation:				
Benefit obligation at beginning of period	\$ 1,565.6	\$ 1,420.1	\$ 13.1	\$ 14.5
Service cost	21.4	23.0	0.2	0.3
Interest cost	29.6	39.8	0.3	0.4
Plan amendments	2.1	1.3	(0.1)	—
Actuarial (gain) loss (a)	(61.1)	132.0	1.3	(1.5)
Participant contributions	—	—	0.6	0.9
Benefits paid	(53.8)	(50.6)	(1.8)	(1.5)
Benefit obligation at plan year end	<u>\$ 1,503.8</u>	<u>\$ 1,565.6</u>	<u>\$ 13.6</u>	<u>\$ 13.1</u>
Accumulated benefit obligation portion of above	<u>\$ 1,464.8</u>	<u>\$ 1,520.4</u>		
Change in Fair Value of Plan Assets:				
Plan assets at fair value at beginning of period	\$ 1,300.7	\$ 1,073.8	\$ —	\$ —
Actual return on plan assets	84.7	193.8	—	—
Company contributions	51.1	83.7	1.2	0.6
Participant contributions	—	—	0.6	0.9
Benefits paid	(53.8)	(50.6)	(1.8)	(1.5)
Fair value of plan assets at plan year end	<u>\$ 1,382.7</u>	<u>\$ 1,300.7</u>	<u>\$ —</u>	<u>\$ —</u>
Underfunded status	<u>\$ (121.1)</u>	<u>\$ (264.9)</u>	<u>\$ (13.6)</u>	<u>\$ (13.1)</u>
Amounts Recognized on Consolidated Balance Sheets:				
Current liabilities	\$ (1.9)	\$ (1.2)	\$ (0.6)	\$ (0.6)
Noncurrent liabilities	(119.2)	(263.7)	(13.0)	(12.5)
Accrued obligation recognized at December 31	<u>\$ (121.1)</u>	<u>\$ (264.9)</u>	<u>\$ (13.6)</u>	<u>\$ (13.1)</u>
Amounts Recognized in Accumulated Other Comprehensive Loss (Income) (Pre-Tax):				
Prior service cost (credit)	\$ 20.0	\$ 21.7	\$ (4.7)	\$ (4.9)
Actuarial loss (gain)	130.4	223.5	(3.6)	(5.5)
Total	<u>\$ 150.4</u>	<u>\$ 245.2</u>	<u>\$ (8.3)</u>	<u>\$ (10.4)</u>

- (a) For the year ended December 31, 2021, the most significant driver of the decrease in benefit obligations for the pension plans was the actuarial gains due to an increase in the discount rate assumption. The OPEB plans experienced an actuarial loss primarily due to adverse medical claims experience that was partially offset by the effect of the change in the discount rate assumption. For the year ended December 31, 2020, the most significant driver of the increase in benefit obligations for the plans was the actuarial losses due to the decrease in the discount rate assumption. The OPEB plans experienced a net actuarial gain primarily due to changes in demographic assumptions that were partially offset by the effect of the change in the discount rate assumption.

Components of Net Periodic Benefit Cost and Other Comprehensive (Income) Loss

The components of net periodic benefit cost and other comprehensive (income) loss (pretax) were as follows (dollars in millions):

	Pension Plans			Postretirement Plans		
	Year Ended December 31,			Year Ended December 31,		
	2021	2020	2019	2021	2020	2019
Service cost	\$ 21.4	\$ 23.0	\$ 24.5	\$ 0.2	\$ 0.3	\$ 0.3
Interest cost	29.6	39.8	47.0	0.3	0.4	0.5
Expected return on plan assets	(63.1)	(56.8)	(52.1)	—	—	—
Net amortization of unrecognized amounts:						
Prior service cost (credit)	3.8	4.3	6.3	(0.4)	(0.4)	(0.3)
Actuarial loss (gain)	10.4	10.8	7.0	(0.5)	(0.4)	(0.4)
Net periodic benefit cost	\$ 2.1	\$ 21.1	\$ 32.7	\$ (0.4)	\$ (0.1)	\$ 0.1
Changes in plan assets and benefit obligations recognized in other comprehensive (income) loss:						
Actuarial net loss (gain)	\$ (82.7)	\$ (5.0)	\$ 51.8	\$ 1.3	\$ (1.5)	\$ 0.2
Prior service cost (credit)	2.1	1.3	2.3	(0.1)	—	(0.3)
Amortization of prior service cost (credit)	(3.8)	(4.3)	(6.3)	0.4	0.4	0.3
Amortization of actuarial loss (gain)	(10.4)	(10.8)	(7.0)	0.5	0.4	0.4
Total recognized in other comprehensive loss (income) (b)	\$ (94.8)	\$ (18.8)	\$ 40.8	\$ 2.1	\$ (0.7)	\$ 0.6
Total recognized in net periodic benefit cost and other comprehensive loss (income) (pre-tax)	\$ (92.7)	\$ 2.3	\$ 73.5	\$ 1.7	\$ (0.8)	\$ 0.7

- (b) Accumulated losses in excess of 10% of the greater of the projected benefit obligation or the market-related value of assets will be recognized on a straight-line basis over the average remaining service period of active employees in PCA plans (which is between six and nine years) and over the average remaining lifetime of inactive participants of Boise plans (which is between 22 and 26 years), to the extent that losses are not offset by gains in subsequent years.

As of both December 31, 2021 and 2020, the accumulated benefit obligations for the plans with obligations in excess of plan assets is \$1.4 billion, and the pension benefit obligations for the plans with obligations in excess of plan assets is \$1.4 billion and \$1.5 billion for those same periods, respectively. Additionally, the fair value of the plan assets for the plans with obligations in excess of plan assets is \$1.3 billion and \$1.2 billion as of December 31, 2021 and 2020, respectively.

Assumptions

The following table presents the assumptions used in the measurement of our benefits obligations:

	Pension Plans			Postretirement Plans		
	December 31,			December 31,		
	2021	2020	2019	2021	2020	2019
Weighted-Average Assumptions Used to Determine Benefit Obligations at December 31:						
Discount rate	2.89 %	2.57 %	3.25 %	2.91 %	2.60 %	3.18 %
Rate of compensation increase	4.00 %	4.00 %	4.00 %	N/A	N/A	N/A
Weighted-Average Assumptions Used to Determine Net Periodic Benefit Cost for the Years Ended December 31:						
Discount rate	2.57 %	3.25 %	4.31 %	2.60 %	3.18 %	4.21 %
Expected return on plan assets	4.91 %	5.29 %	6.06 %	N/A	N/A	N/A
Rate of compensation increase	4.00 %	4.00 %	4.00 %	N/A	N/A	N/A

Discount Rate Assumption. The discount rate reflects the current rate at which the pension obligations could be settled on the measurement date: December 31. The discount rate assumption used to calculate the present value of pension and postretirement benefit obligations reflects the rates available on high-quality, fixed-income debt instruments at December 31. In all periods, the bonds included in the models reflect anticipated investments that would be made to match the expected monthly benefit payments over time. The plans' projected cash flows were duration-matched to these models to develop an appropriate discount rate.

Asset Return Assumption. The expected return on plan assets reflects the expected long-term rates of return for the categories of investments currently held in the plans as well as anticipated returns for additional contributions made in the future. The expected long-term rate of return is adjusted when there are fundamental changes in expected returns on the plan investments. The weighted-average expected return on plan assets we will use in our calculation of 2022 net periodic pension benefit cost is 4.08%.

Rate of Compensation Increase. The rate of compensation increase is determined by PCA based upon annual reviews. The compensation increase assumption is not applicable for all plans as many of our pension plans are frozen and not accruing benefits.

Health Care Cost Trend Rate Assumptions. PCA assumed health care cost trend rates for its postretirement benefits plans were as follows:

	2021	2020	2019
Health care cost trend rate assumed for next year	6.55 %	6.82 %	7.09 %
Rate to which the cost trend rate is assumed to decline (the ultimate trend rate)	4.50 %	4.50 %	4.50 %
Year that the rate reaches the ultimate trend rate	2030	2029	2029

Postretirement Health Care Plan Assumptions. For postretirement health care plan accounting, PCA reviews external data and its own historical trends for health care costs to determine the health care cost trend rate assumption.

Investment Policies and Strategies

PCA has retained the services of professional advisors to oversee pension investments and provide recommendations regarding investment strategy. PCA's overall strategy and related apportionments between equity and debt securities may change from time to time based on market conditions, external economic factors, and the funded status of the plans. The general investment objective for all of our plan assets is to optimize growth of the pension plan trust assets, while minimizing the risk of significant losses to enable the plans to satisfy their benefit payment obligations over time. The objectives take into account the long-term nature of the benefit obligations, the liquidity needs of the plans, and the expected risk/return trade-offs of the asset classes in which the plans may choose to invest. Assets of our pension plans were invested in the following classes of securities at December 31, 2021 and 2020:

	Percentage of Fair Value at December 31,	
	2021	2020
Fixed income securities	67 %	48 %
International equity securities	18 %	29 %
Domestic equity securities	13 %	21 %
Other	2 %	2 %

At December 31, 2021, the targeted investment allocations differed between the plans based on funded status. For our pension plans, the weighted average target allocation of plan assets was 70% in fixed income, 29% in equities, and 1% in other. Our retirement committee reviews the investment allocations for reasonableness at a minimum, semi-annually.

Investment securities, in general, are exposed to various risks, such as interest rate, credit, and overall market volatility risk, all of which are subject to change. Due to the level of risk associated with some investment securities, it is reasonably possible that changes in the values of investment securities will occur in the near term, and such changes could materially affect the reported amounts.

Fair Value Measurements of Plan Assets

The following tables set forth, by level within the fair value hierarchy, discussed in Note 2, Summary of Significant Accounting Policies, the pension plan assets, by major asset category, at fair value at December 31, 2021 and 2020 (dollars in millions):

Asset Category	Fair Value Measurements at December 31, 2021				
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Net Asset Value (NAV) (a)	Total
Short-term investments	\$ —	\$ 19.3	\$ —	\$ —	\$ 19.3
<i>Common/collective trust funds:</i>					
International equities	134.4	20.1	—	90.1	244.6
Domestic equities	—	185.7	—	—	185.7
<i>Corporate and government bonds:</i>					
Corporate bonds	—	436.2	—	—	436.2
Government bonds and agencies	—	320.2	—	—	320.2
Fixed income	—	147.7	—	—	147.7
Municipal bonds	—	24.0	—	—	24.0
Private equity securities (b)	—	—	1.5	—	1.5
Total securities at fair value	\$ 134.4	\$ 1,153.2	\$ 1.5	\$ 90.1	\$ 1,379.2
Accrued income					3.5
Total fair value of plan assets					\$ 1,382.7

Asset Category	Fair Value Measurements at December 31, 2020				
	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)	Net Asset Value (NAV) (a)	Total
Short-term investments	\$ —	\$ 25.1	\$ —	\$ —	\$ 25.1
<i>Common/collective trust funds:</i>					
International equities	198.4	32.8	—	136.9	368.1
Domestic equities	—	276.9	—	—	276.9
<i>Corporate and government bonds:</i>					
Corporate bonds	—	318.3	—	—	318.3
Government bonds and agencies	—	243.4	—	—	243.4
Fixed income	—	49.4	—	—	49.4
Municipal bonds	—	15.9	—	—	15.9
Private equity securities (b)	—	—	2.0	—	2.0
Total securities at fair value	\$ 198.4	\$ 961.8	\$ 2.0	\$ 136.9	\$ 1,299.1
Accrued income					1.6
Total fair value of plan assets					\$ 1,300.7

- (a) In accordance with ASC 820, *Fair Value Measurement*, certain investments that do not have readily determinable fair values are measured at fair value using the net asset value (NAV) per share practical expedient and are not classified within the fair value hierarchy.
- (b) Investments in this category are invested in the Pantheon Global Secondary Fund IV, L.P. The fund specializes in investments in the private equity secondary market and occasionally directly in private companies to maximize capital growth. Fund investments are carried at fair value as determined quarterly using the market approach to estimate the fair value of private investments. The market approach utilizes prices and other relevant information generated by market transactions, type of security, size of the position, degree of liquidity, restrictions on the disposition, latest round of financing data, current financial position, and operating results, among other factors. In circumstances where fair values are not provided with respect to any of the company's fund investments, the investment advisor will seek to determine the fair value of such investments based on information provided by the general partners or managers of such funds or from other sources. Audited financial statements are provided by fund management annually. Notwithstanding the above, the variety of valuation bases adopted and quality of management data of the ultimate underlying investee companies means that there are inherent difficulties in determining the value of the investments. Amounts realized on the sale of these investments may differ from the calculated values. Boise had originally committed to a \$15.0 million investment, with \$2.0 million of the commitment unfunded at December 31, 2021.

The following table sets forth a summary of changes in the fair value of the pension plans' Level 3 assets for the year ended December 31, 2021 (dollars in millions):

	2021	
Balance, beginning of year	\$	2.0
Acquisitions		—
Purchases		0.4
Sales		(0.9)
Unrealized gain		—
Balance, end of year	\$	1.5

Funding and Cash Flows

PCA makes pension plan contributions that are sufficient to fund its actuarially determined costs, generally equal to the minimum amounts required by the Employee Retirement Income Security Act (ERISA). From time to time, PCA may make discretionary contributions based on the funded status of the plans, tax deductibility, income from operations, and other factors. In 2021, 2020, and 2019, we made contributions of \$50.0 million, \$82.5 million, and \$57.9 million, respectively, to our qualified pension plans. We do not have a required minimum contribution amount established for 2022, but we expect to make discretionary contributions to our plans.

The following are estimated benefit payments to be paid to current plan participants by year (dollars in millions). Qualified pension benefit payments are paid from plan assets, while nonqualified pension benefit payments are paid by the Company.

	Pension Plans		Postretirement Plans	
2022	\$	60.1	\$	0.5
2023		63.9		0.5
2024		66.8		0.5
2025		70.0		0.6
2026 - 2031		469.3		3.9

Defined Contribution Plans

Some of our employees participate in contributory defined contribution savings plans, available to most of our salaried and hourly employees. The defined contribution plans permit participants to make contributions by salary reduction pursuant to Section 401(k) of the Code. PCA made employer-matching contributions of \$38.2 million, \$40.8 million, and \$39.0 million in 2021, 2020, and 2019, respectively. All company-matching contributions to all employees were made in cash. We expense employer matching contributions and charge dividends on shares held by the ESOP to retained earnings. Shares of company stock held by the ESOP are included in basic shares for earnings-per-share computations. At both December 31, 2021 and 2020, the ESOP held 1.2 million shares of Company stock.

Certain salaried and hourly employees that are not participating in a PCA sponsored defined benefit pension plan receive a service-related company retirement contribution to their defined contribution plan account in addition to any employer matching contribution. This contribution increases with years of service and ranges from 3% to 5% of base pay. We contributed \$46.4 million, \$39.4 million, and \$36.7 million for this retirement contribution during the years ended December 31, 2021, 2020, and 2019, respectively.

Deferred Compensation Plans

Key managers can elect to participate in a deferred compensation plan. The deferred compensation plan is unfunded; therefore, benefits are paid from our general assets. At December 31, 2021 and 2020, we had \$25.2 million and \$22.6 million, respectively, of liabilities attributable to participation in our deferred compensation plan on our Consolidated Balance Sheets.

14. Asset Retirement Obligations

Our asset retirement obligations relate predominantly to landfill closure, wastewater treatment pond dredging, closed-site monitoring costs, and certain leasehold improvements. In accordance with ASC 410, *Asset Retirement and Environmental Obligations*, we recognize the fair value of these liabilities as an asset retirement obligation and capitalize that cost as part of the cost basis of the related asset in the period in which the costs are incurred if sufficient information is available to reasonably estimate the fair value of the obligation. Fair value estimates are determined using Level 3 inputs in the fair value hierarchy. The fair value of our asset retirement obligations is measured using expected future cash outflows discounted using the Company's credit-adjusted risk-free interest rate. Over time, the liability is accreted to its settlement value, and the capitalized cost is depreciated over the useful life of the related asset. These liabilities are based on the best estimate of costs and are updated periodically to reflect current technology, laws and regulations, inflation, and other economic factors. Occasionally, we become aware of events or circumstances that require us to revise our future estimated cash flows. When revisions become necessary, we recalculate our obligation and adjust our asset and liability accounts utilizing appropriate discount rates. No assets are legally restricted for purposes of settling asset retirement obligations. Upon settlement of the liability, we will recognize a gain or loss for any difference between the settlement amount and the liability recorded.

The following table describes changes to the asset retirement obligation liability (dollars in millions):

	Year Ended December 31,	
	2021	2020
Asset retirement obligation at beginning of period	\$ 31.8	\$ 27.8
Accretion expense	1.2	1.3
Liabilities incurred	1.0	—
Revisions in estimated cash flows (a)	(4.5)	3.5
Payments	(0.1)	(0.8)
Asset retirement obligation at end of period	<u>\$ 29.4</u>	<u>\$ 31.8</u>

(a) For 2021 and 2020, primarily consists of an asset retirement adjustment of \$4.2 million and \$4.5 million, respectively, related to the San Lorenzo, California facility closure.

We have additional asset retirement obligations with indeterminate settlement dates. The fair value of these asset retirement obligations cannot be estimated due to the lack of sufficient information to estimate the settlement dates of the obligations. These asset retirement obligations include, for example, (i) removal and disposal of potentially hazardous materials related to equipment and/or an operating facility if the equipment and/or facilities were to undergo major maintenance, renovation, or demolition and (ii) storage sites or owned facilities for which removal and/or disposal of chemicals and other related materials are required if the operating facility is closed. We will recognize a liability in the period in which sufficient information becomes available to reasonably estimate the fair value of these obligations.

15. Share-Based Compensation

The Company has a long-term equity incentive plan, which allows for grants of restricted stock, performance awards, stock appreciation rights, and stock options to directors, officers, and employees, as well as others who engage in services for PCA. On February 25, 2020, our board of directors approved, and, on May 5, 2020, our stockholders approved, the amendment and restatement of the plan. The amendment extended the plan's term to May 5, 2030 and increased the number of shares of common stock available for issuance under the plan by 1.4 million shares. The total number of shares authorized for past and future awards is 12.0 million shares.

As of December 31, 2021, assuming performance units are paid out at the target level of performance, 1.3 million shares were available for future grants under the current plan. Forfeitures are added back to the pool of shares of common stock available to be granted at a future date.

Restricted Stock

Restricted stock awards granted to officers and employees generally vest at the end of a four-year period, and restricted stock awards granted to directors vest immediately. A summary of the Company's restricted stock activity follows:

	2021		2020		2019	
	Shares	Weighted Average Grant-Date Fair Value	Shares	Weighted Average Grant-Date Fair Value	Shares	Weighted Average Grant-Date Fair Value
Restricted stock at January 1	669,102	\$ 102.55	716,952	\$ 94.50	743,591	\$ 86.90
Granted	173,970	134.10	204,960	94.25	199,499	95.48
Vested (a)	(182,779)	108.59	(244,823)	72.11	(212,809)	68.59
Forfeitures	(8,845)	111.73	(7,987)	99.94	(13,329)	98.86
Restricted stock at December 31	651,448	\$ 109.16	669,102	\$ 102.55	716,952	\$ 94.50

(a) The total fair value of awards upon vesting for the years ended December 31, 2021, 2020, and 2019 was \$24.8 million, \$23.6 million, and \$19.9 million, respectively.

Performance Units

Performance unit awards granted to certain key employees are earned based on the achievement of defined performance rankings of Return on Invested Capital (ROIC) or Total Shareholder Return (TSR) compared to ROIC and TSR for peer companies. ROIC performance unit awards vest four years after the grant date, while TSR performance unit awards vest approximately three years after the grant date. Both ROIC and TSR performance units are paid out entirely in shares of the Company's common stock. A summary of the Company's performance unit activity follows:

	2021		2020		2019	
	Units	Weighted Average Grant-Date Fair Value	Units	Weighted Average Grant-Date Fair Value	Units	Weighted Average Grant-Date Fair Value
Performance units at January 1	357,417	\$ 103.63	323,147	\$ 96.56	266,704	\$ 90.01
Granted	95,236	140.47	111,287	99.20	109,545	97.24
Vested (b)	(74,894)	134.53	(77,017)	67.57	(53,102)	65.03
Forfeitures	(19,667)	132.58	—	—	—	—
Performance units at December 31	358,092	\$ 105.38	357,417	\$ 103.63	323,147	\$ 96.56

(b) The total fair value of awards upon vesting, including dividends, for the years ended December 31, 2021, 2020, and 2019 was \$11.0 million, \$8.5 million, and \$5.5 million, respectively. Upon vesting of the awards in 2021, 2020, and 2019, PCA issued 81,577 shares, 86,015 shares, and 59,165 shares, respectively. For 2021, 2020, and 2019, these amounts included 6,683 shares, 8,998 shares, and 6,063 shares, respectively, for dividends accrued during the vesting period.

Compensation Expense

Our share-based compensation expense is recorded in "Cost of sales" and "Selling, general, and administrative expenses" Compensation expense for share-based awards recognized in the Consolidated Statements of Income, net of forfeitures was as follows (dollars in millions):

	Year Ended December 31,		
	2021	2020	2019
Restricted stock	\$ 23.0	\$ 20.1	\$ 22.6
Performance units	12.5	9.9	7.8
Impact on income before income taxes	35.5	30.0	30.4
Income tax benefit	(8.9)	(7.6)	(7.6)
Impact on net income	\$ 26.6	\$ 22.4	\$ 22.8

The fair value of restricted stock is determined based on the closing price of the Company's stock on the grant date. Compensation expense, net of estimated forfeitures, is recorded over the requisite service period. As PCA's Board of Directors has the ability to accelerate the vesting of these awards upon an employee's retirement, the Company accelerates the recognition of compensation expense for certain employees approaching normal retirement age.

For performance unit awards made in 2021, 2020, and 2019, in terms of grant date value, 50% used total shareholder return (TSR) as the performance measure and 50% used return on invested capital (ROIC) as the performance measure. All units awarded before 2018 used ROIC as the performance measure. The ROIC component of performance unit awards is valued based on the closing price of the stock on the grant date. As the ROIC component contains a performance condition, compensation expense, net of estimated forfeitures, is recorded over the requisite service period based on the most probable number of awards expected to vest. The TSR component of performance unit awards is valued using a Monte Carlo simulation as the TSR component contains a market condition. The Monte Carlo simulation estimates the fair value of the TSR component based on the expected term of the award, a risk-free interest rate, expected dividends, and expected volatility of the Company's common stock and the common stock of the peer companies. Compensation expense is recorded ratably over the expected term of the award.

The unrecognized compensation expense for all share-based awards was as follows (dollars in millions):

	December 31, 2021	
	Unrecognized Compensation Expense	Remaining Weighted Average Recognition Period (in years)
Restricted stock	\$ 26.1	2.4
Performance units	17.9	2.1
Total unrecognized share-based compensation expense	<u>\$ 44.0</u>	<u>2.3</u>

We evaluate share-based compensation expense on a quarterly basis based on our estimate of expected forfeitures, review of recent forfeiture activity, and expected future turnover. We recognize the effect of adjusting the forfeiture rate for all expense amortization in the period that we change the forfeiture estimate. The effect of forfeiture adjustments was insignificant in all periods presented.

16. Derivative Instruments and Hedging Activities

Hedging Strategy

When appropriate, we use derivatives as a risk management tool to mitigate the potential impact of certain market risks. The primary risks managed by using derivative financial instruments are interest rate risks. We do not enter into derivative financial instruments for trading or speculative purposes.

Interest Rate Risk

The Company previously used treasury lock derivative instruments to manage interest costs and the risk associated with changes in the ten-year U.S. Treasury Note rate, which served as a reference in determining the interest rates applicable to the Company's debt securities issued in March 2008 and June 2012. Upon settlement of the interest rate protection agreements, the Company recorded the effective portion of the settlements in accumulated OCI. These amounts were then amortized over the terms of the respective notes.

During the fourth quarter of 2019, the Company recorded a charge of \$13.1 million in interest expense from the write-off of the remaining treasury lock balance due to the redemption of the 3.90% notes on December 23, 2019. The Company has not entered into any new interest rate protection agreements subsequent to the fourth quarter 2019 write-off of the remaining treasury lock balance.

Derivative Instruments

The impact of derivative instruments on the consolidated statements of income and accumulated OCI was as follows (dollars in millions):

	Loss Reclassified from Accumulated OCI into Income (Effective Portion) Year Ended December 31,		
	2021	2020	2019
Amortization of treasury locks (included in interest expense, net)	\$ —	\$ —	\$ (18.2)

As a result of our November 2019 debt refinancing and redemption of the 3.90% notes due June 15, 2022, the Company accelerated the amortization of the remaining treasury lock balance of \$13.1 million (\$6.5 million after tax) during the fourth quarter of 2019. The after tax amount includes \$3.2 million of income tax benefit from the stranded tax effects in accumulated OCI related to the write-off of the remaining treasury lock balance.

17. Stockholders' Equity

Dividends

During the year ended December 31, 2021, we paid \$379.8 million of dividends to shareholders. On December 9, 2021, PCA's Board of Directors declared a regular quarterly cash dividend of \$1.00 per share of common stock, which was paid on January 14, 2022 to shareholders of record as of December 20, 2021. The dividend payment was \$93.5 million.

Share Repurchase Program

On January 26, 2022, PCA announced that its Board of Directors authorized the repurchase of an additional \$1 billion of the Company's outstanding common stock. At the time of the announcement, there was no remaining authority under previously announced programs. Repurchases may be made from time to time in open market or privately negotiated transactions in accordance with applicable securities regulations. The timing and amount of repurchases will be determined by the Company in its discretion based on factors such as PCA's stock price and market and business conditions.

During the fourth quarter of 2021, we paid \$193.0 million to repurchase 1.4 million shares of common stock, which fully depleted the remaining February 2016 authorization of \$200.0 million. All shares repurchased have been retired. The Company did not repurchase any shares of its common stock under this authority during the years ended December 31, 2020 and 2019.

Accumulated Other Comprehensive Income (Loss)

Changes in AOCI, net of taxes, by component follows (dollars in millions). Amounts in parentheses indicate losses.

	Foreign Currency Translation Adjustments	Unrealized Loss on Foreign Exchange Contracts	Unrealized (Loss) Gain on Marketable Debt Securities	Unfunded Employee Benefit Obligations	Total
Balance at January 1, 2020	\$ (0.4)	\$ (0.2)	\$ —	\$ (158.9)	\$ (159.5)
Other comprehensive income before reclassifications	—	—	0.3	4.0	4.3
Amounts reclassified from AOCI	—	—	—	10.7	10.7
Net current-period other comprehensive income (loss)	—	—	0.3	14.7	15.0
Balance at December 31, 2020	\$ (0.4)	\$ (0.2)	\$ 0.3	\$ (144.2)	\$ (144.5)
Other comprehensive income before reclassifications	—	—	(0.5)	59.4	58.9
Amounts reclassified from AOCI	0.4	—	—	10.0	10.4
Net current-period other comprehensive income (loss)	0.4	—	(0.5)	69.4	69.3
Balance at December 31, 2021	\$ —	\$ (0.2)	\$ (0.2)	\$ (74.8)	\$ (75.2)

The following table presents information about reclassifications out of AOCI (dollars in millions). Amounts in parentheses indicate expenses in the Consolidated Statements of Income.

Details about AOCI Components	Amounts Reclassified from AOCI Year Ended December 31,		
	2021	2020	
Unfunded employee benefit obligations (a)			
Amortization of prior service costs	\$ (3.4)	\$ (3.9)	
Amortization of actuarial gains / (losses)	(9.9)	(10.4)	
	(13.3)	(14.3)	Total before tax
	3.3	3.6	Tax benefit
	\$ (10.0)	\$ (10.7)	Net of tax

(a) These AOCI components are included in the computation of net pension and postretirement benefit costs. See Note 13, Employee Benefit Plans and Other Postretirement Benefits, for additional information.

18. Concentrations of Risk

Our Paper segment has had a long-standing commercial and contractual relationship with Office Depot, our largest customer in the paper business. This relationship exposes us to a significant concentration of business and financial risk. Our sales to Office Depot represented approximately 4% and 5% of our total Company sales for 2021 and 2020, respectively, and about 51% and 45% of our Paper segment sales revenue for those periods, respectively. At December 31, 2021 and 2020, we had \$49.8 million and \$39.6 million of accounts receivable due from Office Depot, respectively, which represents approximately 4% and 5% of our total Company receivables, respectively.

In 2021, sales to Office Depot represented about 51% of our Paper segment sales. If these sales are reduced, we would need to find new customers. We may not be able to fully replace any lost sales, and any new sales may be at lower prices or higher costs. Any significant deterioration in the financial condition of Office Depot affecting its ability to pay or any other change that affects its willingness to purchase our products will harm our business and results of operations.

Labor

At December 31, 2021, we had approximately 15,200 employees and approximately 45% of these employees worked pursuant to collective bargaining agreements. Approximately 63% of our hourly employees are represented by unions. The majority of our unionized employees are represented by the United Steel Workers (USW), the International Brotherhood of Teamsters (IBT), the International Association of Machinists (IAM), and the Association of Western Pulp and Paper Workers (AWPPW). Of the employees who work pursuant to collective bargaining agreements, approximately 2% work pursuant to collective bargaining agreements that will expire within the next twelve months.

19. Transactions With Related Parties

Louisiana Timber Procurement Company, L.L.C. (LTP) is a variable-interest entity that is 50% owned by PCA and 50% owned by Boise Cascade Company (Boise Cascade). LTP procures sawtimber, pulpwood, residual chips, and other residual wood fiber to meet the wood and fiber requirements of PCA and Boise Cascade in Louisiana. PCA is the primary beneficiary of LTP and has the power to direct the activities that most significantly affect the economic performance of LTP. Therefore, we consolidate 100% of LTP in our financial statements in our Corporate and Other segment. The carrying amounts of LTP's assets and liabilities (which relate primarily to non-inventory working capital items) on our Consolidated Balance Sheets were \$3.5 million at December 31, 2021 and \$2.5 million at December 31, 2020. For 2021, 2020, and 2019, we recorded \$84.4 million, \$70.6 million, and \$81.7 million, respectively, of LTP sales to Boise Cascade in "Net Sales" in the Consolidated Statements of Income and approximately the same amount of expenses in "Cost of Sales".

Fiber purchases from related parties were \$13.5 million for 2021, \$12.6 million for 2020, and \$16.8 million for 2019. Most of these purchases related to chip and log purchases by LTP from Boise Cascade's wood products business. These purchases are recorded in "Cost of Sales" in the Consolidated Statements of Income.

20. Segment Information

We report our business in three reportable segments: Packaging, Paper, and Corporate and Other. These segments represent distinct businesses that are managed separately because of differing products and services. Each of these businesses requires distinct operating and marketing strategies.

Our Jackson, Alabama mill had historically operated as a UFS mill, with its results of operations reported in our Paper segment. During the fourth quarter of 2020, in order to meet strong packaging demand and maintain appropriate inventory levels, we temporarily began producing linerboard on the No. 3 machine at our Jackson, Alabama mill. In the first quarter of 2021, we announced the discontinuation of production of uncoated freesheet paper grades on the machine and the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities. Before October 2020, operating results for the Jackson mill were included in the Paper segment. Beginning in October 2020, operating results for the Jackson mill are included in both the Packaging and Paper segments.

Packaging. We manufacture and sell a wide variety of containerboard and corrugated packaging products, including conventional shipping containers used to protect and transport manufactured goods, multi-color boxes and displays with strong visual appeal that help to merchandise the packaged product in retail locations. In addition, we are a large producer of packaging for meat, fresh fruit and vegetables, processed food, beverages, and other industrial and consumer products.

Paper. We manufacture and sell a range of communication-based papers. Our papers can be manufactured as either commodity papers or specialty papers with specialized or custom features, such as colors, coatings, high brightness, or recycled content.

Corporate and Other. Our Corporate and Other segment includes corporate support staff services and related assets and liabilities, and foreign exchange gains and losses. This segment also includes transportation assets, such as rail cars and trucks, which we use to transport our products from some of our manufacturing sites and assets related to LTP. See Note 19, Transactions with Related Parties, for more information related to LTP. Sales in this segment relate primarily to LTP and our rail and truck business. We provide transportation services not only to our own facilities but also, on a limited basis, to third parties when geographic proximity and logistics are favorable. Rail cars and trucks are generally leased.

Each segments' profits and losses are measured on operating profits before interest expense, net and other and income taxes. For many of these allocated expenses, the related assets and liabilities remain in the Corporate and Other segment.

Segment sales to external customers by product line were as follows (dollars in millions):

	Year Ended December 31,		
	2021	2020	2019
Packaging	\$ 7,052.6	\$ 5,919.5	\$ 5,932.2
Paper	599.7	674.8	964.3
Corporate and Other	78.0	63.9	67.8
	<u>\$ 7,730.3</u>	<u>\$ 6,658.2</u>	<u>\$ 6,964.3</u>

Sales to foreign unaffiliated customers during the years ended December 31, 2021, 2020, and 2019 were \$497.8 million, \$318.7 million, and \$394.9 million, respectively. At December 31, 2021 and 2020, we did not have any significant long-lived assets held by foreign operations.

An analysis of operations by reportable segment is as follows (dollars in millions):

Year Ended December 31, 2021	Sales, net			Operating Income (Loss)	Depreciation, Amortization, and Depletion	Capital Expenditures (k)	Assets
	Trade	Inter- segment	Total				
Packaging	\$ 7,036.2	\$ 16.4	\$ 7,052.6	\$ 1,306.0 (a)	\$ 381.0	\$ 562.5	\$ 6,603.3
Paper	599.6	0.1	599.7	39.1 (b)	27.4	30.1	398.9
Corporate and Other	94.5	135.9	230.4	(103.7) (c)	9.1	12.5	834.6
Intersegment eliminations	—	(152.4)	(152.4)	—	—	—	—
	<u>\$ 7,730.3</u>	<u>\$ —</u>	<u>\$ 7,730.3</u>	1,241.4	<u>\$ 417.5</u>	<u>\$ 605.1</u>	<u>\$ 7,836.8</u>
Non-operating pension income				19.7			
Interest expense, net				(152.4) (d)			
Income before taxes				<u>\$ 1,108.7</u>			

Year Ended December 31, 2020	Sales, net			Operating Income (Loss)	Depreciation, Amortization, and Depletion	Capital Expenditures (k)	Assets
	Trade	Inter- segment	Total				
Packaging	\$ 5,901.7	\$ 17.8	\$ 5,919.5	\$ 829.5 (e)	\$ 365.2	\$ 394.8	\$ 5,744.0
Paper	674.7	0.1	674.8	(20.0) (f)(g)	36.5	20.1	497.2
Corporate and Other	81.8	131.3	213.1	(85.6)	8.3	6.3	1,192.0
Intersegment eliminations	—	(149.2)	(149.2)	—	—	—	—
	<u>\$ 6,658.2</u>	<u>\$ —</u>	<u>\$ 6,658.2</u>	723.9	<u>\$ 410.0</u>	<u>\$ 421.2</u>	<u>\$ 7,433.2</u>
Non-operating pension income				2.3			
Interest expense, net				(93.5)			
Income before taxes				<u>\$ 632.7</u>			

Year Ended December 31, 2019	Sales, net			Operating Income (Loss)	Depreciation, Amortization, and Depletion	Capital Expenditures (k)	Assets
	Trade	Inter- segment	Total				
Packaging	\$ 5,905.1	\$ 27.1	\$ 5,932.2	\$ 963.4 (h)	\$ 342.8	\$ 367.4	\$ 5,491.5
Paper	964.3	—	964.3	175.4 (i)	37.7	23.8	791.4
Corporate and Other	94.9	133.1	228.0	(85.1)	7.0	8.3	952.9
Intersegment eliminations	—	(160.2)	(160.2)	—	—	—	—
	<u>\$ 6,964.3</u>	<u>\$ —</u>	<u>\$ 6,964.3</u>	1,053.7	<u>\$ 387.5</u>	<u>\$ 399.5</u>	<u>\$ 7,235.8</u>
Non-operating pension expense				(7.9)			
Interest expense, net				(128.8) (j)			
Income before taxes				<u>\$ 917.0</u>			

- (a) Includes the following:
- \$4.3 million of charges related to the announced discontinuation of uncoated freesheet paper grades on the No. 3 machine at the Jackson, Alabama mill in the first quarter of 2021 associated with the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities.
 - \$2.8 million of income primarily consisting of an adjustment of the required asset retirement obligation related to the 2020 closure of the San Lorenzo, California facility, a gain on sale of corrugated products facilities, and insurance proceeds received for a natural disaster at one of the corrugated products facilities, partially offset by closure costs related to corrugated products facilities.
 - \$0.4 million of charges for acquisition and integration costs related to the December 2021 Advance Packaging Corporation acquisition.
- (b) Includes \$9.3 million of charges related to the announced discontinuation of uncoated freesheet paper grades on the No. 3 machine at the Jackson, Alabama mill in the first quarter of 2021 associated with the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities.
- (c) Includes the following:
- \$0.8 million of income related to a gain on sale of transportation assets.
 - \$0.5 million of charges for acquisition and integration costs related to the December 2021 Advance Packaging Corporation acquisition.
 - \$0.4 million of charges related to the announced discontinuation of uncoated freesheet paper grades on the No. 3 machine at the Jackson, Alabama mill in the first quarter of 2021 associated with the permanent conversion of the machine to produce linerboard and other paper-to-containerboard conversion related activities.
- (d) Includes \$58.9 million of costs related to the Company's debt refinancing completed in October 2021, which included a redemption premium and the write-off of the remaining balance of unamortized debt issuance costs.
- (e) Includes the following:
- \$27.3 million of closure costs related to corrugated products facilities, substantially all of which relates to the previously announced closure of the San Lorenzo, California facility during the second quarter of 2020, partially offset by income related to the sale of a corrugated products facility during the second quarter of 2020.
 - \$10.0 million of charges related to the impact of Hurricane Laura at our DeRidder, Louisiana mill, including unabsorbed costs related to lost production, excess purchased containerboard and freight costs, repair expenses, rental and supplies costs, and other recovery expenses.
 - \$6.3 million of incremental, out-of-pocket costs related to COVID-19, including supplies, cleaning and sick pay. Beginning in July 2020, all corresponding COVID-19 related expenses were included in normalized costs.
- (f) Includes the following:
- \$0.8 million of restructuring costs for paper administrative functions.
 - \$0.6 million incremental, out-of-pocket costs related to COVID-19, including supplies, cleaning and sick pay. Beginning in July 2020, all corresponding COVID-19 related expenses were included in normalized costs.
- (g) During the second quarter of 2020, with the exacerbated deterioration in uncoated freesheet market conditions and the estimated impact on our Paper reporting unit arising from the COVID-19 pandemic, as well as projected future results of operations, we identified a triggering event indicating possible impairment of goodwill within our Paper reporting unit. The Company performed an interim quantitative impairment analysis as of May 31, 2020, and, based on the evaluation performed, we determined that goodwill was fully impaired for the Paper reporting unit and recognized a non-cash impairment charge of \$55.2 million.
- (h) Includes the following:
- \$3.0 million of charges for the disposal of fixed assets related to the containerboard mill conversion at our DeRidder, Louisiana mill.
 - \$0.8 million of charges related to the second quarter discontinuation of uncoated free sheet and coated one-side white paper grades at the Wallula, Washington mill associated with the conversion of the No. 3 paper machine to produce virgin kraft linerboard.
 - \$0.3 million of charges consisting of closure costs related to corrugated products facilities, partially offset by income from the sale of a building related to a closed corrugated products facility
- (i) Includes \$0.2 million of charges related to the second quarter discontinuation of uncoated free sheet and coated one-side white paper grades at the Wallula, Washington mill associated with the conversion of the No. 3 paper machine to produce virgin kraft linerboard.
- (j) Includes \$38.7 million of charges related to the Company's November 2019 debt refinancing, which included redemption premiums and the write-offs of remaining balances of treasury locks and unamortized debt issuance costs.
- (k) Includes "Additions to property, plant, and equipment" and excludes cash used for "Acquisition of business, net of cash acquired" as reported on our Consolidated Statements of Cash Flows.

21. Commitments, Guarantees, Indemnifications, and Legal Proceedings

We have financial commitments and obligations that arise in the ordinary course of our business. These include long-term debt (discussed in Note 11, Debt), lease obligations (discussed in Note 3, Leases), capital commitments, purchase commitments for goods and services, and legal proceedings (discussed below).

Capital Commitments

The Company had capital commitments of approximately \$784.9 million and \$304.2 million as of December 31, 2021 and 2020, respectively, in connection with the expansion and replacement of existing facilities and equipment.

Purchase Commitments

In the table below, we set forth our enforceable and legally binding purchase obligations as of December 31, 2021. Some of the amounts are based on management's estimates and assumptions about these obligations, including their duration, the possibility of renewal, anticipated actions by third parties, and other factors. Because these estimates and assumptions are necessarily subjective, our actual payments may vary from those reflected in the table. Purchase orders made in the ordinary course of business are excluded below. Any amounts for which we are liable under purchase orders are reflected on the Consolidated Balance Sheets as accounts payable and accrued liabilities. These obligations relate to various purchase agreements for items such as minimum amounts of energy and fiber purchases over periods ranging from one year to 31 years. Total purchase commitments were as follows (dollars in millions):

2022	\$	75.0
2023		72.3
2024		40.7
2025		32.7
2026		27.0
Thereafter		72.5
Total	\$	<u>320.2</u>

The Company purchased a total of \$360.8 million, \$317.6 million, and \$315.0 million during the years ended December 31, 2021, 2020, and 2019, respectively, under these purchase agreements.

Environmental Matters

On August 8, 2019, the EPA issued a notice of violation (NOV) alleging violations of the Clean Air Act, resulting from an inspection of our Wallula, Washington mill in September 2018. PCA denies the violations set forth in the NOV and has requested that the EPA's Office of Air Quality Planning and Standards provide an applicability determination to clarify that the relevant operations of PCA have not violated the regulations at issue in the NOV. The EPA denied our request in 2020. On July 27, 2020, we filed a petition with the EPA to reconsider its denial of our applicability determination and filed petitions in U.S. federal court to review the agency's denial of our applicability determination as well as the rule at issue. After the filing of the petitions, we conducted further discussions with the agency, and, in the course of those discussions, the agency advised us that it would no longer pursue the enforcement action. The parties have jointly agreed to voluntarily dismiss the litigation.

The potential costs for various environmental matters are uncertain due to such factors as the unknown magnitude of possible cleanup costs, the complexity and evolving nature of governmental laws and regulations and their interpretations, and the timing, varying costs and effectiveness of alternative cleanup technologies. From 2006 through 2021, there were no significant environmental remediation costs at PCA's mills and corrugated plants. At December 31, 2021, the Company had \$24.3 million of environmental-related reserves recorded on its Consolidated Balance Sheet. Of the \$24.3 million, approximately \$17.0 million related to environmental-related asset retirement obligations discussed in Note 14, Asset Retirement Obligations, and \$7.3 million related to our estimate of other environmental contingencies. The Company recorded \$4.0 million in "Accrued liabilities" and \$20.3 million in "Other long-term liabilities" on the Consolidated Balance Sheet. Liabilities recorded for environmental contingencies are estimates of the probable costs based upon available information and assumptions. Because of these uncertainties, PCA's estimates may change. The Company believes that it is not reasonably possible that future environmental expenditures for remediation costs and asset retirement obligations above the \$24.3 million accrued as of December 31, 2021 will have a material impact on its financial condition, results of operations, or cash flows.

Guarantees and Indemnifications

We provide guarantees, indemnifications, and other assurances to third parties in the normal course of our business. These include tort indemnifications, environmental assurances, and representations and warranties in commercial agreements. At December 31, 2021, we are not aware of any material liabilities arising from any guarantee, indemnification, or financial assurance we have provided. If we determined such a liability was probable and subject to reasonable determination, we would accrue for it at that time.

DeRidder Mill Incident

On February 8, 2017, a tank located in the pulp mill at the Company's DeRidder, Louisiana facility exploded, resulting in three contractor fatalities and other injuries. The Company has been served with multiple lawsuits involving the decedents and other allegedly injured parties, alleging negligence on the part of the Company and claiming compensatory and punitive damages. The Company is vigorously defending these lawsuits. The Company believes that these suits are covered by its liability insurance policies, subject to an aggregate \$1.0 million deductible, which has been satisfied in full as a result of settlement of various lawsuits and fees and expenses incurred by the Company. Cases involving nine plaintiffs are pending in the U.S. District Court for the Middle District of Louisiana and one case remains pending in state court in Alabama. One case previously dismissed by the federal district court for the Western District of Louisiana has been appealed by the plaintiff to the United States Court of Appeals for the Fifth Circuit. The remaining lawsuits pending in federal district court and state court are in the early stages. Accordingly, the Company is unable to estimate a range of reasonable possible losses at this time.

The Company has cooperated with investigations from the U.S. Occupational Health and Safety Administration (OSHA), the U.S. Chemical Safety Board (CSB) and the U.S. Environmental Protection Agency (EPA). The U.S. Chemical Safety Board completed its investigation and issued its report during the second quarter of 2018. The Company settled with OSHA during the second quarter of 2018 and paid approximately \$40,000 in penalties for citations.

The EPA investigation is ongoing. In May 2017, the EPA conducted an on-site inspection of the facility to assess compliance with the Clean Air Act, Risk Management Program (RMP). The Company provided additional information to the EPA promptly after the inspection to address certain areas of concern (AOCs) observed during the inspection. In January 2021, the EPA and U.S. Department of Justice (DOJ) initiated civil judicial enforcement discussions with PCA. These discussions are ongoing. As of the date of filing of this report, no complaint has been filed. PCA continues to cooperate with the agencies. Since the inspection in 2017, PCA performed several voluntary activities to address the AOCs presented in the EPA's inspection report and has removed the RMP covered process from the facility.

Legal Proceedings

We are also a party to various legal actions arising in the ordinary course of our business. These legal actions include commercial liability claims, premises liability claims, and employment-related claims, among others. As of the date of this filing, we believe it is not reasonably possible that any of the legal actions against us will, either individually or in the aggregate, have a material adverse effect on our financial condition, results of operations, or cash flows.

Item 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

Item 9A. CONTROLS AND PROCEDURES**Controls and Procedures**

PCA maintains disclosure controls and procedures (as defined in Rule 13a-15(e) of the Securities Exchange Act of 1934) that are designed to provide reasonable assurance that information required to be disclosed in PCA's filings under the Securities Exchange Act is recorded, processed, summarized and reported within the periods specified in the rules and forms of the SEC and that such information is accumulated and communicated to PCA's management, including its Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Prior to filing this report, PCA completed an evaluation under the supervision and with the participation of PCA's management, including PCA's Chief Executive Officer and Chief Financial Officer, of the effectiveness of the design and operation of PCA's disclosure controls and procedures as of December 31, 2021. The evaluation of PCA's disclosure controls and procedures included a review of the controls' objectives and design, PCA's implementation of the controls and the effect of the controls on the information generated for use in this report. Based on this evaluation, PCA's Chief Executive Officer and Chief Financial Officer concluded that PCA's disclosure controls and procedures were effective at the reasonable assurance level as of December 31, 2021.

Changes in Internal Control over Financial Reporting

On December 10, 2021, PCA acquired Advance Packaging Corporation ("Advance Packaging"). We are currently in the process of evaluating and integrating Advance Packaging's controls over financial reporting which may result in changes or additions to PCA's internal control over financial reporting. Under guidelines established by the SEC, companies are permitted to exclude acquisitions from their assessment of internal control over financial reporting during the first year of an acquisition while integrating the acquired company. We excluded Advance Packaging from the assessment of internal control over financial reporting at December 31, 2021. Except as may relate to the Advance Packaging acquisition, there were no other changes in our internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act) that occurred during the most recent fiscal quarter ended December 31, 2021 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting. As of and for the year ended December 31, 2021, Advance Packaging accounted for approximately 3% of the Company's consolidated total assets and less than 1% of consolidated net sales.

Management's Report on Internal Control Over Financial Reporting

PCA's management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rule 13a-15(f). 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. Internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the Company's assets; (2) 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 are being made only with proper authorizations; and (3) 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, PCA's internal control over financial reporting may not prevent or detect misstatements. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that objectives of the control system are met. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls become inadequate because of changes in conditions, or that the degree of compliance with the policies and procedures may deteriorate.

PCA's management, under the supervision of and with the participation of the Chief Executive Officer and Chief Financial Officer, assessed the Company's internal control over financial reporting as of December 31, 2021, based on criteria established in *Internal Control - Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this assessment, and excluding the operations acquired from Advance Packaging, PCA's management concluded that its internal control over financial reporting was effective as of December 31, 2021, based on the specified criteria.

KPMG LLP, the independent registered public accounting firm that audited PCA's financial statements included in this Form 10-K, has also audited the effectiveness of the Company's internal control over financial reporting. Their attestation report precedes PCA's audited financial statements included elsewhere in this report.

Item 9B. OTHER INFORMATION

None.

Item 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

Item 10. DIRECTORS, EXECUTIVE OFFICERS, AND CORPORATE GOVERNANCE

Information regarding PCA's executive officers required by this Item 10 is set forth in Item 1 of Part I of this report under the caption "Executive Officers of the Registrant."

The following information required by this Item 10 will be included in PCA's Proxy Statement for the 2022 Annual Meeting of Stockholders and is incorporated by reference herein:

- Information regarding PCA's directors included under the caption "Election of Directors"
- Information regarding PCA's Audit Committee and financial experts included under the caption "Election of Directors - Audit Committee"
- Information regarding PCA's codes of ethics included under the caption "Election of Directors - Code of Ethics"
- Information regarding PCA's stockholder nominating procedures included under the captions "Election of Directors - Nominating and Governance Committee," "Other Information - Recommendations for Board - Nominated Director Nominees," and "Other Information - Procedures for Nominating Directors or Bringing Business Before the 2023 Annual Meeting"
- Information regarding compliance with Section 16(a) of the Securities Exchange Act of 1934 included under the caption "Delinquent Section 16(a) Reports"

Item 11. EXECUTIVE COMPENSATION

Information with respect to executive compensation required by this Item 11 will be included in PCA's Proxy Statement under the captions "Compensation Discussion and Analysis," "Executive Officer and Director Compensation" (including all subcaptions and tables thereunder) and "Board Committees - Compensation Committee" and is incorporated herein by reference.

Item 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Information with respect to security ownership of certain beneficial owners and management required by this Item 12 will be included in PCA's Proxy Statement under the caption "Ownership of Our Stock" and is incorporated herein by reference.

Authorization of Securities under Equity Compensation Plans — Securities authorized for issuance under our equity compensation plans at December 31, 2021 are as follows:

	Column		
	A	B	C
Plan Category	Number of Securities to Be Issued Upon Exercise of Outstanding Options, Warrants, and Rights (a)	Weighted Average Exercise Price of Outstanding Options, Warrants, and Rights	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (Excluding Securities Reflected in Column A)
Equity compensation plans approved by securityholders	—	\$ —	1,317,879
Equity compensation plans not approved by securityholders	N/A	N/A	N/A
Total	—	\$ —	1,317,879

- (a) Assumes that outstanding performance units pay out at the target level. Does not include 1,009,540 shares of unvested restricted stock and performance units granted pursuant to our Amended and Restated 1999 Long-Term Equity Incentive Plan.

Item 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Information with respect to certain relationships and related transactions and director independence required by this Item 13 will be included in PCA's Proxy Statement under the captions "Transactions with Related Persons" and "Election of Directors - Determination of Director Independence," respectively, and is incorporated herein by reference.

Item 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

Information with respect to fees and services of the principal accountant required by this Item 14 will be included in PCA's Proxy Statement under the caption "Ratification of Appointment of the Independent Registered Public Accounting Firm" under the subcaptions "- Fees to the Independent Registered Public Accounting Firm" and "- Audit Committee Preapproval Policy for Audit and Non-Audit Fees" and are incorporated herein by reference.

PART IV

Item 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

- (a) The following documents are filed as a part of this report:
- (1) The financial statements listed in the “Index to Financial Statements.”
 - (2) Financial Statement Schedule.

All schedules for which provision is made in the applicable accounting regulations of the Securities and Exchange Commission are not required under the related instructions, are inapplicable or not material, or the information called for thereby is otherwise included in the financial statements or the accompanying notes to the financial statements and therefore, have been omitted.

- (3) Exhibits

Exhibit Number	Description
2.1	<u>Contribution Agreement, dated as of January 25, 1999, among Pactiv Corporation (formerly known as Tenneco Packaging Inc.) (“Pactiv”), PCA Holdings LLC (“PCA Holdings”) and Packaging Corporation of America (“PCA”). (Incorporated herein by reference to Exhibit 2.1 to PCA’s registration Statement on Form S-4, Registration No. 333-79511).</u>
2.2	<u>Letter Agreement Amending the Contribution Agreement, dated as of April 12, 1999, among Pactiv, PCA Holdings and PCA. (Incorporated herein by reference to Exhibit 2.2 to PCA’s Registration Statement on Form S-4, Registration No. 333-79511).</u>
2.3	<u>Agreement and Plan of Merger, dated September 16, 2013, between PCA, Bee Acquisition Corp. and Boise Inc. (Incorporated herein by reference to Exhibit 2.1 to PCA’s Current Report on Form 8-K filed September 17, 2013, File No. 1-15399). PCA will furnish supplementally a copy of any omitted schedule or exhibit to the SEC upon request; provided, however, that PCA may request confidential treatment pursuant to Rule 24b-2 of the Securities Exchange Act of 1934, as amended, for any schedule or exhibit so furnished.</u>
3.1	<u>Restated Certificate of Incorporation of PCA. (Incorporated herein by reference to Exhibit 3.1 to PCA’s Registration Statement on Form S-4, Registration No. 333-79511).</u>
3.2	<u>Certificate of Amendment to Restated Certificate of Incorporation of PCA. (Incorporated herein by reference to Exhibit 3.2 to PCA’s Registration Statement on Form S-4, Registration No. 333-109437.)</u>
3.3	<u>Amended and Restated By-laws of PCA. (Incorporated herein by reference to Exhibit 3.1 to PCA’s Current Report on Form 8-K filed December 13, 2020, File No. 1-15399.)</u>
4.1	<u>Form of certificate representing shares of common stock. (Incorporated herein by reference to Exhibit 4.9 to PCA’s Registration Statement on Form S-1, Registration No. 333-86963.)</u>
4.2	<u>Indenture, dated as of July 21, 2003, between PCA and U.S. Bank National Association. (Incorporated herein by reference to Exhibit 4.2 to PCA’s Quarterly Report on Form 10-Q for the period ended June 30, 2003, File No. 1-15399.)</u>
4.3	<u>First Supplemental Indenture, dated as of July 21, 2003, between PCA and U.S. Bank National Association. (Incorporated herein by reference to Exhibit 4.3 to PCA’s Quarterly Report on Form 10-Q for the period ended June 30, 2003, File No. 1-15399.)</u>
4.4	<u>Officers’ Certificate, dated as of November 21, 2019, pursuant to Section 301 of the Indenture establishing 3.000% Senior Notes due 2029 and 4.050% Senior Notes due 2049. (Incorporated herein by reference to Exhibit 4.1 to PCA’s Current Report on Form 8-K filed November 21, 2019, File No. 1-15399.)</u>
4.5	<u>3.000% Senior Notes due 2029. (Incorporated herein by reference to Exhibit 4.2 to PCA’s Current Report on Form 8-K filed November 21, 2019, File No. 1-15399.)</u>
4.6	<u>4.050% Senior Notes due 2049. (Incorporated herein by reference to Exhibit 4.3 to PCA’s Current Report on Form 8-K filed November 21, 2019, File No. 1-15399.)</u>

- 4.7 [Officers' Certificate, dated September 5, 2014, pursuant to Section 301 of the Indenture establishing 3.650% Senior Notes due 2024. \(Incorporated herein by reference to Exhibit 4.1 to PCA's Current Report on Form 8-K filed September 5, 2014, File No. 1-15399\).](#)
- 4.8 [3.650% Senior Notes due 2024 \(Incorporated herein by reference to Exhibit 4.2 to PCA's Current Report on Form 8-K filed September 5, 2014, File No. 1-15399\).](#)
- 4.9 [Officer's Certificate, dated December 13, 2017, pursuant to Section 301 of the Indenture establishing 2.450% Senior Notes due 2020 \(redeemed and no longer outstanding\) and 3.400% Senior Notes due 2027. \(Incorporated herein by reference to Exhibit 4.1 to PCA's Current Report on Form 8-K filed December 13, 2017, File No. 1-15399\).](#)
- 4.10 [3.400% Senior Notes due 2027 \(Incorporated herein by reference to Exhibit 4.3 to PCA's Current Report on Form 8-K filed December 13, 2017, File No. 1-15399\).](#)
- 4.11 [Officer's Certificate, dated September 21, 2021, pursuant to Section 301 of the Indenture establishing 3.050% Senior Notes due 2051. \(Incorporated herein by reference to Exhibit 4.1 to PCA's Current Report on Form 8-K filed September 21, 2021, File No. 1-15399\).](#)
- 4.12 [3.050% Senior Notes due 2051 \(Incorporated herein by reference to Exhibit 4.2 to PCA's Current Report on Form 8-K filed September 21, 2021, File No. 1-15399\).](#)
- 4.13 [Description of Common Stock. \(Incorporated herein by reference to Exhibit 4.13 to PCA's Annual Report on Form 10-K for the year ended December 31, 2019, File No. 1-15399\).](#)
- 10.1 [Credit Agreement, dated June 8, 2021 between Packaging Corporation of America and the lenders and agents named therein. \(Incorporated herein by reference to Exhibit 10.1 to PCA's Current Report on Form 8-K filed June 11, 2021, File No. 1-15399\).](#)
- 10.2 [Packaging Corporation of America Thrift Plan for Hourly Employees and First Amendment of Packaging Corporation of America Thrift Plan for Hourly Employees, effective February 1, 2000. \(Incorporated herein by reference to Exhibit 4.5 to PCA's Registration Statement on Form S-8, Registration No. 333-33176\).](#)
- 10.3 [Packaging Corporation of America Retirement Savings Plan, effective February 1, 2000. \(Incorporated herein by reference to Exhibit 4.6 to PCA's Registration Statement on Form S-8, Registration No. 333-33176\).*](#)
- 10.4 [Packaging Corporation of America Supplemental Executive Retirement Plan, as Amended and Restated Effective as of February 27, 2019. \(Incorporated herein by reference to Exhibit 10.4 to PCA's Annual Report on Form 10-K for the year ended December 31, 2019, File No. 1-15399\).*](#)
- 10.5 [Packaging Corporation of America Deferred Compensation Plan, as Amended and Restated Effective as of February 27, 2019. \(Incorporated herein by reference to Exhibit 10.5 to PCA's Annual Report on Form 10-K for the year ended December 31, 2019, File No. 1-15399\).*](#)
- 10.6 [Amended and Restated 1999 Long-Term Equity Incentive Plan, effective as of May 5, 2020, conformed to incorporate all amendments. \(Incorporated herein by reference to Appendix A to PCA's Proxy Statement for the 2020 Annual Meeting of Stockholders\)*](#)
- 10.7 [Amended and Restated Executive Incentive Compensation Plan, effective as of December 29, 2017. \(Incorporated herein by reference to Exhibit 10.10 to PCA's Annual Report on Form 10-K for the year ended December 31, 2017, File No. 1-15399\).*](#)
- 10.8 [Trade Vendor Purchasing Agreement, dated December 6, 2019, between Boise White Paper, L.L.C. and Office Depot, Inc. \(Incorporated by reference to Exhibit 10.11 to PCA's Annual Report on Form 10-K for the year ended December 31, 2019, File No. 1-15399\)**](#)
- 10.9 [Form of Return on Invested Capital Performance Unit Agreement for executive officer awards. \(Incorporated by reference to Exhibit 10.2 to PCA's Quarterly Report on Form 10-Q for the period ended June 30, 2018, File No. 1-15399\).*](#)
- 10.10 [Form of Total Shareholder Return Performance Unit Agreement for executive officer awards. \(Incorporated by reference to Exhibit 10.3 to PCA's Quarterly Report on Form 10-Q for the period ended June 30, 2018, File No. 1-15399\).*](#)
- 10.11 [Form of Restricted Stock Agreement for executive officer awards. \(Incorporated by reference to Exhibit 10.1 to PCA's Quarterly Report on Form 10-Q for the period ended June 30, 2018, File No. 1-15399\).*](#)

21.1	Subsidiaries of the Registrant.†
23.1	Consent of KPMG LLP.†
24.1	Powers of Attorney.†
31.1	Certification of Chief Executive Officer, As Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.†
31.2	Certification of Chief Financial Officer, As Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.†
32	Certification of Chief Executive Officer and Chief Financial Officer Pursuant to 18 U.S.C. §1350, As Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.†
101.INS	Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because XBRL tags are embedded within the Inline XBRL document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)

* Management contract or compensatory plan or arrangement.

** Confidential information in this exhibit has been omitted.

† Filed herewith.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrants have duly caused this report to be signed on their behalf by the undersigned, thereunto duly authorized on February 24, 2022.

Packaging Corporation of America

/s/ MARK W. KOWLZAN

Mark W. Kowlzan

Chairman of the Board and Chief Executive Officer

Principal Executive Officer

/s/ ROBERT P. MUNDY

Robert P. Mundy

Executive Vice President and Chief Financial Officer

Principal Financial Officer

/s/ PAMELA A. BARNES

Pamela A. Barnes

Senior Vice President, Finance and Controller

Principal Accounting Officer

Pursuant to the requirements of the Securities Exchange Act of 1934, this report has been signed below on February 24, 2022, by the following persons on behalf of the registrants and in the capacities indicated.

<u>Signature</u>	<u>Capacity</u>
<hr/> <i>/s/</i> MARK W. KOWLZAN Mark W. Kowlzan	Chairman of the Board and Chief Executive Officer (Principal Executive Officer)
<hr/> <i>/s/</i> ROBERT P. MUNDY Robert P. Mundy	Executive Vice President and Chief Financial Officer (Principal Financial Officer)
<hr/> <i>/s/</i> PAMELA A. BARNES Pamela A. Barnes	Senior Vice President, Finance and Controller (Principal Accounting Officer)
<hr/> * Cheryl K. Beebe	Director
<hr/> * Duane Farrington	Director
<hr/> * Donna A. Harman	Director
<hr/> * Robert C. Lyons	Director
<hr/> * Thomas P. Maurer	Director
<hr/> * Samuel M. Mencoff	Director
<hr/> * Roger B. Porter	Director
<hr/> * Thomas S. Souleles	Director
<hr/> * Paul T. Stecko	Director
<hr/> * James D. Woodrum	Director
<hr/> <i>/s/</i> ROBERT P. MUNDY Robert P. Mundy (Attorney-In-Fact)	

Subsidiaries of the Registrant *

	State or Other Jurisdiction of Incorporation or Organization
Packaging Corporation of America (100%)	Delaware
Polywoven Distributors PA, LLC (51%)	Pennsylvania
PCA International Inc. (100%)	Delaware
PCA International Services, LLC (100%)	Delaware
PCA Hydro Inc. (100%)	Delaware
Packaging Corporation of Asia, Limited (100%)	Hong Kong
PCA Texas Acquisition, LLC (100%)	Delaware
PCA Central California Corrugated, LLC (100%)	Delaware
PCA Michigan Acquisition, LLC (100%)	Delaware
Packaging Asset Holdings, LLC (100%)	Delaware
Hexacomb Corporation (100%)	Illinois
Hexacomb Canada Holdings Corporation (100%)	Canada
Hexacomb Canada Corporation (100%)	Canada
Louisiana Timber Procurement Company, LLC (50%)	Delaware
Boise White Paper, LLC (100%)	Delaware
International Falls Power Company (100%)	Delaware
Minnesota, Dakota & Western Railway Company (100%)	Minnesota
B C T, Incorporated (100%)	Delaware

* The names of some of our foreign subsidiaries have been omitted. These unnamed subsidiaries, considered in the aggregate as a single subsidiary, would not constitute a significant subsidiary, as defined in Regular S-X, Rule 1-02 (w).

Consent of Independent Registered Public Accounting Firm

The Board of Directors
Packaging Corporation of America:

We consent to the incorporation by reference in the registration statements (No. 333-259350) on Form S-3 and (Nos. 333-188265, 333-202723, 333-238155, and 333-238156) on Form S-8 of our reports dated February 24, 2022, with respect to the consolidated financial statements of Packaging Corporation America and the effectiveness of internal control over financial reporting.

Our report dated February 24, 2022, on the effectiveness of internal control over financial reporting as of December 31, 2021, contains an explanatory paragraph that states that the Company acquired Advance Packaging Corporation during 2021, and management excluded from its assessment of the effectiveness of the Company's internal control over financial reporting as of December 31, 2021, Advance Packaging Corporation's internal control over financial reporting associated with approximately 3% of the Company's consolidated total assets and less than 1% of consolidated net sales included in the consolidated financial statements of the Company as of and for the year ended December 31, 2021. Our audit of internal control over financial reporting of the Company also excluded an evaluation of the internal control over financial reporting of Advance Packaging Corporation.

/s/ KPMG LLP

Chicago, Illinois
February 24, 2022

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleederer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ CHERYL K. BEEBE

Cheryl K. Beebe

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pflederer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ DUANE FARRINGTON

Duane Farrington

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleiderer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ DONNA A. HARMAN

Donna A. Harman

SPECIAL POWER OF ATTORNEY

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DATED: February 23, 2022

/s/ MARK W. KOWLZAN

Mark W. Kowlzan

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleiderer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ ROBERT C. LYONS

Robert C. Lyons

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleiderer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ THOMAS P. MAURER

Thomas P. Maurer

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleiderer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ SAMUEL M. MENCOFF

Samuel M. Mencoff

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleiderer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ ROGER B. PORTER

Roger B. Porter

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleiderer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ THOMAS S. SOULELES

Thomas S. Souleles

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleiderer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ PAUL T. STECKO

Paul T. Stecko

SPECIAL POWER OF ATTORNEY

The undersigned constitutes and appoints Mark W. Kowlzan, Robert P. Mundy and Kent A. Pfleiderer, and each of them, his true and lawful attorney-in-fact and agent with full power of substitution and resubstitution, for him and in his name, place, and stead, in any and all capacities, to sign the Annual Report on Form 10-K for the fiscal year ended December 31, 2021, for filing with the Securities and Exchange Commission by Packaging Corporation of America, a Delaware corporation, together with any and all amendments to such Form 10-K, and to file the same with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting to such attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully and to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that such attorneys-in-fact and agents, or each of them, may lawfully do or cause to be done by virtue hereof.

DATED: February 23, 2022

/s/ JAMES D. WOODRUM

James D. Woodrum

**CEO CERTIFICATION PURSUANT TO SECTION 302
OF THE SARBANES-OXLEY ACT OF 2002**

I, Mark W. Kowlzan, certify that:

(1) I have reviewed this annual report on Form 10-K of Packaging Corporation of America (PCA);

(2) Based on my knowledge, this annual report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this annual report;

(3) Based on my knowledge, the financial statements, and other financial information included in this annual report, fairly present in all material respects the financial condition, results of operations and cash flows of PCA as of, and for, the periods presented in this annual report;

(4) PCA's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for PCA and have:

a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to PCA, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) evaluated the effectiveness of PCA's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) disclosed in this report any change in PCA's internal control over financial reporting that occurred during PCA's most recent fiscal quarter (PCA's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, PCA's internal control over financial reporting; and

(5) PCA's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to PCA's auditors and the Audit Committee of PCA's Board of Directors (or persons performing the equivalent functions):

a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect PCA's ability to record, process, summarize and report financial information; and

b) any fraud, whether or not material, that involves management or other employees who have a significant role in PCA's internal control over financial reporting.

/s/ MARK W. KOWLZAN

Mark W. Kowlzan

Chairman of the Board and Chief Executive Officer

Date: February 24, 2022

**CFO CERTIFICATION PURSUANT TO SECTION 302
OF THE SARBANES-OXLEY ACT OF 2002**

I, Robert P. Mundy, certify that:

(1) I have reviewed this annual report on Form 10-K of Packaging Corporation of America (PCA);

(2) Based on my knowledge, this annual report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this annual report;

(3) Based on my knowledge, the financial statements, and other financial information included in this annual report, fairly present in all material respects the financial condition, results of operations and cash flows of PCA as of, and for, the periods presented in this annual report;

(4) PCA's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for PCA and have:

a) designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to PCA, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

b) designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

c) evaluated the effectiveness of PCA's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

d) disclosed in this report any change in PCA's internal control over financial reporting that occurred during PCA's most recent fiscal quarter (PCA's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, PCA's internal control over financial reporting; and

(5) PCA's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to PCA's auditors and the Audit Committee of PCA's Board of Directors (or persons performing the equivalent functions):

a) all significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect PCA's ability to record, process, summarize and report financial information; and

b) any fraud, whether or not material, that involves management or other employees who have a significant role in PCA's internal control over financial reporting.

/s/ ROBERT P. MUNDY

Robert P. Mundy

Executive Vice President and Chief Financial Officer

Date: February 24, 2022

**CERTIFICATIONS OF CHIEF EXECUTIVE OFFICER AND
CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. §1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

We are providing this Certificate pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, 18 U.S.C., Section 1350. It accompanies the Annual Report on Form 10-K of Packaging Corporation of America for the year ended December 31, 2021.

I, Mark W. Kowlzan, Chief Executive Officer of Packaging Corporation of America (the "Company"), certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

(1) The Annual Report of the Company on Form 10-K for the period ended December 31, 2021 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in such Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ MARK W. KOWLZAN

Mark W. Kowlzan

Chairman of the Board and Chief Executive Officer

Date: February 24, 2022

I, Robert P. Mundy, Chief Financial Officer of Packaging Corporation of America (the "Company"), certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to my knowledge:

(1) The Annual Report of the Company on Form 10-K for the period ended December 31, 2021 fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in such Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

/s/ ROBERT P. MUNDY

Robert P. Mundy

Executive Vice President and Chief Financial Officer

Date: February 24, 2022

