CHART INDUSTRIES INC
Form 10-K
February 22, 2019

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

Form 10-K

x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2018
OR
o TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to
Commission File No. 1-11442

CHART INDUSTRIES, INC.
(Exact Name of Registrant as Specified in its Charter)

Delaware	34-1712937
(State or Other Jurisdiction of Incorporation or Organization)	(IRS Employer Identification No.)
3055 Torrington Drive, Ball Ground, Georgia	30107
(Address of Principal Executive Offices)	(Zip Code)

Registrant's telephone number, including area code:
(770) 721-8800
Securities registered pursuant to Section 12(b) of the Act:

Title of Each Class	Name of Each Exchange on Which Registered
Common Stock, par value $0.01	The NASDAQ Stock Market LLC

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 x No o
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 o No x
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 x No o
Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to submitted and posted 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 and post such files). Yes x No o
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. x

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 (Check one):

Large accelerated filer	x	Accelerated filer	o
Non-accelerated filer	o (Do not check if a smaller reporting company)	Smaller reporting company	o
		Emerging growth company	o

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 is a shell company (as defined in Rule 12b-2 of the Act). Yes ¨ No x

The aggregate market value of the voting common equity held by non-affiliates computed by reference to the price of $61.68 per share at which the common equity was last sold, as of the last business day of the registrant’s most recently completed second fiscal quarter, was $1,909,931,501.

As of February 18, 2019, there were 31,597,161 outstanding shares of the Company’s common stock, par value $0.01 per share.

Documents Incorporated by Reference

Portions of the following document are incorporated by reference into Part III of this Annual Report on Form 10-K: the definitive Proxy Statement to be used in connection with the Registrant’s Annual Meeting of Stockholders to be held on May 22, 2019 (the “2019 Proxy Statement”).

Except as otherwise stated, the information contained in this Annual Report on Form 10-K is as of December 31, 2018.

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PART I

Item 1. Business

THE COMPANY

Overview

Chart Industries, Inc., a Delaware corporation incorporated in 1992 (the "Company," "Chart," "we," "us," or "our" as used here refers to Chart Industries, Inc. and our consolidated subsidiaries, unless the context indicates otherwise), is a leading diversified global manufacturer of highly engineered equipment, packaged solutions, and value-add services used throughout the gas to liquid cycle in all industries that require gases as cryogenic liquids or alternative equipment for gas generation, generally for the industrial gas and energy industries. Our equipment and engineered systems are primarily used to cool gases often to cryogenic liquid temperatures and then to transport and store them as liquids utilizing our expertise in cryogenic systems and equipment. Our equipment often operates at temperatures approaching absolute zero (0 Kelvin; -273° Centigrade; -459° Fahrenheit). Our products include vacuum insulated containment vessels, heat exchangers, cold boxes, liquefaction process units, other cryogenic components, gas processing equipment, and ambient temperature fans.

Our primary customers are large, multinational producers and distributors of hydrocarbon and industrial gases and their end-users. We sell our products and services to more than 2,000 customers worldwide. We have developed long-standing relationships with leading companies in the gas production, gas distribution, gas processing, liquefied natural gas or LNG, petroleum refining, chemical and industrial gas industries, including Air Products, Praxair, Air Liquide, Bechtel Corporation, ExxonMobil, British Petroleum or BP, ConocoPhillips, PetroChina, CB&I, Toyo, JGC, Samsung, UOP, and Shell, some of whom have been purchasing our products for over 20 years.

We have attained this position by capitalizing on our technical expertise and know-how, broad product offering, reputation for quality, low-cost global manufacturing footprint, and by focusing on attractive, growing markets. We have an established sales and customer support presence across the globe and manufacturing operations in the United States, Central Europe, China and India. For the years ended December 31, 2018, 2017 and 2016, we generated sales of $1,084.3 million, $842.9 million, and $722.0 million, respectively.

On November 15, 2018, we completed the acquisition of VRV S.r.l. and its subsidiaries (collectively "VRV"). VRV is a diversified multinational corporation with highly automated, purpose-built facilities for the design and manufacture of pressure equipment serving the industrial gas and energy end markets. VRV's results are included in our E&C and D&S East segments from the date of acquisition. For further discussion refer to "Note 12, Business Combinations," to our consolidated financial statements included elsewhere in this report.

On December 20, 2018, we completed the divestiture of our oxygen-related business (the "CAIRE Divestiture") to NGK SPARK PLUG CO., LTD. A portion of our former Biomedical segment business related to cryogenic technological expertise (the "Cryobiological Business") was excluded from the CAIRE Divestiture. Our disclosure in "Item 1 – Business" reflects the CAIRE Divestiture and is presented on a continuing operations basis.

Segments, Applications and Products

To support the VRV acquisition as well as our expanded focus on geographic expansion outside of North America, we executed a strategic realignment of our segment structure during the third quarter and divided our Distribution & Storage segment into two segments: Distribution & Storage Western Hemisphere ("D&S West") and Distribution & Storage Eastern Hemisphere ("D&S East"). Likewise, the former BioMedical segment was eliminated in connection with the CAIRE Divestiture, with the remaining Cryobiological Business now managed by and part of D&S West. We believe this strategic realignment of our segment structure will facilitate our growth strategies, better align with our customer needs, and provide improved transparency of business results to our shareholders. As a result of these changes, we now operate in two major end-market applications: Energy and Industrial Gas, through our three business segments: (i) Energy & Chemicals ("E&C"), (ii) D&S East, and (iii) D&S West. While each segment manufactures and markets different cryogenic and gas processing equipment and systems to distinct end-users, they all share a reliance on our heat transfer, vacuum insulation, low temperature storage, and gas processing know-how and expertise. Each of our segments manufacture products used primarily in energy-related and industrial applications, such as the separation, liquefaction, distribution, and storage of hydrocarbon and industrial gases. The recent VRV acquisition was complementary to our D&S East and E&C end markets and technologies, while expanding our presence in

Europe and India and expanding our end market into the “warm” side of energy and petrochemical processing. Further information about these segments is located in Note 4 of our consolidated financial statements included in Item 8 of this Annual Report on Form 10-K.

The following charts show the proportion of our revenues generated by each business segment, as well as our estimate of the proportion of revenue generated by end-user application for the year ended December 31, 2018:

Energy & Chemicals Segment

E&C (36% of sales for the year ended December 31, 2018) facilitates major natural gas, petrochemical processing, petroleum refining, power generation and industrial gas companies in the production of their products. E&C supplies mission critical engineered equipment and systems used in the separation, liquefaction, and purification of hydrocarbon and industrial gases that span gas-to-liquid applications including natural gas processing, petrochemical, LNG, petroleum refining and industrial gas applications. Our principal products include brazed aluminum heat exchangers, Core-in-Kettle® heat exchangers, air cooled heat exchangers, cold boxes, shell & tube heat exchangers, reactors and process systems as well as axial cooling fans for power, HVAC, and refining end user applications. Brazed aluminum heat exchangers accounted for 6.1%, 6.3%, and 9.4% of consolidated sales for the years ended December 31, 2018, 2017 and 2016, respectively. Process systems accounted for 3.1%, 3.6%, and 6.9% of consolidated sales for the years ended December 31, 2018, 2017 and 2016, respectively.

Natural Gas Processing (including Petrochemical) Applications

We provide natural gas processing solutions that facilitate the progressive cooling and liquefaction of hydrocarbon mixtures for the subsequent recovery or purification of component gases, which accounted for 24.2%, 18.1%, and 14.6% of consolidated sales for the years ended December 31, 2018, 2017, and 2016, respectively. Primary products used in these applications include brazed aluminum heat exchangers, cold boxes and air cooled heat exchangers. Our brazed aluminum heat exchangers allow producers to obtain purified hydrocarbon by-products, such as methane, ethane, propane, and ethylene, which are commercially marketable for various industrial or residential uses. Our cold boxes are highly engineered systems that incorporate brazed aluminum heat exchangers, pressure vessels, and interconnecting piping used to significantly reduce the temperature of gas mixtures to liquefy component gases so that they can be separated and purified for further use in multiple energy, industrial, scientific, and commercial applications. Our air cooled heat exchangers are used to cool or condense fluids to allow for further processing and for cooling gas compression equipment. Customers for our natural gas processing applications include large companies in the hydrocarbon processing industry, as well as engineering, procurement and construction (“EPC”) contractors. Demand for these applications is primarily driven by the growth in the natural gas liquids (or NGLs) separation and other natural gas segments of the hydrocarbon processing industries, including LNG. In the future, management believes that continuing efforts by petroleum producing countries to better utilize stranded natural gas and associated gases which historically had been flared, present a promising source of demand. We have a number of competitors for our heat exchangers and cold boxes, including certain leading companies in the industrial gas and hydrocarbon processing industries and many smaller fabrication-only facilities around the world. Competition with respect to our more specialized brazed aluminum heat exchangers includes a small number of global (European and Asian) manufacturers.

LNG Applications

We provide process technology, liquefaction train, and independent mission critical equipment for the liquefaction of LNG, including small to mid-scale facilities, floating LNG applications, and large base-load export facilities, which accounted for 3.7%, 3.5%, and 5.3% of consolidated sales for the years ended December 31, 2018, 2017, and 2016, respectively. We are a leading supplier to EPC firms where we provide equipment or design the process and provide equipment, providing an integrated and optimized approach to the project. These “Concept-to-Reality” process systems incorporate many of Chart’s core products, including brazed aluminum heat exchangers, Core-in-Kettle® heat exchangers, cold boxes, pressure vessels, pipe work, and air cooled heat exchangers. These systems are used for global LNG projects, including projects in North America and China, for local LNG production and LNG export terminals. Our proprietary IPSMR® (Integrated Pre-cooled Single Mixed Refrigerant) liquefaction process technology offers lower capital expenditure rates than competing processes per ton of LNG produced and very competitive operating costs.

Demand for LNG applications is primarily driven by increased use and global trade in natural gas (transported as LNG) since natural gas offers significant cost and environmental advantages over other fossil fuels. Demand for LNG applications is also driven by diesel displacement and continuing efforts by petroleum producing countries to better utilize stranded natural gas and previously flared gases. We have a number of competitors for these applications, including leading industrial gas companies, other brazed aluminum heat exchanger manufacturers, and other equipment fabricators to whom we also act as a supplier of equipment, including heat exchangers and cold boxes.

Industrial Gas Applications

For industrial gas applications, our brazed aluminum heat exchangers (BAHX) and cold boxes are used to produce high purity atmospheric gases, such as oxygen, nitrogen, and argon, which have diverse industrial applications. Cold boxes, which incorporate our BAHX are used to separate air into its major atmospheric components, including oxygen, nitrogen, and argon, where the gases are used in a diverse range of applications such as metal production and heat treating, enhanced oil and gas production, coal gasification, chemical and oil refining, electronics, medical, the quick-freezing of food, wastewater treatment, and industrial welding. Our brazed aluminum heat exchangers and cold boxes are also used in the purification of helium and hydrogen.

Demand for industrial gas applications is driven by growth in manufacturing and industrial gas use. Other key global drivers involve developing Gas to Liquids, or GTL, clean coal processes including Coal to Liquids, or CTL, and Integrated Gasification Combined Cycle, or IGCC, power projects. In addition, demand for our products in developed countries is expected to continue as customers upgrade their facilities for greater efficiency and regulatory compliance. We have a number of competitors for these applications, including leading industrial gas companies and EPC firms, to whom we also act as a supplier of equipment, including heat exchangers and cold boxes.

HVAC, Power and Refining Applications

Our Air Cooled Heat Exchangers (ACHX) and fans are used in HVAC, power and refining applications. Demand for HVAC is driven by growing construction activities and demand for energy efficient devices, and there is also positive impact from growing industrial production. Refining demand continues to be driven by United States shale production, benefiting from low cost shale crude and gas resulting in high utilization and increased investment. Our ACHX products are used in each phase of refining processing to condense and cool fluids. Worldwide power use is projected to grow 48% through 2040, with growth steady in the United States and Europe, while additional growth comes from emerging economies.

After Market Services

To support the products and solutions we sell, our Lifecycle group offers services through the entire lifecycle of our products, which is unique and unparalleled in the markets we serve. Our focus is to build relationships with plant stakeholders, from process and mechanical engineers to operations and maintenance personnel, focusing on the optimized performance and lifespan of Chart proprietary equipment. Lifecycle services include extended warranties, plant start-up, parts, 24/7 support, monitoring and process optimization, as well as repair, maintenance, and upgrades.

We perform plant services on equipment, including brazed aluminum heat exchangers, air cooled heat exchangers, fans, cold boxes, etc.

D&S West

D&S West (42% of sales for the year ended December 31, 2018) designs, manufactures, and services cryogenic solutions for the storage and delivery of cryogenic liquids used in industrial gas and LNG applications. D&S West includes distribution and storage operations in the United States and Latin America and primarily serves the Americas geographic region. D&S West also includes cryobiological storage manufacturing and distribution operations in the U.S., Europe and Asia, which serve customers around the world. Using sophisticated vacuum insulation technology, our cryogenic storage systems are able to store and transport liquefied industrial gases and hydrocarbon gases at temperatures from 0° Fahrenheit to temperatures nearing absolute zero. End-use customers for our cryogenic storage equipment include industrial gas producers and distributors, chemical producers, manufacturers of electrical components, health care organizations, food processors, and businesses in the oil and natural gas industries. On a product line basis, cryogenic bulk storage systems, which include LNG cryogenic systems and after market services, accounted for 35.6% of D&S West segment sales in 2018, and represented 15.0%, 18.8% and 24.1% of consolidated sales for the years ended December 31, 2018, 2017 and 2016, respectively. Cryogenic packaged gas systems, which include LNG cryogenic systems and after market services, accounted for 46.4% of D&S West segment sales in 2018, and represented 19.5%, 19.6% and 18.4% of consolidated sales for the years ended December 31, 2018, 2017 and 2016, respectively. We service industrial gas and LNG applications as follows:

Industrial Gas Applications

We design, manufacture, install, service, and maintain bulk and packaged gas cryogenic solutions for the storage, distribution, vaporization, and application of industrial gases, which accounted for 27.8%, 31.5%, and 36.2% of consolidated sales for the years ended December 31, 2018, 2017, and 2016, respectively. Industrial gas applications include any end-use of the major elements of air (nitrogen, oxygen, and argon), including manufacturing, welding, electronics, medical, nitrogen dosing, food processing, and beverage carbonation. Carbon dioxide, nitrous oxide, hydrogen, and helium applications also utilize our equipment. Our products span the entire spectrum of industrial gas demand from small customers requiring cryogenic packaged gases to large users requiring custom engineered cryogenic storage systems in both mobile and stationary applications. We also offer cryogenic components, including vacuum insulated pipe ("VIP"), engineered bulk gas installations, specialty liquid nitrogen, or LN2, end-use equipment, and cryogenic flow meters. Principal customers for industrial applications are global industrial gas producers and distributors.

Demand for industrial gas applications is driven primarily by the significant installed base of users of cryogenic liquids, as well as new applications and distribution technologies for cryogenic liquids. Our competitors tend to be regionally focused while we are able to supply a broad range of systems on a worldwide basis. We also compete with several suppliers owned by the global industrial gas producers. From a technology perspective, we tend to compete with compressed gas alternatives or on-site generated gas supply.

LNG Applications

We supply cryogenic solutions for the storage, distribution, regasification, and use of LNG, which accounted for 6.6%, 6.9%, and 6.4% of consolidated sales for the years ended December 31, 2018, 2017, and 2016, respectively. LNG may be utilized as an alternative to other fossil fuels such as diesel, propane, or fuel oil in transportation or off pipeline applications. Examples include heavy duty truck and transit bus transportation, locomotive propulsion, marine, and power generation in remote areas that often occurs in oil and gas drilling. We refer to our LNG distribution products as a "Virtual Pipeline," as the traditional natural gas pipeline is replaced with cryogenic distribution to deliver the gas to the end-user. We supply cryogenic trailers, ISO containers, railcars, bulk storage tanks, fuel stations, loading facilities, and regasification equipment specially configured for delivering LNG into Virtual Pipeline applications. LNG may also be used as a fuel for a variety of on and off-road vehicles and applications. Our LNG vehicle fueling applications primarily consist of LNG and liquefied/compressed natural gas refueling systems for heavy-duty truck and bus fleets. We sell LNG applications around the world from various D&S West and D&S East facilities to numerous end-users, energy companies, and gas distributors. Additionally, we supply large vacuum insulated storage tanks as equipment for purchasers of standard liquefaction plants sold by our E&C business.

Demand for LNG applications is driven by the spread in price between oil and gas, diesel displacement initiatives, environmental and energy security initiatives, and the associated cost of equipment. Our competitors tend to be regionally focused or product-specific, while we are able to supply a broad range of solutions required by LNG applications. We compete with compressed natural gas (or CNG) or field gas in several of these applications and LNG is most highly valued where its energy density and purity are beneficial to the end-user.

After Market Services

D&S West operates multiple service locations in the U.S. These service locations provide installation, service, repair, maintenance, and refurbishment of cryogenic products. We service Chart products, as well as our competitors primarily in North America. We provide services for storage vessels, VIP, reconfigurations, relocation, trailers, ISO containers, vaporizers, and other gas to liquid equipment. With the acquisition of Skaff on January 2, 2018, we expanded our direct regional presence for service and aftermarket support in the Northeast United States. Skaff provides quality repair service and remanufacturing of cryogenic and liquefied natural gas storage tanks and trailers and also maintains a portfolio of cryogenic storage equipment that is leased to customers for temporary and permanent needs.

Cryobiological Storage

Our cryobiological storage products, which were part of our former BioMedical segment, include vacuum insulated containment vessels for the storage of biological materials. The primary applications for this product line include medical laboratories, biotech/pharmaceutical research facilities, blood and tissue banks, veterinary laboratories, large-scale repositories, and artificial insemination, particularly in the beef and dairy industry.

The significant competitors for cryobiological storage products include a number of companies worldwide. These products are sold through multiple channels of distribution specifically applicable to each industry sector. The distribution channels range from highly specialized cryogenic storage systems providers to general supply and catalogue distribution operations and breeding service providers. Competition in this field is focused on design, reliability, and price. Alternatives to vacuum insulated containment vessels include electrically powered mechanical refrigeration.

D&S East

D&S East (22% of sales for the year ended December 31, 2018) designs, manufactures, and services cryogenic solutions for the storage and delivery of cryogenic liquids used in industrial gas and LNG applications. D&S East includes distribution and storage operations in Europe and Asia and primarily serves the geographic regions of Europe, the Middle East, Africa and Asia (including China and India). The distribution and storage portion of the recent VRV acquisition is included in this segment. With the exception of Cryobiological Storage, which is contained solely within D&S West, D&S East utilizes the same technologies and product lines as those employed by and disclosed with respect to D&S West, except for a valves business acquired as part of the VRV acquisition. Product lines within D&S East which represent significant consolidated sales in any of the three years ending December 31, 2018 are as follows:

- Cryogenic bulk storage systems (including LNG cryogenic systems and after market services) accounted for 16.4%, 18.0% and 19.6% of consolidated sales for the years ended December 31, 2018, 2017 and 2016 respectively.
- Cryogenic packaged gas systems (including LNG cryogenic systems and after market services) accounted for 6.3%, 9.5% and 7.8% of consolidated sales for the years ended December 31, 2018, 2017 and 2016 respectively.

Within Industrial Gas Applications

- Bulk and packaged gas cryogenic solutions for the storage, distribution, vaporization and application of industrial gases accounted for 16.7%, 18.0% and 18.1% of consolidated sales for the years ended December 31, 2018, 2017 and 2016 respectively.

Within LNG Applications

- Cryogenic solutions for the storage, distribution, regasification and use of LNG accounted for 6.0%, 9.5% and 9.3% of consolidated sales for the years ended December 31, 2018, 2017 and 2016 respectively.

After Market Services

D&S East operates multiple service locations in Europe and Asia. The recent VRV acquisition expanded the service and repair access and offerings in these regions. These service locations provide installation, service, repair, maintenance, and refurbishment of cryogenic products. We service Chart products, as well as our competitors mainly throughout Europe and Asia. We provide services for storage vessels, VIP, reconfigurations, relocation, trailers, ISO containers, vaporizers, and other gas to liquid equipment.

Engineering and Product Development

Our engineering and product development activities are focused primarily on developing new and improved solutions and equipment for the users of cryogenic liquids and hydrocarbon and industrial gases across all industries served. Our engineering, technical and marketing employees actively assist customers in specifying their needs and in determining appropriate products to meet those needs. Portions of our engineering expenditures typically are charged to customers, either as separate items or as components of product cost.

Competition

We believe we can compete effectively around the world and that we are a leading competitor in the industries we serve. Competition is based primarily on performance and the ability to provide the design, engineering, and manufacturing capabilities required in a timely and cost-efficient manner. Contracts are usually awarded on a competitive bid basis. Quality, technical expertise, and timeliness of delivery are the principal competitive factors within the industries we serve. Price and terms of sale are also important competitive factors. Because our equipment is specialized and independent third-party prepared market share data is not available, it is difficult to know for certain our exact position in our markets, although we believe we rank among the leaders in each of the markets we serve. We base our statements about industry and market positions on our reviews of annual reports and published investor presentations of our competitors and augment this data with information received by marketing consultants conducting competition interviews and our sales force and field contacts. For information concerning competition within a specific segment of our business, see the descriptions provided under segment captions in this Annual Report on Form 10-K.

Marketing

We market our products and services in each of our segments throughout the world primarily through direct sales personnel and independent sales representatives and distributors. The technical and custom design nature of our products requires a professional, highly trained sales force. We use independent sales representatives and distributors to market our products and services in certain foreign countries and in certain North American regions. These independent sales representatives supplement our direct sales force in dealing with language and cultural matters. Our domestic and foreign independent sales representatives earn commissions on sales, which vary by product type.

Backlog

The dollar amount of our backlog as of December 31, 2018, 2017 and 2016 was $568.2 million, $446.4 million, and $326.2 million, respectively. Backlog as of December 31, 2018 included $81.6 million related to our November 15, 2018 acquisition of VRV. Backlog as of December 31, 2017 included $65.8 million related to our September 20, 2017 acquisition of RCHPH Holdings, Inc. (“Hudson”). We expect to recognize revenue on approximately 91.8% of the remaining performance obligations over the next 12 months and 0.4% of the remaining performance obligations over the next 13 to 24 months, with the remaining balance recognized thereafter. Backlog is comprised of the portion of firm signed purchase orders or other written contractual commitments received from customers that we have not recognized as revenue under the percentage of completion method or based upon shipment. Backlog can be significantly affected by the timing of orders for large products, particularly in the E&C segment, and the amount of backlog at December 31, 2018 described above is not necessarily indicative of future backlog levels or the rate at which backlog will be recognized as sales. Orders included in our backlog may include customary cancellation provisions under which the customer could cancel all or part of the order, potentially subject to the payment of certain costs and/or penalties. For further information about our backlog, including backlog by business segment, see Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

Customers

We sell our products primarily to gas producers, distributors, and end-users across energy, industrial, cryobiological storage, power, HVAC and refining applications in countries throughout the world. Sales to our top ten customers accounted for 39%, 38%, and 41% of consolidated sales in 2018, 2017 and 2016, respectively. Sales to Praxair and Linde, which combined in 2018, exceeded 10% of consolidated sales in 2018 on a combined basis and represented approximately $121.6 million or 11.2% of consolidated sales in 2018 and is primarily attributable to the D&S West segment, along with D&S East and E&C segments. Sales to Air Liquide, exceeded 10% of consolidated sales in 2016, and represented approximately $90.6 million or 12.5% of consolidated sales in 2016 and is primarily attributable to the D&S West segment, along with the D&S East and E&C segments.

Our sales to particular customers fluctuate from period to period, but the global producers and distributors of hydrocarbon and industrial gases and their suppliers tend to be a consistently large source of revenue for us. Our supply contracts are generally contracts for “requirements” only. While our customers may be obligated to purchase a certain percentage of their supplies from us, there are generally no minimum requirements. Also, many of our contracts may be canceled at any time, subject to possible cancellation charges. To minimize credit risk from trade receivables, we review the financial condition of potential customers in relation to established credit requirements before sales credit is extended and we monitor the financial condition of customers to help ensure timely collections and to minimize losses. In addition, for certain domestic and foreign customers, we require advance payments, letters of credit, bankers’ acceptances, and other such guarantees of payment. Certain customers also require us to issue letters of credit or performance bonds, particularly in instances where advance payments are involved, as a condition to placing the order. We believe our relationships with our customers are generally good.

Intellectual Property

Although we have a number of patents, trademarks, and licenses related to our business, no one of them or related group of them is considered by us to be of such importance that its expiration or termination would have a material adverse effect on our business. In general, we depend upon technological capabilities, manufacturing quality control, and application of know-how, rather than patents or other proprietary rights, in the conduct of our business.

Raw Materials and Suppliers

We manufacture most of the products we sell. The raw materials used in manufacturing include aluminum products (including sheets, bars, plate, and piping), stainless steel products (including sheets, plates, heads, and piping), palladium oxide, carbon steel products (including sheets, plates, and heads), valves and gauges, and fabricated metal components. Most raw materials are available from multiple sources of supply. We have long-term relationships with our raw material suppliers and other vendors. Commodity components of our raw material (stainless steel and carbon steel) could experience some level of volatility during 2019 and may have a relational impact on raw material pricing. Subject to certain risks related to our suppliers as discussed under Item 1A. “Risk Factors,” we foresee no acute shortages of any raw materials that would have a material adverse effect on our operations.

Employees

As of January 31, 2019, we had 4,605 employees, including 2,244 domestic employees and 2,361 international employees.

We are party to one collective bargaining agreement with the International Association of Machinists and Aerospace Workers (“IAM”) covering 238 employees at our La Crosse, Wisconsin heat exchanger facility. Effective February 3, 2018, we entered into a three-year agreement with the IAM which expires on February 6, 2021.

Environmental Matters

Our operations have historically included and currently include the handling and use of hazardous and other regulated substances, such as various cleaning fluids used to remove grease from metal, that are subject to federal, state, local, and foreign environmental laws and regulations. These regulations impose limitations on the discharge of pollutants into the soil, air, and water and establish standards for their handling, management, use, storage, and disposal. We monitor and review our procedures and policies for compliance with environmental laws and regulations. Our management is familiar with these regulations and supports an ongoing program to maintain our adherence to required standards.

We are involved with environmental compliance, investigation, monitoring, and remediation activities at certain of our owned or formerly owned manufacturing facilities and at one owned facility that is leased to a third party. We believe that we are currently in substantial compliance with all known environmental regulations. We accrue for certain environmental remediation-related activities for which commitments or remediation plans have been developed or for which costs can be reasonably estimated. These estimates are determined based upon currently available facts regarding each facility. Actual costs incurred may vary from these estimates due to the inherent uncertainties involved. Future expenditures relating to these environmental remediation efforts are expected to be made over the next 7 years as ongoing costs of remediation programs. We do not believe that these regulatory requirements have had a material effect upon our capital expenditures, earnings, or competitive position. We are not anticipating any material capital expenditures in 2019 that are directly related to regulatory compliance matters. Although we believe we have adequately provided for the cost of all known environmental conditions, additional contamination, the outcome of disputed matters, or changes in regulatory posture could result in more costly remediation measures than budgeted, or those we believe are adequate or required by existing law. We believe that any additional liability in excess of amounts accrued which may result from the resolution of such matters will not have a material adverse effect on our financial position, liquidity, cash flows, or results of operations.

Available Information

Additional information about the Company is available at www.chartindustries.com. On the Investor Relations page of the website, the public may obtain free copies of our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and any amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 as soon as reasonably practicable following the time that they are filed with, or furnished to, the Securities and Exchange Commission (“SEC”). Additionally, we have posted our Code of Ethical Business Conduct and Officer Code of Ethics on our website, which are also available free of charge to any shareholder interested in obtaining a copy. References to our website do not constitute incorporation by reference of the information contained on such website, and such information is not part of this Form 10-K.

Item 1A. Risk Factors
Investing in our common stock involves risk. You should carefully consider the risks described below, as well as the other information contained in this Annual Report on Form 10-K in evaluating your investment in us. If any of the following risks actually occur, our business, financial condition, operating results, or cash flows could be harmed materially. Additional risks, uncertainties, and other factors that are not currently known to us or that we believe are not currently material may also adversely affect our business, financial condition, operating results or cash flows. In any of these cases, you may lose all or part of your investment in us.
Risks Related to Our Business
The markets we serve are subject to cyclical demand and vulnerable to economic downturn, which could harm our business and make it difficult to project long-term performance.
Demand for our products depends in large part upon the level of capital and maintenance expenditures by many of our customers and end-users, in particular those customers in the global hydrocarbon and industrial gas markets. These customers' expenditures historically have been cyclical in nature and vulnerable to economic downturns. Decreased capital and maintenance spending by these customers could have a material adverse effect on the demand for our products and our business, financial condition, and results of operations. In addition, this historically cyclical demand limits our ability to make accurate long-term predictions about the performance of our company. Even if demand improves, it is difficult to predict whether any improvement represents a long-term improving trend or the extent or timing of improvement. There can be no assurance that historically improving cycles are representative of actual future demand.
The loss of, or significant reduction or delay in, purchases by our largest customers could reduce our sales and profitability.
Sales to our top ten customers accounted for 39%, 38%, and 41% of consolidated sales in 2018, 2017 and 2016, respectively, with sales to one customer of approximately 11.2% of consolidated sales in 2018 and one customer of approximately 12.5% of consolidated sales in 2016. We expect that a limited number of customers will continue to represent a substantial portion of our sales for the foreseeable future. While our sales to particular customers fluctuate from period to period, the global producers and distributors of hydrocarbon and industrial gases and their suppliers tend to be a consistently large source of our sales.
The loss of any of our major customers, consolidation of our customers, or a decrease or delay in orders or anticipated spending by such customers could materially reduce our sales and profitability. Although order activity in 2018 increased year over year, we continued to experience energy price volatility and our customers' adjusted project timing. Delays in the anticipated timing of LNG infrastructure build out could materially reduce the demand for our products. Our largest customers could also engage in business combinations, which could increase their size, reduce their demand for our products as they recognize synergies or rationalize assets and increase or decrease the portion of our total sales concentration to any single customer. For example, four of our largest customers have combined in recent years, with Airgas and Air Liquide combining in 2016 and Praxair and Linde combining in 2018. Further industry consolidation could further exacerbate our customer concentration risk.
If we are unable to successfully control our costs and efficiently manage our operations, it may place a significant strain on our management and administrative resources and lead to increased costs and reduced profitability.
We have implemented cost savings initiatives to align our business with current and expected economic conditions. Our ability to operate our business successfully and implement our strategies depends, in part, on our ability to allocate our resources optimally in each of our facilities in order to maintain efficient operations. Ineffective management could cause manufacturing inefficiencies, increase our operating costs, place significant strain on our management and administrative resources, and prevent us from being able to take advantage of opportunities as economic conditions improve. If we are unable to align our cost structure in response to prevailing economic conditions on a timely basis, or if implementation or failure to implement any cost structure adjustments has an adverse impact on our business or prospects, then our financial condition, results of operations, and cash flows may be negatively affected.
Similarly, it is critical that we appropriately manage our planned capital expenditures in this challenging economic environment. For example, we have invested or plan to invest approximately $35 to $40 million in new capital

expenditures in 2019. If we fail to manage the projects related to these capital expenditures in an effective manner, we may lose the opportunity to obtain some new customer orders or the ability to operate our businesses efficiently. Even if we effectively implement these projects, the orders needed to support the capital expenditure may not be obtained, may be delayed, or may be less than expected, which may result in sales or profitability at lower levels than anticipated. For example, while we invested in the expansion of D&S East in China in recent years, we have experienced significant delays in some of the related orders anticipated to support that expansion, which has resulted in the underutilization of our capacity in China. In addition, we have completed a $24 million capital expansion for additional capacity in our Brazed Aluminum Heat Exchanger facility in La Crosse, Wisconsin as of October

1, 2018, allowing us to handle expected 2019 larger LNG related equipment orders; if, however, those anticipated orders do not materialize, we could experience underutilization of our capacity in La Crosse, Wisconsin.

Decreases in energy prices, or a decrease in the cost of oil relative to natural gas, may decrease demand for some of our products and cause downward pressure on the prices we charge, which could harm our business, financial condition, and results of operations.

A significant amount of our sales is to customers in the energy production and supply industry. We estimate that 47% of our sales for the year ended December 31, 2018 were generated by end-users in the energy industry, with many of our products sold for natural gas-related applications. Accordingly, demand for a significant portion of our products depends upon the level of capital expenditures by companies in the oil and gas industry, which depends, in part, on energy prices, as well as the price of oil relative to natural gas for some applications. Some applications for our products could see greater demand when prices for natural gas are relatively low compared to oil prices, but a sustained decline in energy prices generally and a resultant downturn in energy production activities could negatively affect the capital expenditures of our customers. For example, the sharp decline in oil prices since the fourth quarter of 2014 has had a negative impact on demand for some of our products. Although prices have recovered somewhat from these lows, any further deterioration and significant decline in the capital expenditures of our customers, whether due to a decrease in the market price of energy or otherwise, may decrease demand for our products and cause downward pressure on the prices we charge. Accordingly, if there is a continued or further downturn in the energy production and supply industry, including a decline in the cost of oil relative to natural gas, our business, financial condition, and results of operations could be adversely affected.

We carry goodwill and indefinite-lived intangible assets on our balance sheet, which are subject to impairment testing and could subject us to significant non-cash charges to earnings in the future if impairment occurs.

As of December 31, 2018, we had goodwill and indefinite-lived intangible assets of $619.0 million, which represented approximately 32.6% of our total assets. Goodwill and indefinite-lived intangible assets are not amortized, but are tested for impairment annually in the fourth quarter or more often if events or changes in circumstances indicate a potential impairment may exist. Factors that could indicate that our goodwill or indefinite-lived intangible assets are impaired include a decline in our stock price and market capitalization, lower than projected operating results and cash flows, and slower growth rates in our industry. Our stock price historically has shown volatility and often fluctuates significantly in response to market and other factors. Declines in our stock price, lower operating results and any decline in industry conditions in the future could increase the risk of impairment. Impairment testing incorporates our estimates of future operating results and cash flows, estimates of allocations of certain assets and cash flows among reporting segments, estimates of future growth rates, and our judgment regarding the applicable discount rates used on estimated operating results and cash flows. If we determine at a future time that further impairment exists, it may result in a significant non-cash charge to earnings and lower stockholders’ equity.

Our backlog is subject to modification, termination or reduction of orders, which could negatively impact our sales.

Our backlog is comprised of the portion of firm signed purchase orders or other written contractual commitments received from customers that we have not recognized as sales. The dollar amount of backlog as of December 31, 2018 was $568.2 million. Our backlog can be significantly affected by the timing of orders for large projects, particularly in our E&C segment, and the amount of our backlog at December 31, 2018 is not necessarily indicative of future backlog levels or the rate at which backlog will be recognized as sales. Although modifications and terminations of our orders may be partially offset by cancellation fees, customers can, and sometimes do, terminate or modify these orders. We cannot predict whether cancellations will accelerate or diminish in the future. Cancellations of purchase orders, indications that the customers will not perform or reductions of product quantities in existing contracts could substantially and materially reduce our backlog and, consequently, our future sales. For example, during 2015, D&S East segment backlog was reduced by approximately $150.0 million when circumstances suggested that our customers were not likely to take delivery in the future. Our failure to replace canceled orders could negatively impact our sales and results of operations. Included in the E&C backlog is approximately $40 million related to the previously announced Magnolia LNG order where production release is delayed into late 2019. We did not have any significant cancellations in 2018, 2017 and 2016.

We may fail to successfully integrate companies that provide complementary products or technologies, including the Hudson acquisition and the recent VRV acquisition.

A component of our business strategy is the acquisition of businesses that complement our existing products and services. Such a strategy involves the potential risks inherent in assessing the value, strengths, weaknesses, contingent or other liabilities, and potential profitability of acquisition candidates and in integrating the operations of acquired companies. In addition, any acquisitions of businesses with foreign operations or sales may increase our exposure to risks inherent in doing business outside the United States.

For example, we acquired Hudson on September 30, 2017 for a purchase price of $419.5 million, net of cash acquired (including certain estimated net working capital adjustments and acquisition-related tax benefits acquired). Furthermore, we recently acquired VRV on November 15, 2018 for a purchase price of euro 125.0 million, or approximately $141.3 million. The benefits that are expected to result from the VRV and Hudson acquisitions will depend, in part, on our ability to realize the anticipated growth opportunities and cost synergies from the acquisitions. There can be no assurance that we successfully or cost-effectively integrate Hudson and VRV into our business and realize these expected benefits. The failure to do so could have a material adverse effect on our business, financial condition and results of operations.

From time to time, we may have acquisition discussions with other potential target companies both domestically and internationally. If a large acquisition opportunity arises and we proceed, a substantial portion of our cash and surplus borrowing capacity could be used for the acquisition or we may seek additional debt or equity financing.

Potential acquisition opportunities become available to us from time to time, and we periodically engage in discussions or negotiations relating to potential acquisitions, including acquisitions that may be material in size or scope to our business. Any acquisition may or may not occur and, if an acquisition does occur, it may not be successful in enhancing our business for one or more of the following reasons:

- Any business acquired may not be integrated successfully and may not prove profitable;
- The price we pay for any business acquired may overstate the value of that business or otherwise be too high;
- Liabilities we take on through the acquisition may prove to be higher than we expected;
- We may fail to achieve acquisition synergies; or
- The focus on the integration of operations of acquired entities may divert management's attention from the day-to-day operation of our businesses.

Inherent in any future acquisition is the risk of transitioning company cultures and facilities. The failure to efficiently and effectively achieve such transitions could increase our costs and decrease our profitability.

Due to the nature of our business and products, we may be liable for damages based on product liability and warranty claims.

Due to the high pressures and low temperatures at which many of our products are used, the inherent risks associated with concentrated industrial and hydrocarbon gases, and the fact that some of our products are relied upon by our customers or end users in their facilities or operations or are manufactured for relatively broad industrial, medical, transportation, or consumer use, we face an inherent risk of exposure to claims in the event that the failure, use, or misuse of our products results, or is alleged to result, in death, bodily injury, property damage, or economic loss. We believe that we meet or exceed existing professional specification standards recognized or required in the industries in which we operate. We have been subject to claims from time to time, some of which were substantial. For example, during 2018 we were named in lawsuits (including purported class action lawsuits filed in the U.S. District Court for the Northern District of California) filed against Chart and other defendants with respect to the alleged failure of a stainless steel cryobiological storage tank at the Pacific Fertility Center in San Francisco, California, and we have also been named in purported class action lawsuits filed in the Ontario Superior Court of Justice against Chart and other defendants with respect to the alleged failure of an aluminum cryobiological storage tank at The Toronto Institute for Reproductive Medicine in Etobicoke, Ontario. See Item 3. "Legal Proceedings," for further details. Although we currently maintain product liability coverage, which we believe is adequate for existing product liability claims and for the continued operation of our business, it includes customary exclusions and conditions, it may not cover certain specialized applications such as aerospace-related applications, and it generally does not cover warranty claims. Additionally, such insurance may become difficult to obtain or be unobtainable in the future on terms acceptable to us. A successful product liability claim or series of claims against us, including one or more consumer claims purporting to constitute class actions or claims resulting from extraordinary loss events, in excess of or outside our insurance coverage, or a significant warranty claim or series of claims against us, could materially decrease our liquidity, impair our financial condition, and adversely affect our results of operations.

Governmental energy policies could change or expected changes could fail to materialize which could adversely affect our business or prospects.

Energy policy can develop rapidly in the markets we serve, including the United States, Asia, Australia, Europe, and Latin America. Within the last few years, significant developments have taken place, primarily in international markets that we serve with respect to energy policy and related regulations. We anticipate that energy policy will continue to be an important regulatory priority globally, as well as on a national, state, and local level. As energy policy continues to evolve, the existing rules and incentives that impact the energy-related segments of our business may change. It is difficult, if not impossible, to predict whether changes in energy policy might occur in the future and the timing of potential changes and their impact on our business. The elimination or reduction of favorable policies for our energy-related business, or the failure to adopt expected policies that would benefit our business, could negatively impact our sales and profitability.

Our exposure to fixed-price contracts, including exposure to fixed pricing on long-term customer contracts and performance guarantees, could negatively impact our financial results.

A substantial portion of our sales has historically been derived from fixed-price contracts for large system projects which may involve long-term fixed price commitments to customers or guarantees of equipment or process performance and which are sometimes difficult to execute. To the extent that any of our fixed-price contracts are delayed, we fail to satisfy a performance guarantee, our subcontractors fail to perform, contract counterparties successfully assert claims against us, the original cost estimates in these or other contracts prove to be inaccurate or the contracts do not permit us to pass increased costs on to our customers, profitability from a particular contract may decrease or project losses may be incurred, which, in turn, could decrease our sales and overall profitability. The uncertainties associated with our fixed-price contracts make it more difficult to predict our future results and exacerbate the risk that our results will not match expectations, which has happened in the past.

We depend on the availability of certain key suppliers; if we experience difficulty with a supplier, we may have difficulty finding alternative sources of supply.

The cost, quality, and availability of raw materials, certain specialty metals and specialized components used to manufacture our products are critical to our success. The materials and components we use to manufacture our products are sometimes custom made and may be available only from a few suppliers, and the lead times required to obtain these materials and components can often be significant. We rely on sole suppliers or a limited number of suppliers for some of these materials, including special grades of aluminum used in our brazed aluminum heat exchangers and compressors included in some of our product offerings. While we have not historically encountered problems with availability, this does not mean that we will continue to have timely access to adequate supplies of essential materials and components in the future or that supplies of these materials and components will be available on satisfactory terms when needed. If our vendors for these materials and components are unable to meet our requirements, fail to make shipments in a timely manner, or ship defective materials or components, we could experience a shortage or delay in supply or fail to meet our contractual requirements, which would adversely affect our results of operations and negatively impact our cash flow and profitability.

Fluctuations in currency exchange or interest rates may adversely affect our financial condition and operating results.

A significant portion of our revenue and expense is incurred outside of the United States. We must translate revenues, income and expenses, as well as assets and liabilities into U.S. dollars using exchange rates during or at the end of each period. Fluctuations in currency exchange rates have had, and will continue to have an impact on our financial condition, operating results, and cash flow. While we monitor and manage our foreign currency exposure with limited use of derivative financial instruments to mitigate these exposures, fluctuations in currency exchange rates may materially impact our financial and operational results.

In addition, we are exposed to changes in interest rates. While our convertible notes have a fixed cash coupon, other instruments, primarily borrowings under our senior secured revolving credit facility, are exposed to a variable interest rate. The impact of a 100 basis point increase in interest rates to our senior secured revolving credit facility is discussed in the “Quantitative and Qualitative Disclosures About Market Risk” section of this report.

As a global business, we are exposed to economic, political, and other risks in different countries which could materially reduce our sales, profitability or cash flows, or materially increase our liabilities.

Since we manufacture and sell our products worldwide, our business is subject to risks associated with doing business internationally. In 2018, 2017 and 2016, 44%, 44%, and 48%, respectively, of our sales occurred in international markets. Our future results could be harmed by a variety of factors, including:

- changes in foreign currency exchange rates;
- exchange controls and currency restrictions;
- changes in a specific country’s or region’s political, social or economic conditions, particularly in emerging markets;
- civil unrest, turmoil or outbreak of disease in any of the countries in which we operate or sell our products;
- tariffs, other trade protection measures, as discussed in more detail below, and import or export licensing requirements;

- potential adverse changes in trade agreements between the United States and foreign countries, including the proposed United States-Mexico-Canada Agreement (USMCA), among the United States, Canada and Mexico;
- uncertainty and potentially negative consequences relating to the United Kingdom’s vote to leave the European Union (“Brexit”);
- potentially negative consequences from changes in U.S. and international tax laws;

- difficulty in staffing and managing geographically widespread operations;
- differing labor regulations;
- requirements relating to withholding taxes on remittances and other payments by subsidiaries;
- different regulatory regimes controlling the protection of our intellectual property;
- restrictions on our ability to own or operate subsidiaries, make investments or acquire new businesses in these jurisdictions;
- restrictions on our ability to repatriate dividends from our foreign subsidiaries;
- difficulty in collecting international accounts receivable;
- difficulty in enforcement of contractual obligations under non-U.S. law;
- transportation delays or interruptions;
- changes in regulatory requirements; and
- the burden of complying with multiple and potentially conflicting laws.

Our international operations and sales also expose us to different local political and business risks and challenges. For example, we are faced with potential difficulties in staffing and managing local operations and we have to design local solutions to manage credit and legal risks of local customers and distributors, which may not be effective. In addition, because some of our international sales are to suppliers that perform work for foreign governments, we are subject to the political risks associated with foreign government projects. For example, certain foreign governments may require suppliers for a project to obtain products solely from local manufacturers or may prohibit the use of products manufactured in certain countries.

Our operations in markets such as Asia, Australia, Europe, and Latin America, may cause us difficulty due to greater regulatory barriers than in the United States, the necessity of adapting to new regulatory systems, problems related to entering new markets with different economic, social and political systems and conditions, and significant competition from the primary participants in these markets, some of which may have substantially greater resources than us. In addition, unstable political conditions or civil unrest, including political instability in Eastern Europe, the Middle East or elsewhere, could negatively impact our order levels and sales in a region or our ability to collect receivables from customers or operate or execute projects in a region.

Changes in U.S. trade policy, tariff and import/export regulations may have a material adverse effect on our business, financial condition and results of operations.

Our international operations and transactions also depend upon favorable trade relations between the United States and the foreign countries in which our customers and suppliers have operations. Changes in U.S. or international social, political, regulatory and economic conditions or in laws and policies governing foreign trade, manufacturing, development and investment in the territories or countries where we currently sell our products or conduct our business, as well as any negative sentiment toward the U.S. as a result of such changes, could adversely affect our business. The current U.S. presidential administration has instituted or proposed changes in trade policies that include the negotiation or termination of trade agreements, the imposition of higher tariffs on imports into the U.S., economic sanctions on individuals, corporations or countries, and other government regulations affecting trade between the U.S. and other countries where we conduct our business. It may be time-consuming and expensive for us to alter our business operations in order to adapt to or comply with any such changes.

As a result of recent policy changes of the U.S. presidential administration and recent U.S. government proposals, there may be greater restrictions and economic disincentives on international trade. The new tariffs and other changes in U.S. trade policy could trigger retaliatory actions by affected countries, and certain foreign governments have instituted or are considering imposing trade sanctions on certain U.S. goods. We do a significant amount of business that would be impacted by changes to the trade policies of the U.S. and foreign countries (including governmental action related to tariffs, international trade agreements, or economic sanctions). Such changes have the potential to adversely impact the U.S. economy or certain sectors thereof, our industry and the global demand for our products. We may not succeed in developing and implementing policies and strategies to counter the foregoing factors effectively in each location where we do business and the foregoing factors may cause a reduction in our sales, profitability or cash flows, or cause an increase in our liabilities.

Data privacy and data security considerations could impact our business.

The interpretation and application of data protection laws, including but not limited to the General Data Protection Regulation (the “GDPR”) in Europe, are uncertain and evolving. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our data security practices. Complying with these various laws is difficult and could cause us to incur substantial costs or require us to change our business practices in a manner adverse to our business. Further, although we are implementing internal controls and procedures designed to ensure compliance with the GDPR and other privacy-related laws, rules and regulations (collectively, the “Data Protection Laws”), there can be no assurance that our controls and procedures will enable us to fully comply with all Data Protection Laws.

Despite our efforts to protect sensitive information and confidential and personal data, comply with applicable laws, rules and regulations and implement data security measures, our facilities and systems may be vulnerable to security breaches and other data loss, including cyber-attacks. In addition, it is not possible to predict the impact on our business of the future loss, alteration or misappropriation of information in our possession related to us, our employees, former employees, customers, suppliers or others. This could lead to negative publicity, legal claims, theft, modification or destruction of proprietary information or key information, damage to or inaccessibility of critical systems, manufacture of defective products, production downtimes, operational disruptions and other significant costs, which could adversely affect our reputation, financial condition and results of operations.

We are subject to potential insolvency or financial distress of third parties.

We are exposed to the risk that third parties to various arrangements who owe us money or goods and services, or who purchase goods and services from us, will not be able to perform their obligations or continue to place orders due to insolvency or financial distress. If third parties fail to perform their obligations under arrangements with us, we may be forced to replace the underlying commitment at current or above market prices or on other terms that are less favorable to us or we may have to write off receivables in the case of customer failures to pay. If this happens, whether as a result of the insolvency or financial distress of a third party or otherwise, we may incur losses, or our results of operations, financial position or liquidity could otherwise be adversely affected.

Failure to protect our intellectual property and know-how could reduce or eliminate any competitive advantage and reduce our sales and profitability, and the cost of protecting our intellectual property may be significant.

We rely on a combination of internal procedures, nondisclosure agreements and intellectual property rights assignment agreements, as well as licenses, patents, trademarks and copyright law to protect our intellectual property and know-how. Our intellectual property rights may not be successfully asserted in the future or may be invalidated, circumvented or challenged. For example, we frequently explore and evaluate potential relationships and projects with other parties, which often require that we provide the potential partner with confidential technical information. While confidentiality agreements are typically put in place, there is a risk the potential partner could violate the confidentiality agreement and use our technical information for its own benefit or the benefit of others or compromise the confidentiality. In addition, the laws of certain foreign countries in which our products may be sold or manufactured do not protect our intellectual property rights to the same extent as the laws of the United States. In addition, the United States has transitioned from a “first-to-invent” to a “first-to-file” patent system, which means that between two identical, pending patent applications, the first inventor no longer receives priority on the patent to the invention. As a result, the Leahy-Smith America Invents Act may require us to incur significant additional expense and effort to protect our intellectual property. Failure or inability to protect our proprietary information could result in a decrease in our sales or profitability.

We have obtained and applied for some U.S. and foreign trademark and patent registrations and will continue to evaluate the registration of additional trademarks and patents, as appropriate. We cannot guarantee that any of our pending applications will be approved. Moreover, even if the applications are approved, third parties may seek to oppose or otherwise challenge them. A failure to obtain registrations in the United States or elsewhere could limit our ability to protect our trademarks and technologies and could impede our business. Further, the protection of our intellectual property may require expensive investment in protracted litigation and the investment of substantial management time and there is no assurance we ultimately would prevail or that a successful outcome would lead to an economic benefit that is greater than the investment in the litigation. The patents in our patent portfolio are scheduled to expire from 2019 to 2039.

In addition, we may be unable to prevent third parties from using our intellectual property rights and know-how without our authorization or from independently developing intellectual property that is the same as or similar to ours, particularly in those countries where the laws do not protect our intellectual property rights as fully as in the United States. We compete in a number of industries (e.g., heat exchangers and cryogenic storage) that are small or specialized, which makes it easier for a competitor to monitor our activities and increases the risk that ideas will be stolen. The unauthorized use of our know-how by third parties could reduce or eliminate any competitive advantage we have developed, cause us to lose sales or otherwise harm our business or increase our expenses as we attempt to enforce our rights.

We may be required to make expenditures in order to comply with environmental, health and safety laws and climate change regulations, or incur additional liabilities under these laws and regulations.

We are subject to numerous environmental, health and safety laws and regulations that impose various environmental controls on us or otherwise relate to environmental protection and various health and safety matters, including the discharge of pollutants in the air and water, the handling, use, treatment, storage and clean-up of solid and hazardous materials and wastes, the investigation and remediation of soil and groundwater affected by hazardous substances and the requirement to obtain and maintain permits and licenses. These laws and regulations often impose strict, retroactive and joint and several liability for the costs and damages resulting from cleaning up our or our predecessors’ facilities and third party disposal sites. Compliance with these laws generally increases the costs of transportation and storage of raw materials and finished products, as well as the costs of storing and disposing waste, and could decrease our liquidity and profitability and increase our liabilities. Health and safety and other laws in the jurisdictions in which we operate impose various requirements on us including state licensing requirements that may benefit our customers. If we are found to have violated any of these laws, we may become subject to corrective action orders and fines or penalties, and incur substantial costs, including substantial remediation costs and commercial liability to our customers. Further, we also could be subject to future liability resulting from conditions that are currently unknown to us that could be discovered in the future.

We are currently remediating or developing work plans for remediation of environmental conditions involving certain current or former facilities. For example, the discovery of contamination arising from historical industrial operations at our Clarksville, Arkansas property, which is currently being leased to a third party business, has exposed us, and in the future may continue to expose us, to remediation obligations. We have also been subject to environmental liabilities for other sites where we formerly operated or at locations where we or our predecessors did or are alleged to have operated. To date, our environmental remediation expenditures and costs for otherwise complying with environmental laws and regulations have not been material, but the uncertainties associated with the investigation and remediation of contamination and the fact that such laws or regulations change frequently makes predicting the cost or impact of such laws and regulations on our future operations uncertain. Stricter environmental, safety and health laws, regulations or enforcement policies could result in substantial costs and liabilities to us and could subject us to more rigorous scrutiny. Consequently, compliance with these laws could result in significant expenditures, as well as other costs and liabilities that could decrease our liquidity and profitability and increase our liabilities.

There is a growing political and scientific belief that emissions of greenhouse gases alter the composition of the global atmosphere in ways that are affecting the global climate. Various stakeholders, including legislators and regulators, stockholders and non-governmental organizations, as well as companies in many business sectors, are considering ways to reduce greenhouse gas emissions. New regulations could result in product standard requirements for our global businesses but because any impact is dependent on the design of the mandate or standard, we are unable to predict its significance at this time. Furthermore, the potential physical impacts of theorized climate change on our customers, and therefore on our operations, are speculative and highly uncertain, and would be particular to the circumstances developing in various geographical regions. These may include changes in weather patterns (including drought and rainfall levels), water availability, storm patterns and intensities, and temperature levels. These potential physical effects may adversely impact the cost, production, sales and financial performance of our operations.

Our pension plan is currently underfunded and we contribute to a multi-employer plan for collective bargaining U.S. employees, which is also underfunded.

Certain U.S. hourly and salaried employees are covered by our defined benefit pension plan. The plan has been frozen since February 2006. As of December 31, 2018, the projected benefit obligation under our pension plan was approximately $53.6 million, and the value of the assets of the plan was approximately $42.8 million, resulting in our pension plan being underfunded by approximately $10.8 million.

As part of the Hudson acquisition we acquired a noncontributory defined benefit plan covering certain employees of a Hudson subsidiary. This plan is closed to new participants. As of December 31, 2018, the projected benefit obligation of the plan was $2.5 million, and the fair value of plan assets were $1.7 million, resulting in the pension plan being underfunded by approximately $0.8 million.

We are also a participant in a multi-employer plan, which is underfunded. Among other risks associated with multi-employer plans, contributions and unfunded obligations of the multi-employer plan are shared by the plan participants and we may inherit unfunded obligations if other plan participants withdraw from the plan or cease to participate. Additionally, if we elect to stop participating in the multi-employer plan, we may be required to pay amounts related to withdrawal liabilities associated with the underfunded status of the plan. If the performance of the assets in our pension plan or the multi-employer plan does not meet expectations or if other actuarial assumptions are modified, our required pension contributions for future years could be higher than we expect, which may negatively impact our results of operations, cash flows and financial condition.

We operate in many different jurisdictions and we could be adversely affected by violations of the U.S. Foreign Corrupt Practices Act and similar worldwide anti-corruption laws.

The U.S. Foreign Corrupt Practices Act (“FCPA”) and similar worldwide anti-corruption laws generally prohibit companies and their intermediaries from making improper payments for the purpose of obtaining or retaining business. Our internal policies mandate compliance with these anti-corruption laws. We operate in many parts of the world that have experienced corruption to some degree, and in certain circumstances, strict compliance with anti-corruption laws may conflict with local customs and practices. Despite our training and compliance programs, we cannot assure you that our internal control policies and procedures always will protect us from reckless or criminal acts committed by our employees or agents. Our continued expansion outside the U.S., including in developing countries, could increase the risk of such violations in the future. Violations of these laws, or allegations of such violations, could disrupt our business and result in a material adverse effect on our results of operations or financial condition.

Our operations could be impacted by the effects of severe weather.

Some of our operations, including our operations in New Iberia, Louisiana and Houston, Texas, are located in geographic regions and physical locations that are susceptible to physical damage and longer-term economic disruption from hurricanes or other severe weather. We also could make significant future capital expenditures in hurricane-susceptible or other severe weather locations from time to time. These weather events can disrupt our operations, result in damage to our properties and negatively affect the local economy in which these facilities operate. In September 2008, for example, our New Iberia, Louisiana facility was forced to close as a result of heavy rainfall, evacuations, strong winds and power outages resulting from Hurricane Gustav. Two weeks after Hurricane Gustav, winds and flooding from Hurricane Ike damaged our New Iberia, Louisiana, Houston, Texas and The Woodlands, Texas operations and offices, and those facilities were also closed for a period of time, and in September 2017, our employees in Beasley, Texas and in the Houston area were impacted by the flooding and damage from Hurricane Harvey. Future hurricanes or other severe weather may cause production or delivery delays as a result of the physical damage to the facilities, the unavailability of employees and temporary workers, the shortage of or delay in receiving certain raw materials or manufacturing supplies and the diminished availability or delay of transportation for customer shipments, any of which may have an adverse effect on our sales and profitability. Additionally, the potential physical impact of theorized climate change could include more frequent and intense storms, which would heighten the risk to our operations in areas that are susceptible to hurricanes and other severe weather. Although we maintain insurance subject to certain deductibles, which may cover some of our losses, that insurance may become unavailable or prove to be inadequate.

We are subject to regulations governing the export of our products.

Due to our significant foreign sales, our export activities are subject to regulation, including the U.S. Treasury Department's Office of Foreign Assets Control's regulations. We believe we are in compliance with these regulations and maintain robust programs intended to maintain compliance. However, unintentional lapses in our compliance or uncertainties associated with changing regulatory requirements could result in future violations (or alleged violations) of these regulations. Any violations may subject us to government scrutiny, investigation and civil and criminal penalties and may limit our ability to export our products.

As a provider of products to the U.S. government, we are subject to federal rules, regulations, audits and investigations, the violation or failure of which could adversely affect our business.

We sell certain of our products to the U.S. government; and, therefore, we must comply with and are affected by laws and regulations governing purchases by the U.S. government. Government contract laws and regulations affect how we do business with our government customers and, in some instances, impose added costs on our business. For example, a violation of specific laws and regulations could result in the imposition of fines and penalties or the termination of our contracts or debarment from bidding on contracts. In some instances, these laws and regulations impose terms or rights that are more favorable to the government than those typically available to commercial parties in negotiated transactions.

Current economic and political conditions make tax rules in jurisdictions subject to significant change, and unanticipated changes in our effective tax rate could adversely affect our future results.

Our future results of operations could be affected by changes in the effective tax rate as a result of changes in tax laws, regulations and judicial rulings. In December 2017, the Tax Cuts and Jobs Act of 2017 was signed into law in the United States, which among other things, lowered the federal corporate income tax rate from 35% to 21% and moved the country towards a territorial tax system with a one-time mandatory tax on previously deferred foreign earnings of foreign subsidiaries. Although our effective tax rate decreased during 2018, there can be no assurances that any expected benefit from the Tax Cuts and Jobs Act will be maintained long-term given political and other uncertainties.

Also, further changes in the tax laws of foreign jurisdictions could arise, including as a result of the base erosion and profit shifting (BEPS) project undertaken by the Organisation for Economic Cooperation and Development (OECD). The OECD, which represents a coalition of member countries, has issued recommendations that, in some cases, would make substantial changes to numerous long-standing tax positions and principles. These contemplated changes, to the extent adopted by OECD members and/or other countries, could increase tax uncertainty and may adversely affect our provision for income taxes.

Our effective tax rate could also be adversely affected by changes in the mix of earnings and losses in countries with differing statutory tax rates, certain non-deductible expenses arising from share-based compensation, the valuation of deferred tax assets and liabilities and changes in accounting principles. In addition, we are subject to income tax audits by many tax jurisdictions throughout the world. Although we believe our income tax liabilities are reasonably estimated and accounted for in accordance with applicable laws and principles, an adverse resolution of one or more uncertain tax positions in any period could have a material impact on the results of operations for that period.

Risks Related to Our Leverage

Our leverage and future debt service obligations could adversely affect our financial condition, limit our ability to raise additional capital to fund our operations, limit our ability to react to changes in the economy or our industry, impact the way we operate our business, expose us to interest rate risk to the extent of our variable rate debt and prevent us from fulfilling our debt service obligations.

We are leveraged and have future debt service obligations. Our financial performance could be affected by our leverage. As of December 31, 2018, our total indebtedness was $599.3 million. In addition, at that date, under our senior secured revolving credit facility, we had $47.6 million of letters of credit and bank guarantees outstanding and borrowing capacity of approximately $173.1 million. Through separate facilities, our subsidiaries had $11.4 million in bank guarantees outstanding at December 31, 2018.

Our level of indebtedness could have important negative consequences, including:

- difficulty in generating sufficient cash flow and reduced availability of cash for our operations and other business activities;

- difficulty in obtaining financing in the future;
- exposure to risk of increased interest rates due to variable rates of interest under our senior secured revolving credit facility;
- vulnerability to general economic downturns and adverse industry conditions;
- increased competitive disadvantage due to our debt service obligations;
- adverse customer reaction to our debt levels;

- inability to comply with covenants in, and potential for default under, our debt instruments; and
- failure to refinance any of our debt. See Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations — Liquidity and Capital Resources.”

If our cash flows and capital resources are insufficient to fund our debt service obligations, we may be forced to sell assets, seek additional capital or seek to restructure or refinance our indebtedness. These alternative measures may not be successful and may not permit us to meet our scheduled debt service obligations. We may be unable to consummate those asset sales to raise capital or sell assets at prices that we believe are fair and proceeds that we do receive may be inadequate to meet any debt service obligations then due.

We may still be able to incur substantially more debt. This could further exacerbate the risks that we face.

We may be able to incur substantial additional indebtedness in the future. The terms of our debt instruments do not fully prohibit us from doing so. Our senior secured revolving credit facility provides commitments of up to $550.0 million, approximately $173.1 million of which would have been available for future borrowings (after giving effect to letters of credit and bank guarantees outstanding) as of December 31, 2018. See Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations — Liquidity and Capital Resources — Debt Instruments and Related Covenants.” We may also further increase the size of our senior secured revolving credit facility which includes an expansion option permitting us to add up to an aggregate of $225.0 million in additional borrowings, subject to certain conditions, or we could refinance with higher borrowing limits. If new debt is added to our current debt levels, the related risks that we now face could intensify.

The senior secured revolving credit facility contains a number of restrictive covenants which limit our ability to finance future operations or capital needs or engage in other business activities that may be in our interest.

The senior secured revolving credit facility imposes, and the terms of any future indebtedness may impose, operating and other restrictions on us and our subsidiaries. Such restrictions affect or will affect, and in various circumstances limit or prohibit, among other things, our ability and the ability of our subsidiaries to:

- incur additional indebtedness;
- create liens;
- pay dividends based on our leverage ratio and make other distributions in respect of our capital stock;
- redeem or buy back our capital stock based on our leverage ratio;
- make certain investments or certain other restricted payments;
- sell or transfer certain kinds of assets;
- enter into certain types of transactions with affiliates; and
- effect mergers or consolidations.

The senior secured revolving credit facility also requires us to achieve certain financial and operating results and maintain compliance with specified financial ratios. Our ability to comply with these ratios may be affected by events beyond our control.

The restrictions contained in the senior secured revolving credit facility could:

- limit our ability to plan for or react to market or economic conditions or meet capital needs or otherwise restrict our activities or business plans; and
- adversely affect our ability to finance our operations, acquisitions, investments or strategic alliances or other capital needs or to engage in other business activities that would be in our interest.

A breach of any of these covenants or our inability to comply with the required financial ratios could result in a default under our senior secured revolving credit facility. If an event of default occurs under our senior secured revolving credit facility, which includes an event of default under the indenture governing our 1.00% Convertible Senior Subordinated Notes due November 2024, the lenders could elect to:

- declare all borrowings outstanding, together with accrued and unpaid interest, to be immediately due and payable; or
- require us to apply all of our available cash to repay the borrowings,

either of which could result in an event of default under our convertible notes or prevent us from making payments on the convertible notes when due in 2024, as the case may be. The lenders will also have the right in these circumstances to terminate any commitments they have to provide further financing.

If we were unable to repay or otherwise refinance these borrowings when due, our lenders could sell the collateral securing the senior secured revolving credit facility, which constitutes substantially all of our and our domestic wholly-owned subsidiaries' assets.

Our 1.00% Convertible Senior Subordinated Notes due November 2024 have certain fundamental change and conditional conversion features which, if triggered, may adversely affect our financial condition.

If a fundamental change occurs under our 1.00% Convertible Senior Subordinated Notes due November 2024, the holders of the convertible notes may require us to purchase for cash any or all of the convertible notes. However, there can be no assurance that we will have sufficient funds at the time of the fundamental change to purchase all of the convertible notes delivered for purchase, and we may not be able to arrange necessary financing on acceptable terms, if at all. Likewise, if one of the conversion contingencies of our convertible notes is triggered, holders of convertible notes will be entitled to convert the convertible notes at any time during specified periods.

We are subject to counterparty risk with respect to the convertible note hedge and capped call transactions associated with our 1.00% Convertible Senior Subordinated Notes due November 2024.

The option counterparties for our convertible note hedging arrangements are financial institutions, and we will be subject to the risk that any or all of them might default under the convertible note hedge and capped call transactions. Our exposure to the credit risk of the option counterparties is not secured by any collateral. Global economic conditions during the 2008-2009 economic downturn resulted in the actual or perceived failure or financial difficulties of many financial institutions. If an option counterparty becomes subject to insolvency proceedings, we will become an unsecured creditor in those proceedings with a claim equal to our exposure at that time under the convertible note hedge and capped call transactions with that option counterparty. Our exposure will depend on many factors but, generally, the increase in our exposure will be correlated to the increase in the market price and in the volatility of our common stock. In addition, upon a default by an option counterparty, we may suffer adverse tax consequences and more dilution than we currently anticipate with respect to our common stock. We can provide no assurances as to the financial stability or viability of the option counterparties.

Risks Related to the Trading Market for Our Common Stock

Our common stock has experienced, and may continue to experience, price volatility.

Our common stock has at times experienced substantial price volatility as a result of many factors, including the general volatility of stock market prices and volumes, changes in securities analysts' estimates of our financial performance, variations between our actual and anticipated financial results, fluctuations in order or backlog levels, fluctuations in energy prices, or uncertainty about current global economic conditions. For these reasons, among others, the price of our stock may continue to fluctuate.

Provisions in our amended and restated certificate of incorporation and amended and restated bylaws and other agreements and in Delaware law may discourage a takeover attempt.

Provisions contained in our amended and restated certificate of incorporation and amended and restated bylaws and Delaware law could make it more difficult for a third party to acquire us. Provisions of our amended and restated certificate of incorporation and amended and restated bylaws and Delaware law impose various procedural and other requirements, which could make it more difficult for stockholders to effect certain corporate actions. For example, our amended and restated certificate of incorporation authorizes our board of directors to determine the rights, preferences, privileges and restrictions of unissued series of preferred stock, without any vote or action by our stockholders. Therefore, our board of directors can authorize and issue shares of preferred stock with voting or conversion rights that could adversely affect the voting or other rights of holders of our common stock. These rights may have the effect of delaying or deterring a change of control of our company. These provisions could limit the price that certain investors might be willing to pay in the future for shares of our common stock.

In addition, the terms of our 1.00% Convertible Senior Subordinated Notes due November 2024 may require us to purchase these convertible notes for cash in the event of a takeover of our Company. The indentures governing the convertible notes also prohibit us from engaging in certain mergers or acquisitions unless, among other things, the surviving entity assumes our obligations under the convertible notes. These and other provisions applicable to the convertible notes may have the effect of increasing the cost of acquiring us or otherwise discourage a third party from acquiring us.

The issuance of common stock upon conversion of our 1.00% Convertible Senior Subordinated Notes due November 2024 could cause dilution to the interests of our existing stockholders.

As of December 31, 2018, we had $258.8 million aggregate principal amount of our 1.00% Convertible Senior Subordinated Notes due November 2024. Prior to the close of business on the business day immediately preceding August 15, 2024, the convertible notes will be convertible only upon satisfaction of certain conditions. Holders may convert their 1.00% convertible notes at their option at any time after August 15, 2024 until the close of business on the second scheduled trading day immediately preceding November 15, 2024. We currently intend to settle conversions of 1.00% convertible notes through a combination of the payment of cash and issuance of shares, with payments of cash up to the aggregate principal amount of the convertible notes to be converted and delivering shares of our common stock in respect of the remainder, if any, of our conversion obligation in excess of the aggregate principal amount of the notes being converted. The number of shares issued could be significant and such an issuance could cause significant dilution to the interests of the existing stockholders.

Item 1B. Unresolved Staff Comments

Not applicable.

Item 2. Properties

We occupy 47 facilities totaling approximately 5.5 million square feet, including the locations listed below, with the majority devoted to manufacturing, assembly, and storage. Of these facilities, approximately 4.3 million square feet are owned and 1.2 million square feet are occupied under operating leases. One of our owned facilities, a 0.1 million square foot facility in Clarksville, Arkansas, is leased to a third party. We currently lease approximately 20 thousand square feet for our corporate office in Ball Ground, Georgia. Our major owned facilities in the United States are subject to mortgages securing our senior secured revolving credit facility.

The following table summarizes information about our principal plants and other materially important physical properties as of January 31, 2019:

Location	Segment	Ownership	Use
Ball Ground, Georgia, U.S.	Corporate	Leased	Office
Luxembourg, Luxembourg	Corporate	Leased	Office
Chennai, India	D&S East	Owned	Manufacturing/Office
Decin, Czech Republic	D&S East	Owned	Manufacturing/Office
Goch, Germany	D&S East	Owned	Manufacturing/Office
Kuala Lumpur, Malaysia	D&S East	Leased	Marketing & Sales/Office
Lery, France	D&S East and D&S West	Owned	Manufacturing/Office
Changzhou, China	D&S East and Energy & Chemicals	Leased/Owned	Manufacturing/Office
Milan, Italy	D&S East and Energy & Chemicals	Leased/Owned	Manufacturing/Office
Ball Ground, Georgia, U.S.	D&S West	Leased/Owned	Manufacturing/Office/Service
Chengdu, China	D&S West	Owned	Manufacturing/Office
New Prague, Minnesota, U.S.	D&S West	Leased/Owned	Manufacturing/Office/Service
Owatonna, Minnesota, U.S.	D&S West	Leased	Manufacturing/Office
Houston, Texas, U.S.	D&S West and Energy & Chemicals	Leased/Owned	Manufacturing/Office/Service
Beasley, Texas, U.S.	Energy & Chemicals	Owned	Manufacturing/Office
Franklin, Indiana, U.S.	Energy & Chemicals	Leased	Manufacturing/Office/Service
La Crosse, Wisconsin, U.S.	Energy & Chemicals	Leased/Owned	Manufacturing/Office
Monterey, Mexico	Energy & Chemicals	Owned	Manufacturing/Office
New Iberia, Louisiana, U.S.	Energy & Chemicals	Leased	Manufacturing
Pombia, Italy	Energy & Chemicals	Leased	Manufacturing/Office
The Woodlands, Texas, U.S.	Energy & Chemicals	Leased	Office
Tulsa, Oklahoma, U.S.	Energy & Chemicals	Leased/Owned	Manufacturing/Office

Regulatory Environment

We are subject to federal, state, and local regulations relating to the discharge of materials into the environment, production and handling of hazardous and regulated materials, and the conduct and condition of our production facilities. We do not believe that these regulatory requirements have had a material effect upon our capital expenditures, earnings, or competitive position. We are not anticipating any material capital expenditures in 2019 that are directly related to regulatory compliance matters. We are also not aware of any pending or potential regulatory changes that would have a material adverse impact on our business.

Item 3. Legal Proceedings

Stainless Steel Cryobiological Tank Legal Proceedings

During the second quarter of 2018, Chart was named in lawsuits (including a class action lawsuit filed in the U.S. District Court for the Northern District of California) filed against Chart and other defendants with respect to the alleged failure of a stainless steel cryobiological storage tank (model MVE 808AF-GB) at the Pacific Fertility Center in San Francisco, California. No monetary damages related to the alleged failure have been specified or communicated to Chart at this point, and we are evaluating the merits of such claims in light of the limited information available to date regarding use, maintenance and operation of the tank which has been out of our custody for the past six years when it was sold to the Pacific Fertility Center through an independent distributor. Accordingly, an accrual related to any damages that may result from the lawsuits has not been recorded because a potential loss is not currently probable or estimable.

We have asserted various defenses against the claims in the lawsuits, including a defense that since manufacture, we were not in any way involved with the installation, ongoing maintenance or monitoring of the tank or related fertility center cryogenic systems at any time since the initial delivery of the tank.

Aluminum Cryobiological Tank Legal Proceeding

Chart has been named in purported class action lawsuits filed during the second quarter of 2018 in the Ontario Superior Court of Justice against the Company and other defendants with respect to the alleged failure of an aluminum cryobiological storage tank (model FNL XC 47/11-6 W/11) at The Toronto Institute for Reproductive Medicine in Etobicoke, Ontario. We have confirmed that the tank in question was part of the aluminum cryobiological tank recall commenced on April 23, 2018. We have asserted various defenses against the claims in the lawsuits and are in the early stages of litigation. Accordingly, an accrual related to any damages that may result from the lawsuit has not been recorded because a potential loss is not currently probable or estimable.

We are occasionally subject to various legal claims related to performance under contracts, product liability, environmental liability, taxes, employment, intellectual property, and other matters, several of which claims assert substantial damages in the ordinary course of our business. Based on our historical experience in litigating these claims, as well as our current assessment of the underlying merits of the claims and applicable insurance, if any, we believe the resolution of these legal claims will not have a material adverse effect on our financial position, liquidity, cash flows or results of operations. Future developments may, however, result in resolution of these legal claims in a way that could have a material adverse effect. See Item 1A. “Risk Factors.”

Item 4. Mine Safety Disclosures

Not applicable.

Item 4A. Executive Officers of the Registrant*

The name, age and positions of each Executive Officer of the Company as of February 15, 2019 are as follows:

Name	Age	Position
Jillian C. (Jill) Evanko	41	Chief Executive Officer and President
Jeffrey R. (Jeff) Lass	49	Vice President and Chief Financial Officer
Gerald F. (Gerry) Vinci	53	Vice President, Chief Human Resources Officer

* Included pursuant to Instruction 3 to Item 401(b) of Regulation S-K.

Jillian C. (Jill) Evanko was appointed Chief Executive Officer and President on June 12, 2018 and served as Chief Financial Officer from March 1, 2017 until January 14, 2019. Ms. Evanko joined Chart on February 13, 2017 as Vice President of Finance. Prior to joining Chart, Ms. Evanko served as the Vice President and Chief Financial Officer of Truck-Lite Co., LLC, a manufacturer of lighting and specialty products for the truck and commercial vehicle industries, since October 2016, prior to which she held multiple executive positions at Dover Corporation, a diversified global manufacturer, and its subsidiaries, including the role of Vice President and Chief Financial Officer of Dover Fluids since January 2014. Prior to joining Dover in 2004, Ms. Evanko worked in valuation services at Arthur Andersen, LLP and also held audit and accounting roles for Honeywell and Sony Corporation of America.

Jeffrey R. (Jeff) Lass was appointed Vice President and Chief Financial Officer on January 14, 2019. Prior to joining Chart, Mr. Lass served as Vice President of Finance & Operations and Chief Financial Officer of CognitiveScale, an artificial intelligence software development company, since May 2018. Prior to that, he served as Vice President and Chief Financial Officer of Dover Fueling Solutions, a manufacturer of advanced fuel dispensing equipment, from December 2016 to May 2018, and previously served in various executive roles for Wayne Fueling Systems, a global fuel dispenser manufacturer for retail and fleet applications (both as part of its ownership by General Electric and Riverstone Holdings after its separation from General Electric in 2014), from February 2011 through December 2016. Mr. Lass also previously held Finance roles at Dresser, Inc., Pavilion Technologies, Trilogy Software, Inc. Applied Materials, Inc. and Pricewaterhouse LLP.

Gerald F. (Gerry) Vinci was appointed our Vice President and Chief Human Resources Officer and has served in that capacity since December 5, 2016, when he joined Chart. Mr. Vinci was designated an executive officer of Chart on August 23, 2017. Prior to joining Chart, Mr. Vinci held various executive Human Resources roles at Dover Corporation, a diversified global manufacturer, from February 2013 to November 2016, including Vice President, Human Resources for Dover Engineered Systems and Dover Refrigeration and Food Equipment Segments. From 1997 to 2013, Mr. Vinci served in numerous Human Resources executive roles and as Senior Counsel for Harsco Corporation. Prior to that, Mr. Vinci was an attorney for Sunoco, Inc.

PART II

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

Chart’s common stock is traded on the NASDAQ Global Select Market under the symbol “GTLS.” As of February 1, 2019, there were 169 holders of record of our common stock. Since many holders hold shares in “street name,” we believe that there are a significantly larger number of beneficial owners of our common stock than the number of record holders.

We do not currently intend to pay any cash dividends on our common stock, and instead intend to retain earnings, if any, for future operations, debt reduction and potential acquisitions. The amounts available to us to pay future cash dividends may be restricted by our senior secured revolving credit facility to the extent our pro forma leverage ratio exceeds certain targets. Any decision to declare and pay dividends in the future will be made at the discretion of our board of directors and will depend on, among other things, our results of operations, financial condition, cash requirements, contractual restrictions and other factors that our board of directors may deem relevant.

Cumulative Total Return Comparison

Set forth below is a line graph comparing the cumulative total return of a hypothetical investment in the shares of common stock of Chart with the cumulative return of a hypothetical investment in each of the S&P SmallCap 600 Index and our Peer Group Index based on the respective market prices of each such investment on the dates shown below, assuming an initial investment of $100 on December 31, 2013, including reinvestment of dividends, if any.

	December 31,					
	2013	2014	2015	2016	2017	2018
Chart Industries, Inc.	$100.00	$35.76	$18.78	$37.66	$49.00	$67.99
S&P SmallCap 600 Index	100.00	105.76	103.67	131.20	148.56	135.96
Peer Group Index	100.00	97.01	86.99	113.64	135.14	110.98

We select the peer companies that comprise the Peer Group Index solely on the basis of objective criteria. These criteria result in an index composed of oil field equipment/service and other comparable industrial companies. The 2017 Peer Group Index was comprised of Acuity Brands, Inc., Barnes Group Inc., Circor International, Inc., Colfax Corp., Enpro Industries Inc., Esco Technologies Inc., Graco Inc., Harsco Corporation, Idex Corp., Nordson Corporation, SPX Corporation and Worthington Industries, Inc.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

During the fourth quarter of 2018, 5,645 shares of common stock were surrendered to us by participants under our share-based compensation plans to satisfy tax withholding obligations relating to the vesting or payment of equity awards for an aggregate purchase price of approximately $332,900. The total number of shares repurchased represents the net shares issued to satisfy tax withholdings. All such repurchased shares were subsequently retired during the three months ended December 31, 2018.

Period	Issuer Purchases of Equity Securities			
	Total Number of Shares Purchased	Average Price Paid Per Share	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
October 1 — 31, 2018	114	$ 74.65	—	$ —
November 1 — 30, 2018	—	—	—	—
December 1 — 31, 2018	5,531	58.65	—	—
Total	5,645	$ 58.97	—	$ —

Item 6. Selected Financial Data

The following table sets forth selected historical consolidated financial information as of the dates and for each of the periods indicated. We selected historical financial consolidated data as of and for the years ended December 31, 2018, 2017 and 2016 derived from our audited financial statements for such periods incorporated by reference into Item 8 of this Annual Report on Form 10-K, which have been audited by Ernst & Young LLP. We selected historical financial consolidated data as of and for the years ended December 31, 2015 and 2014 derived from our audited financial statements for such periods, which have been modified in order to conform to the discontinued operations presentation as further discussed in our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K.

The following table should be read together with Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our consolidated financial statements and related notes included elsewhere in this Annual Report on Form 10-K (all dollar amounts in millions, except per share data):

	Year Ended December 31,				
	2018	2017	2016	2015	2014
Statements of Operations Data:					
Sales [1] [2]	$1,084.3	$842.9	$722.0	$883.2	$1,032.8
Cost of sales [3]	788.4	611.3	512.3	631.1	721.7
Gross profit	295.9	231.6	209.7	252.1	311.1
Operating expenses [4] [5] [6] [7] [8] [9]	203.8	193.1	167.5	174.8	172.0
Asset impairments	—	—	1.2	151.8	—
Operating income (loss) [1] [2]	92.1	38.5	41.0	(74.5)	139.1
Interest expense, net (including deferred financing costs amortization)	22.7	18.6	16.4	13.9	14.4
Loss on extinguishment of debt [10]	—	4.9	—	—	—
Foreign currency loss	0.4	3.9	0.5	2.0	0.5
Other expenses, net	23.1	27.4	16.9	15.9	14.9
Income (loss) before income taxes	69.0	11.1	24.1	(90.4)	124.2
Income tax expense (benefit), net [11]	13.4	(16.6)	10.6	8.3	40.3
Net income (loss) from continuing operations	55.6	27.7	13.5	(98.7)	83.9
Income (loss) from discontinued operations, net of tax [12]	34.4	1.8	11.2	(105.8)	(0.8)
Net income (loss)	90.0	29.5	24.7	(204.5)	83.1
Less: Income (loss) attributable to noncontrolling interests, net of taxes	2.0	1.5	(3.5)	(1.5)	1.2
Net income (loss) attributable to Chart Industries, Inc.	$88.0	$28.0	$28.2	$(203.0)	$81.9

	Year Ended December 31,				
	2018	2017	2016	2015	2014
Earnings Per Share Data:					
Basic earnings (loss) per common share attributable to Chart Industries, Inc.					
Income (loss) from continuing operations	$1.73	$0.85	$0.55	$(3.19)	$2.72
Income (loss) from discontinued operations	1.10	0.06	0.37	(3.47)	(0.03)
Net Income (loss) attributable to Chart Industries, Inc.	$2.83	$0.91	$0.92	$(6.66)	$2.69
Diluted earnings (loss) per common share attributable to Chart Industries, Inc. (13)					
Income (loss) from continuing operations	$1.67	$0.84	$0.55	$(3.19)	$2.70
Income (loss) from discontinued operations	1.06	0.05	0.36	(3.47)	(0.03)
Net Income (loss) attributable to Chart Industries, Inc.	$2.73	$0.89	$0.91	$(6.66)	$2.67
Weighted-average shares — basic	31.05	30.74	30.58	30.49	30.38
Weighted-average shares — diluted (13)	32.20	31.34	30.98	30.49	30.67
Cash Flow Data:					
Cash provided by operating activities	$119.0	$44.3	$169.3	$98.4	$124.3
Cash used in investing activities	(260.6)	(477.8)	(17.0)	(70.2)	(70.1)
Cash provided by (used in) financing activities	38.2	275.2	7.7	0.4	(70.8)
Cash provided by (used in) discontinued operations	102.5	0.5	0.4	(0.7)	(8.0)
Other Financial Data:					
Depreciation and amortization, including deferred financing costs amortization (14)	$52.1	$38.9	$34.4	$36.2	$32.3

	As of December 31,				
	2018	2017	2016	2015	2014
Balance Sheet Data:					
Cash and cash equivalents	$118.1	$122.6	$282.0	$123.7	$103.7
Working capital (15)	177.0	73.0	60.4	139.1	157.6
Goodwill (16) (17)	520.7	459.7	208.9	209.3	347.7
Identifiable intangible assets, net (16) (17)	330.4	286.4	74.5	84.8	94.6
Total assets (16) (17)	1,897.7	1,724.7	1,233.0	1,200.1	1,459.5
Long-term debt (18)	533.2	439.2	233.7	213.8	201.6
Total debt (18)	544.4	498.1	240.2	220.0	206.5
Chart Industries, Inc. shareholders' equity	884.5	802.2	697.2	670.6	879.9

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(1) Includes sales and operating loss for VRV, included in the E&C and D&S East segments results since the acquisition date, November 15, 2018 as follows:

- Sales were $14.1 (E&C: $3.8, D&S East: $10.3) for the year ended December 31, 2018, and
- Operating (loss) income was $(2.0) (E&C: $(2.2), D&S East: $0.2) for the year ended December 31, 2018, which included $1.5 of depreciation and amortization expense and $1.6 in expense recognized in the cost of sales related to inventory step-up.

(2) Includes sales and operating income for Hudson, included in the E&C segment results since the acquisition date, September 20, 2017 as follows:

- Sales were $180.3 and $58.0 for the year ended December 31, 2018 and 2017, respectively, and
- Operating income was $19.0 and $6.4 for the year ended December 31, 2018 and 2017, respectively.

(3) Cost of sales includes restructuring costs of $0.8 million, $2.7 million, $3.5 million and $2.9 million for the years ended December 31, 2018, 2017, 2016 and 2015, respectively.

(4) Operating expenses include selling, general and administrative expenses and amortization expense. Amortization expense related to intangible assets for the years ended December 31, 2018, 2017, 2016, 2015 and 2014 was $21.9 million, $12.2 million, $8.8 million, $9.2 million, and $8.1 million, respectively.

(5) Includes an expense of $4.0 million recorded to cost of sales related to the estimated costs of the aluminum cryobiological tank recall for the year ended December 31, 2018.

(6) Operating income (loss) includes restructuring costs of $4.4 million, $11.2 million, 9.5 million and $6.4 million for the years ended December 31, 2018, 2017, 2016 and 2015, respectively.

(7) Includes transaction-related costs of $10.1 million, $0.4 million, $0.7 million, and $1.2 million for the years ended December 31, 2017, 2016, 2015 and 2014, respectively.

(8) Includes transaction-related costs of $2.1 million for the year ended December 31, 2018, which were mainly related to the VRV acquisition. Includes integration costs of $0.8 million related to the VRV acquisition for the year ended December 31, 2018.

(9) During the year ended December 31, 2018, we recorded net severance costs of $2.3 million primarily related to headcount reductions associated with the strategic realignment of our segment structure, which includes $1.8 million in payroll severance costs partially offset by a $0.9 million credit due to related share-based compensation forfeitures for 2018. Includes net severance costs of $1.4 million related to the departure of our former CEO, which includes $3.2 million in payroll severance costs partially offset by a $1.8 million credit due to related share-based compensation forfeitures for 2018.

(10) During the year ended December 31, 2017, we recorded a $4.9 million loss on extinguishment of debt associated with the repurchase of $192.9 million principal amount of our $250.0 million 2.00% convertible notes due August 2018 and refinance of our senior secured revolving credit facility.

(11) Includes a one-time $22.5 million net favorable tax benefit that was recorded during the fourth quarter of 2017, which resulted from the enactment of the Tax Cuts and Jobs Act. This benefit mainly consisted of a one-time, provisional benefit of $26.9 million related to the remeasurement of certain of our deferred tax liabilities using the lower U.S. federal corporate tax rate of 21%. This was partially offset by (i) a one-time, provisional charge of $8.7 million related to the deemed repatriation transition tax, which is a tax on previously untaxed accumulated earnings and profits of certain of our foreign subsidiaries, and (ii) a one-time tax expense and tax benefit of $4.5 million and $8.7 million, respectively, related to our intent to amend pre-acquisition Hudson U.S. federal tax returns. We have completed our analysis to determine the effect of the Tax Cuts and Jobs Act, and as such, we have recorded an additional tax benefit of $1.8 million.

(12) Includes gain on sale of the CAIRE business of $34.3 million, net of taxes of $2.6 million, for the year ended December 31, 2018.

(13) Zero incremental shares from share-based awards are included in the computation of diluted net loss per share for periods in which a net loss occurs, because to do so would be anti-dilutive.

(14) Includes deferred financing costs amortization of $1.3 million for each of the years ended December 31, 2018, 2017, 2016, and 2015 and $1.4 million for the year ended December 31, 2014.

(15) Working capital is defined as current assets excluding cash and cash equivalents minus current liabilities excluding short-term debt and current portion of long-term debt (including current convertible notes, if applicable).

(16) Total assets at December 31, 2017 included $572.8 million related to Hudson of which $238.3 million and $211.0 million represented acquired goodwill and identifiable intangible assets, net, respectively. For further information, see Note 12, "Business Combinations," in the consolidated financial statements located elsewhere in this report.

(17) Total assets at December 31, 2018 included $327.8 million related to VRV of which $64.0 million and $66.4 million represented acquired goodwill and identifiable intangible assets, net, respectively. For further information, see Note 12, "Business Combinations," in the consolidated financial statements located elsewhere in this report.

(18) Total debt at December 31, 2018 includes convertible notes, net of unamortized discounts and debt issuance costs of $203.9 million, $329.3 million outstanding borrowings on our senior secured revolving credit facility and $11.2

million in borrowings on our foreign facilities. Long-term debt represents total debt less current maturities. At December 31, 2018 current maturities were $11.2 million.

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

The following discussion of our results of operations and financial condition should be read in conjunction with the "Selected Financial Data" section and our consolidated financial statements and related notes appearing elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements. Actual results may differ materially from those discussed below. See "Forward-Looking Statements" at the end of this discussion and Item 1A. "Risk Factors" for a discussion of the uncertainties, risks and assumptions associated with this discussion.

Overview

We are a leading diversified global manufacturer of highly engineered equipment for the industrial gas, energy, and biomedical industries. Our equipment and engineered systems are primarily used for low-temperature and cryogenic applications utilizing our expertise in cryogenic systems and equipment which operate at low temperatures sometimes approaching absolute zero (0 Kelvin; -273° Centigrade; -459° Fahrenheit).

Strategic Update

On November 15, 2018, Chart completed the previously announced acquisition of VRV S.r.l. and its subsidiaries (collectively "VRV"). VRV is a diversified multinational corporation engaged in the design and manufacture of pressure equipment serving the cryogenic, as well as the energy and petrochemical end markets. The VRV acquisition purchase price, which is subject to a working capital adjustment expected in the first quarter of 2019, was euro 188.7 million (equivalent to $213.3 million), inclusive of the base purchase price of euro 125.0 million (equivalent to $141.3 million) in cash and assumed indebtedness of VRV, which was paid off immediately at closing or shortly thereafter, of euro 63.7 million (equivalent to $72.0 million). Additional indebtedness of VRV of $4.9 million was assumed at the acquisition date and not paid off, although we expect to pay it off in early 2019. We funded the VRV acquisition, including the subsequent payoff of assumed indebtedness, with borrowings of euro 140.0 million (equivalent to $160.3 million) from our senior secured revolving credit facility and the remainder with cash on hand. All U.S. dollar equivalent dollar amounts are based on the exchange rate as of the acquisition date. VRV is expected to add annual net sales of $115 million in 2019, achieve significant cost synergies related to operational efficiencies and sourcing, and be accretive to earnings in our first full year of ownership. The VRV acquisition is further described in Note 12, "Business Combinations," to our consolidated financial statements included elsewhere in this report.

To support this strategic acquisition as well as Chart's expanded focus on geographic expansion outside of North America, we executed a strategic realignment of our segment structure during the third quarter and divided our Distribution & Storage segment into two segments: Distribution & Storage Western Hemisphere ("D&S West") and Distribution & Storage Eastern Hemisphere ("D&S East"). We believe these changes will facilitate our growth strategies, better align with our customer needs, and provide increased improved transparency of business results to our shareholders.

Additionally, on December 20, 2018, we closed on the sale of all of the equity interests in our oxygen-related products business within our former BioMedical segment to NGK SPARK PLUG CO., LTD. (the "Buyer") for $133.5 million (the "Divestiture"). The strategic decision to divest the oxygen-related products business reflects our strategy and capital allocation approach to focus on our core capabilities and offerings.

As a result of the Divestiture, the asset group, which includes our respiratory and on-site generation systems businesses, met the criteria to be held for sale. Furthermore, we determined that the assets held for sale qualify for discontinued operations. As such, the financial results of the respiratory therapy and on-site generation systems businesses are reflected in our consolidated statements of income and comprehensive income as discontinued operations for all periods presented. Furthermore, current and non-current assets and liabilities of discontinued operations are reflected in the audited consolidated balance sheets as of December 31, 2017. For further information, refer to Note 3, "Discontinued Operations," in the consolidated financial statements located elsewhere in this report. The remaining former BioMedical segment business, cryobiological storage systems, is now part of D&S West, and financial information is shown in all tables for D&S West.

The financial information presented and discussion of results that follows is presented on a continuing operations basis.

2018 Highlights

Orders in 2018 of $1,142.4 million increased 32.6% compared to 2017 (11.7% organically) with each segments' orders increasing year-over-year. Fiscal year 2018 continued to reflect the strong demand seen in 2017 for natural gas liquids ("NGL"), petrochemical applications and bulk industrial gas applications.

Sales in 2018 of $1,084.3 million increased 28.6% compared to 2017 (13.4% organically), across all segments including double-digit increases in our Energy & Chemicals ("E&C") segment and our D&S West segment. Sales for Hudson, included in the E&C segment results since the September 20, 2017 acquisition date, were $180.3 million and $58.0 million for the years ended December 31, 2018 and 2017, respectively. Sales for VRV, included in both the E&C and D&S East segment results since the

November 15, 2018 acquisition date, were $14.1 million for the year ended December 31, 2018. Selling, general and administrative ("SG&A") expenses as a percentage of consolidated sales decreased from 21.5% in 2017 to 16.8% as a result of the improvement generated by our recent restructuring and cost-reduction initiatives. Operating income in 2018 of $92.1 million increased 139.2% compared to 2017 (134.0%, organically), across all segments.

Outlook

Our 2019 full year outlook reflects 2018 and 2019 organic year-to-date order growth in our segments and the positive contributions from both 2018 and 2017 acquisitions VRV, Skaff Cryogenics and Cryo-Lease (together "Skaff"), RCHPH Holdings, Inc. ("Hudson"), VCT Vogel GmbH ("VCT") and Hetsco, Inc. We continue to anticipate that the forecasted global supply/demand LNG gas balance will be reached in 2022-2023, thereby driving LNG export facility orders in 2019 and 2020. A majority of upcoming projects for U.S. LNG export have transitioned from utilizing traditional single train baseload plants to multi-train mid-scale projects, with a modular approach to achieve baseload capacities. This is important to us because multi-train mid-scale projects, such as the previously announced Driftwood LNG project, may use Chart's patented IPSMR® technology as well as our brazed aluminum heat exchangers and cold boxes as the main liquefaction heat exchanger technology.

We continue to invest in our automation, process improvement, and productivity activities across the Company, with total anticipated 2019 capital investment of $35.0 million to $40.0 million. The total anticipated 2019 capital spend is inclusive of anticipated capital spending at VRV, potential investment in the LNG fuel systems production line in Europe and automation projects in our New Prague, Minnesota facility.

Operating Results

The following table sets forth the percentage relationship that each line item in our consolidated statements of income represents to sales for the years ended December 31, 2018, 2017 and 2016 (dollars in millions):

	2018	2017	2016
Sales	100.0%	100.0 %	100.0 %
Cost of sales (1) (2)	72.7	72.5	71.0
Gross profit	27.3	27.5	29.0
Selling, general and administrative expenses (2) (3) (4) (5) (6) (7)	16.8	21.5	22.0
Amortization expense	2.0	1.4	1.2
Asset impairments	—	—	0.2
Operating income	8.5	4.6	5.7
Interest expense, net (8) (9)	2.0	2.1	2.1
Loss on extinguishment of debt (10)	—	0.6	—
Financing costs amortization	0.1	0.2	0.2
Foreign currency loss	—	0.5	0.1
Income tax expense (benefit), net (11)	1.2	(2.0)	1.5
Net income from continuing operations	5.1	3.3	1.9
Income from discontinued operations, net of tax	3.2	0.2	1.6
Net income	8.3	3.5	3.4
Income (loss) attributable to noncontrolling interests, net of taxes	0.2	0.2	(0.5)
Net income attributable to Chart Industries, Inc.	8.1	3.3	3.9

(1) Cost of sales includes restructuring costs of $0.8 million, $2.7 million and $3.5 million for the years ended December 31, 2018, 2017 and 2016, respectively.

(2) Includes an expense of $4.0 million recorded to cost of sales related to the estimated costs of the aluminum cryobiological tank recall for the year ended December 31, 2018.

(3) Selling, general and administrative expenses includes restructuring costs of $3.6 million, $8.5 million and $6.0 million for the years ended December 31, 2018, 2017 and 2016, respectively.

(4) Includes transaction-related costs of $2.1 million for the year ended December 31, 2018, which were mainly related to the VRV acquisition. Includes integration costs of $0.8 million related to the VRV acquisition for the year ended December 31, 2018.

(5) Includes transaction-related costs of $10.1 million and $0.4 million for the years ended December 31, 2017 and 2016, respectively.

(6) During the year ended December 31, 2018, we recorded net severance costs of $2.3 million primarily related to headcount reductions associated with the strategic realignment of our segment structure, which includes $1.8 million in payroll severance costs partially offset by a $0.9 million credit due to related share-based compensation forfeitures for 2018. Includes net severance costs of $1.4 million related to the departure of our former CEO, which includes $3.2 million in payroll severance costs partially offset by a $1.8 million credit due to related share-based compensation forfeitures for 2018.

(7) Includes share-based compensation expense of $4.9 million, $10.6 million, and $10.1 million, representing 0.5%, 1.3%, and 1.4% of sales, for the years ended December 31, 2018, 2017 and 2016, respectively.

(8) Includes $1.9 million, $11.8 million, and $12.5 million of non-cash interest accretion expense related to the carrying amount of the 2.00% Convertible Senior Subordinated Notes due August 2018 (the "2018 Notes"), representing 0.2%, 1.4%, and 1.7% of sales, for the years ended December 31, 2018, 2017 and 2016, respectively.

(9) Includes $7.2 million and $1.1 million of non-cash interest accretion expense related to the carrying amount of the 1.00% Convertible Senior Subordinated Notes due November 2024 (the "2024 Notes"), representing 0.7% and 0.1% of sales for the years ended December 31, 2018 and 2017, respectively.

(10) During the year ended December 31, 2017, we recorded a $4.9 million loss on extinguishment of debt associated with the repurchase of $192.9 million principal amount of our 2018 Notes and refinance of our senior secured revolving credit facility.

(11) Includes a one-time $22.5 million net favorable tax benefit that was recorded during the fourth quarter of 2017, which resulted from the enactment of the Tax Cuts and Jobs Act. This benefit mainly consisted of a one-time, provisional benefit of $26.9 million related to the remeasurement of certain of our deferred tax liabilities using the lower U.S. federal corporate tax rate of 21%. This was partially offset by (i) a one-time, provisional charge of $8.7 million related to the deemed repatriation transition tax, which is a tax on previously untaxed accumulated earnings and profits of certain of our foreign subsidiaries, and (ii) a one-time tax expense and tax benefit of $4.5 million and $8.7 million, respectively, related to our intent to amend pre-acquisition Hudson U.S. federal tax returns. We have completed our analysis to determine the effect of the Tax Cuts and Jobs Act, and as such, we have recorded an additional tax benefit of $1.8 million.

Consolidated Results for the Years Ended December 31, 2018, 2017 and 2016

The following table includes key metrics used to evaluate our business and measure our performance and represents selected financial data for our operating segments for the years ended December 31, 2018, 2017 and 2016 (dollars in millions). Further detailed information regarding our operating segments is presented in Note 4, “Segment and Geographic Information,” of the consolidated financial statements included elsewhere in this report.

Selected Segment Financial Information

	Year Ended December 31,		
	2018	2017	2016
Sales			
Energy & Chemicals	$390.5	$225.6	$154.3
D&S West	455.5	400.6	378.1
D&S East	246.3	232.3	197.6
Intersegment eliminations	(8.0)	(15.6)	(8.0)
Consolidated	$1,084.3	$842.9	$722.0
Gross Profit			
Energy & Chemicals	$89.2	$45.1	$44.9
D&S West [1]	156.8	141.8	132.5
D&S East	52.4	48.3	34.4
Intersegment eliminations	(2.5)	(3.6)	(2.1)
Consolidated	$295.9	$231.6	$209.7
Gross Profit Margin			
Energy & Chemicals	22.8 %	20.0 %	29.1 %
D&S West	34.4 %	35.4 %	35.0 %
D&S East	21.3 %	20.8 %	17.4 %
Consolidated	27.3 %	27.5 %	29.0 %
SG&A Expenses			
Energy & Chemicals	$48.1	$34.3	$29.4
D&S West	51.0	52.0	51.5
D&S East	31.6	33.0	31.9
Corporate	51.2	61.6	45.9
Consolidated	$181.9	$180.9	$158.7
SG&A Expenses (% of Sales)			
Energy & Chemicals	12.3 %	15.2 %	19.1 %
D&S West	11.2 %	13.0 %	13.6 %
D&S East	12.8 %	14.2 %	16.1 %
Consolidated	16.8 %	21.5 %	22.0 %
Operating Income (Loss) [1] [2] [3]			
Energy & Chemicals	$25.5	$5.1	$13.3
D&S West	101.2	85.2	75.6
D&S East	19.3	14.2	0.3
Corporate [4] [5]	(51.4)	(62.4)	(46.1)
Intersegment eliminations	(2.5)	(3.6)	(2.1)
Consolidated	$92.1	$38.5	$41.0
Operating Margin			
Energy & Chemicals	6.5 %	2.3 %	8.6 %
D&S West	22.2 %	21.3 %	20.0 %
D&S East	7.8 %	6.1 %	0.2 %
Consolidated	8.5 %	4.6 %	5.7 %

(1) Includes an expense of $4.0 million recorded to cost of sales in D&S West related to the estimated costs of the aluminum cryobiological tank recall for the year ended December 31, 2018.

(2) Includes restructuring costs of:

- $4.4 million for the year ended December 31, 2018 ($0.7 million – E&C, $1.4 million D&S East, and $2.3 million – Corporate),
- $11.2 million for the year ended December 31, 2017 ($2.4 million – E&C, $1.1 million – D&S West, $1.7 million D&S East, and $6.0 million – Corporate), and

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• $9.5 million for the year ended December 31, 2016 ($1.0 million – E&C, $3.5 million – D&S West, $0.8 million D&S East, and $4.2 million – Corporate).

(3) Includes transaction-related costs of $2.1 million in Corporate for the year ended December 31, 2018, which were mainly related to the VRV acquisition. Includes integration costs of $0.8 million in Corporate related to the VRV acquisition for the year ended December 31, 2018.

(4) Includes transaction-related costs in Corporate of $10.1 million and $0.4 million for the years ended December 31, 2017 and 2016, respectively.

(5) During the year ended December 31, 2018, we recorded net severance costs of $2.3 million in Corporate primarily related to headcount reductions associated with the strategic realignment of our segment structure, which includes $1.8 million in payroll severance costs partially offset by a $0.9 million credit due to related share-based compensation forfeitures for 2018. Includes net severance costs of $1.4 million in Corporate related to the departure of our former CEO, which includes $3.2 million in payroll severance costs partially offset by a $1.8 million credit due to related share-based compensation forfeitures for 2018.

Results of Operations for the Years Ended December 31, 2018 and 2017

Sales in 2018 increased by $241.4 million or 28.6% compared to 2017. Driving the sales growth were positive trends in the E&C segment, especially in our air cooled heat exchangers product offering, as well as stronger sales in D&S West. Sales for Hudson, included in the E&C segment results since the September 20, 2017 acquisition date, were $180.3 million and $58.0 million for the years ended December 31, 2018 and 2017, respectively. Sales for VRV, included in both the E&C and D&S East segment results since the November 15, 2018 acquisition date, were $14.1 million for the year ended December 31, 2018.

Gross profit increased while the related margin decreased slightly during 2018 compared to 2017. Excluding gross profit added from the Hudson acquisition (2018: $49.5 million, 2017: $15.4 million) and the VRV acquisition (2018: $1.0 million), gross profit increased organically by $29.2 million as a result of higher volume in our D&S West and D&S East segments and project mix in our E&C segment. Gross margin as a percent of sales of 27.3% for 2018 was impacted by an expense of $4.0 million recorded to cost of sales related to the estimated costs of the aluminum cryobiological tank recall for 2018, which negatively impacted consolidated gross margin as a percent of consolidated sales by 0.4 percentage points.

Restructuring costs of $4.4 million for 2018 were recorded in cost of sales ($0.8 million) and SG&A ($3.6 million), which were related to certain cost reduction or avoidance actions, primarily related to departmental restructuring, including our strategic realignment of our segment structure, and including headcount reductions resulting in associated severance costs. Restructuring costs of $11.2 million for 2017 were recorded in cost of sales ($2.7 million) and SG&A ($8.5 million), which were related to costs to relocate the corporate office from Garfield Heights, Ohio to Ball Ground, Georgia and consolidation of certain facilities in China.

Interest Expense, Net and Financing Costs Amortization

Net interest expense for 2018 and 2017 was $21.4 million and $17.3 million, respectively. Interest expense for 2018 included $1.0 million of 2.0% cash interest and $1.9 million of non-cash interest accretion expense related to the carrying value of the 2018 Notes and $2.6 million of 1.0% cash interest and $7.2 million of non-cash interest accretion expense related to the carrying value of the 2024 Notes. Interest expense also included $11.8 million and $2.7 million in interest related to borrowings on our senior secured revolving credit facility for 2018 and 2017, respectively. For 2018 and 2017, financing costs amortization was $1.3 million for both periods.

Foreign Currency (Gain) Loss

For 2018 foreign currency gains were $0.4 million. We recorded foreign currency losses of $3.9 million for 2017. Gains increased by $3.5 million during 2018 due to exchange rate volatility, especially with respect to the euro and Chinese yuan.

Income Tax Expense (Benefit)

Income tax expense for 2018 was $13.4 million compared to income tax benefit of $16.6 million for 2017 and represents taxes on both U.S. and foreign earnings at a combined effective income tax rate of 19.4% and (149.5)%, respectively. The effective income tax rate of 19.4% for 2018 differed from the U.S. federal statutory rate of 21%

primarily due to tax benefits related to certain share-based compensation, partially offset by the effect of income earned by certain of our foreign entities being taxed at higher rates than the federal statutory rate as well as losses incurred by certain of our Chinese operations for which no benefit was recorded.

Income tax benefit in 2017 was mainly driven by a one-time $22.5 million net favorable tax benefit that was recorded during the fourth quarter of 2017, which resulted from the enactment of the Tax Cuts and Jobs Act. This benefit mainly consisted of a one-time, provisional benefit of $26.9 million related to the remeasurement of certain of our deferred tax liabilities using the lower U.S. federal corporate tax rate of 21%. This was partially offset by (i) a one-time, provisional charge of $8.7 million related to the deemed repatriation transition tax, which is a tax on previously untaxed accumulated earnings and profits of certain of our foreign subsidiaries, and (ii) a one-time tax expense and tax benefit of $4.5 million and $8.7 million, respectively, related to our intent to amend pre-acquisition Hudson U.S. federal tax returns. The 2017 effective income tax rate was also impacted by transaction costs incurred with the acquisition of Hudson, a portion of which were non-deductible for U.S. federal income tax purposes. We have completed our analysis to determine the effect of the Tax Cuts and Jobs Act, and as such, we have recorded an additional tax benefit of $1.8 million.

Net Income from Continuing Operations

As a result of the foregoing, net income from continuing operations attributable to Chart was $53.6 million and $26.2 million for 2018 and 2017, respectively.

Discontinued Operations

The results from our oxygen-related products business formerly reported in our BioMedical segment, prior to the strategic realignment in the third quarter of 2018, discussed further in Note 4, “Segment and Geographic Information”, are reflected in our consolidated financial statements as discontinued operations for all periods presented. For further information, refer to Note 3, “Discontinued Operations.”

Results of Operations for the Years Ended December 31, 2017 and 2016

Sales in 2017 increased compared to 2016 by $120.9 million or 16.7%, with increases in all of our segments. Sales for Hudson, included in the E&C segment results since the September 20, 2017 acquisition date were $58.0 million for 2017, and incremental sales for Lifecycle were $44.6 million, which includes the Hetsco acquisition. D&S East sales increased by $34.7 million during 2017 primarily due to increased sales in LNG and bulk industrial gas applications. D&S West sales increased by $22.5 million during 2017 primarily due to increased sales in packaged industrial gas applications.

Gross profit increased $21.9 million, while the related margin decreased from 29.0% to 27.5% during 2017 compared to 2016. The decrease was primarily due to several high margin short-lead time replacement equipment sales and contract expiration fees in our E&C segment that did not recur in 2017. The increase in gross profit was primarily a result of the $15.4 million in incremental gross profit added from the Hudson acquisition within our E&C segment. Gross profit further increased as a result of higher volume in our D&S East and D&S West segments.

SG&A expenses for 2017 were $180.9 million, or 21.5% of sales, compared to $158.7 million, or 22.0% of sales, for 2016, representing an increase of $22.2 million. The increase in SG&A expenses is due to Hudson and Lifecycle incremental expenses of $5.7 million and $2.5 million, respectively. Additionally, Corporate incurred $10.1 million in transaction-related costs. Restructuring expenses classified as SG&A expenses increased $2.5 million over 2016 as further discussed below.

Restructuring costs of $11.2 million in 2017 were recorded in cost of sales ($2.7 million) and SG&A ($8.5 million), which were related to costs to relocate the corporate office from Garfield Heights, Ohio to Ball Ground, Georgia and consolidation of certain facilities in China. Restructuring costs of $9.5 million in 2016 were recorded in cost of sales ($3.5 million) and SG&A ($6.0 million).

Interest Expense, Net and Financing Costs Amortization

Net interest expense for 2017 and 2016 was $17.3 million and $15.1 million, respectively. Interest expense for 2017 included $4.3 million of 2.0% cash interest and $11.8 million of non-cash interest accretion expense related to the carrying value of the 2018 Notes and $0.4 million of 1.0% cash interest and $1.1 million of non-cash interest accretion expense related to the carrying value of the 2024 Notes. Interest expense also included $2.7 million in interest related to borrowings on our senior secured revolving credit facility 2017. For 2017 and 2016, financing costs amortization was $1.3 million for both periods.

Loss on Extinguishment of Debt

On November 6, 2017, we repurchased $192.9 million principal of our $250.0 million 2018 Notes for total consideration of $195.9 million in cash, which included $1.0 million of accrued interest and $194.9 million for the notes. The amount by which total consideration exceeded the fair value of the 2018 Notes was recorded as a reduction of additional paid-in capital. The loss from early extinguishment of the 2018 Notes and refinance of our senior secured revolving credit facility was $4.9 million in 2017.

Foreign Currency Loss

For 2017 and 2016, foreign currency losses were $3.9 million and $0.5 million, respectively. Losses decreased by $3.4 million during 2017 due to reduced exchange rate volatility, especially with respect to the euro.

Income Tax (Benefit) Expense

Income tax benefit for 2017 was $16.6 million compared to income tax expense of $10.6 million for 2016 and represents taxes on both U.S. and foreign earnings at a combined effective income tax rate of (149.5)% and 44.0%, respectively. The income tax benefit in 2017 was mainly driven by a one-time $22.5 million net favorable tax benefit that was recorded during the fourth quarter of 2017, which resulted from the enactment of the Tax Cuts and Jobs Act. This benefit mainly consisted of a one-time, provisional benefit of $26.9 million related to the remeasurement of certain of our deferred tax liabilities using the lower U.S. federal corporate tax rate of 21%. This was partially offset by (i) a one-time, provisional charge of $8.7 million related to the deemed repatriation transition tax, which is a tax on previously untaxed accumulated earnings and profits of certain of our foreign subsidiaries, and (ii) a one-time tax expense and tax benefit of $4.5 million and $8.7 million, respectively, related to our intent to amend pre-acquisition Hudson U.S. federal tax returns. The effective income tax rate of 44.0% in 2016 differed from the federal corporate tax rate of 35% primarily due to valuation allowances recorded against current and accumulated operating losses incurred by certain of our foreign operations (primarily China) for which no benefit was recorded.

Net Income from Continuing Operations

As a result of the foregoing, net income from continuing operations attributable to Chart was $26.2 million and $17.0 million for 2017 and 2016, respectively.

Segment Results for the Years Ended December 31, 2018, 2017 and 2016

Our reportable and operational segments include: E&C, D&S West and D&S East. Corporate includes operating expenses for executive management, accounting, tax, treasury, corporate development, human resources, information technology, investor relations, legal, internal audit, and risk management. Corporate support functions are not currently allocated to the segments. For further information, refer to Note 4, “Segment and Geographic Information.” of our consolidated financial statements included elsewhere in this report. The following tables include key metrics used to evaluate our business and measure our performance and represents selected financial data for our operating segments for the Years ended December 31, 2018, 2017 and 2016 (dollars in millions):

Energy & Chemicals

Results of Operations for the Years Ended December 31, 2018 and 2017

	Year Ended December 31,		2018 vs. 2017	
	2018	2017	Variance ($)	Variance (%)
Sales	$390.5	$225.6	$164.9	73.1 %
Gross Profit	89.2	45.1	44.1	97.8 %
Gross Profit Margin	22.8 %	20.0 %		
SG&A Expenses	$48.1	$34.3	$13.8	40.2 %
SG&A Expenses (% of Sales)	12.3 %	15.2 %		
Operating Income	$25.5	$5.1	$20.4	400.0 %
Operating Margin	6.5 %	2.3 %		

For the year 2018, E&C segment sales increased as compared to 2017. Sales for Hudson, included in the E&C segment results since the September 20, 2017 acquisition date were $180.3 million and $58.0 million for 2018 and 2017, respectively. Sales for VRV, included in E&C segment results since the November 15, 2018 acquisition date, were $3.8 million for the year ended December 31, 2018. Excluding the impact from Hudson and VRV, sales increased by $38.8 million, which was driven primarily by growth in air cooled heat exchangers within NGL and petrochemical applications.

Excluding the impact of the VRV and Hudson acquisitions, E&C segment gross profit increased by $11.0 million during 2018 as compared to 2017, mainly due to improved productivity driven by increased sales volume in NGL and petrochemical applications. The related margin increased 2.8 percentage points (2.0 percentage points organically), primarily due to an increase in high margin short lead-time replacement equipment.

E&C segment SG&A expenses increased during 2018 as compared to 2017 primarily driven by the Hudson acquisition, which added $12.8 million in incremental SG&A expenses during the year (2018: $18.5 million, 2017: $5.7 million). SG&A expenses for VRV were $0.7 million in 2018. Excluding the impact of the VRV and Hudson acquisitions, SG&A expenses increased by $0.3 million during 2018.

Results of Operations for the Years Ended December 31, 2017 and 2016

	Year Ended December 31,		2017 vs. 2016	
	2017	2016	Variance ($)	Variance (%)
Sales	$225.6	$154.3	$71.3	46.2 %
Gross Profit	45.1	44.9	0.2	0.4 %
Gross Profit Margin	20.0 %	29.1 %		
SG&A Expenses	$34.3	$29.4	$4.9	16.7 %
SG&A Expenses (% of Sales)	15.2 %	19.1 %		
Operating Income	$5.1	$13.3	$(8.2)	(61.7)%
Operating Margin	2.3 %	8.6 %		

During 2017, E&C segment sales increased as compared to 2016. The increase was primarily driven by increases in U.S. shale and associated gas, which drove natural gas processing plant activity throughout 2017, the Hudson acquisition, which added $58.0 million of sales in 2017, and incremental sales increases in our Lifecycle business of $44.6 million, which included the Hetsco acquisition.

E&C gross profit increased slightly while the related margin decreased during 2017 as compared to 2016. The increase in gross profit was primarily driven by Hudson and growth in Lifecycle which added incremental gross profit of $15.4 million and $5.2 million, respectively, during 2017. Included in 2016 were several short lead-time orders and contract expiration fees which contributed approximately $38.7 million of gross profit in 2016 and improved the gross margin by 25.1 percentage points for the year.

E&C segment SG&A expenses increased mainly as a result of the Hudson acquisition which added $5.7 million to SG&A expenses during 2017 and incremental SG&A expenses from Lifecycle of $2.5 million during 2017.

D&S West

Results of Operations for the Years Ended December 31, 2018 and 2017

	Year Ended December 31,		2018 vs. 2017	
	2018	2017	Variance ($)	Variance (%)
Sales	$455.5	$400.6	$54.9	13.7 %
Gross Profit	156.8	141.8	15.0	10.6 %
Gross Profit Margin	34.4 %	35.4 %		
SG&A Expenses	$51.0	$52.0	$(1.0)	(1.9)%
SG&A Expenses (% of Sales)	11.2 %	13.0 %		
Operating Income	$101.2	$85.2	$16.0	18.8 %
Operating Margin	22.2 %	21.3 %		

D&S West segment sales increased during the full year 2018 as compared to 2017 primarily due to an increase in sales within packaged gas industrial applications. As previously discussed, cryobiological storage is now included in the D&S West segment.

D&S West segment gross profit increased during the full year 2018 as compared to 2017 mainly driven by higher volume in both packaged gas industrial applications and cryobiological storage. The 2018 year-to-date gross margin percentage was negatively impacted 0.9 percentage points due to the estimated costs of the aluminum cryobiological tank recall of $4.0 million recorded in cost of sales during 2018.

D&S West segment SG&A expenses decreased during the full year 2018 as compared to 2017 mainly due to cost based saving measures taken during the period as well as share-based compensation forfeiture credits related to the strategic realignment of our segment structure. All severance costs related to the strategic realignment of our segment structure were recorded in restructuring within SG&A at Corporate. Additionally, the full year of 2017 included a reduction in a contingent consideration liability associated with a prior acquisition, which partially offset the decrease in D&S West segment SG&A expenses.

Results of Operations for the Years Ended December 31, 2017 and 2016

	Year Ended December 31,		2017 vs. 2016	
	2017	2016	Variance ($)	Variance (%)
Sales	$400.6	$378.1	$22.5	6.0 %
Gross Profit	141.8	132.5	9.3	7.0 %
Gross Profit Margin	35.4 %	35.0 %		
SG&A Expenses	$52.0	$51.5	$0.5	1.0 %
SG&A Expenses (% of Sales)	13.0 %	13.6 %		
Operating Income	$85.2	$75.6	$9.6	12.7 %
Operating Margin	21.3 %	20.0 %		

D&S West segment sales increased during 2017 as compared to 2016 by $22.5 million mainly attributable to higher sales within liquefied natural gas applications and packaged gas industrial applications and cryobiological storage, partially offset by lower sales within bulk industrial gas applications.

D&S West segment gross profit increased during 2017 as compared to 2016 mainly driven by higher volume in packaged gas industrial applications. The related margin increased mainly due to improved product mix.

D&S West segment SG&A expenses increased during the full year 2017 as compared to 2016 by $0.5 million due to higher employee-related costs.

D&S East

Results of Operations for the Years Ended December 31, 2018 and 2017

	Year Ended December 31,		2018 vs. 2017	
	2018	2017	Variance ($)	Variance (%)
Sales	$246.3	$232.3	$14.0	6.0 %
Gross Profit	52.4	48.3	4.1	8.5 %
Gross Profit Margin	21.3 %	20.8 %		
SG&A Expenses	$31.6	$33.0	$(1.4)	(4.2)%
SG&A Expenses (% of Sales)	12.8 %	14.2 %		
Operating Income	$19.3	$14.2	$5.1	35.9 %
Operating Margin	7.8 %	6.1 %		

During 2018, D&S East segment sales increased $14.0 million compared to 2017, which was primarily driven by the inclusion of VRV sales of $10.3 million for the six weeks of ownership, and the remaining increase driven by strength across all product applications.

During the full year 2018, D&S East segment gross profit increased $4.1 million as compared to 2017 primarily due to the increase in volume, and the related margin increased mainly due to favorable product mix, primarily in China, which was operating income positive for the first time since 2014.

D&S East segment SG&A expenses decreased during the year 2018 as compared to 2017 by $1.4 million primarily due to the inclusion of additional commissions expense as a result of a litigation award in China, which are reflected in 2017 results.

Results of Operations for the Years Ended December 31, 2017 and 2016

	Year Ended December 31,		2017 vs. 2016	
	2017	2016	Variance ($)	Variance (%)
Sales	$232.3	$197.6	$34.7	17.6 %
Gross Profit	48.3	34.4	13.9	40.4 %
Gross Profit Margin	20.8 %	17.4 %		
SG&A Expenses	$33.0	$31.9	$1.1	3.4 %
SG&A Expenses (% of Sales)	14.2 %	16.1 %		
Operating Income	$14.2	$0.3	$13.9	4,633.3 %
Operating Margin	6.1 %	0.2 %		

For the full year 2017, D&S East segment sales increased as compared to 2016, which was primarily driven by lower sales related to liquefied natural gas applications sales in Europe partially offset by increased sales in bulk industrial gas applications and vehicle tanks.

During the full year 2017, D&S East segment gross profit and the related margin percentage increased as compared to 2016 mainly due to higher volume, and the related margin increased, especially in China, primarily due to improved execution.

D&S East segment SG&A expenses during the full year 2017, increased by $1.1 million as compared to 2016 primarily due to additional commissions expense as a result of a litigation award in China in 2017 partially offset by lower bad debt expense in 2017 driven by successful accounts receivable collection activities in China.

Corporate

Corporate SG&A expenses decreased by $10.4 million during 2018 as compared 2017 primarily due to prior restructuring activities and lower transaction-related costs. Corporate SG&A expenses in 2018 included transaction-related costs of $2.1 million for the year ended December 31, 2018, which were mainly related to the VRV acquisition. This compares favorably to transaction-related costs of $10.1 million in 2017 driven by the Hudson acquisition. The overall decrease in Corporate SG&A expenses was also driven by a $5.7 million decrease in share-based compensation expense. Share-based compensation expense included the acceleration of expense based on retirement eligibility provisions as a greater mix of share-based awards satisfied these provisions during 2017 as compared to 2018. Furthermore, we incurred net severance costs of $1.4 million related to the departure of our former CEO, which includes $3.2 million in payroll severance costs partially offset by a $1.8 million credit due to related share-based compensation forfeitures for 2018.

Corporate SG&A expenses increased by $15.7 million during 2017 as compared 2016 primarily due to $10.1 million in transaction-related costs, and $6.0 million in corporate restructuring costs in 2017 compared to $4.2 million in 2016 attributable to the relocation of our corporate offices to Ball Ground, Georgia.

Orders and Backlog

We consider orders to be those for which we have received a firm signed purchase order or other written contractual commitment from the customer. Backlog is comprised of the portion of firm signed purchase orders or other written contractual commitments from customers for which work has not been performed, or is partially completed, that we have not recognized as revenue and excludes unexercised contract options and potential orders. Backlog can be significantly affected by the timing of orders for large projects, particularly in the E&C segment, and is not necessarily indicative of future backlog levels or the rate at which backlog will be recognized as sales. Orders included in our backlog may include customary cancellation provisions under which the customer could cancel part or all of the order, potentially subject to the payment of certain costs and/or fees. Backlog may be negatively impacted by the ability or likelihood of customers to fulfill their obligations. Our backlog as of December 31, 2018, 2017 and 2016 was $568.2 million, $446.4 million and $326.2 million, respectively.

The tables below represent orders received and backlog by segment for the periods indicated (dollar amounts in millions):

	Year Ended December 31,		
	2018	2017	2016
Orders			
Energy & Chemicals	$388.0	$243.6	$110.2
D&S West	477.4	407.1	374.3
D&S East	277.0	210.8	223.9
Consolidated	$1,142.4	$861.5	$708.4

	As of December 31,		
	2018	2017	2016
Backlog			
Energy & Chemicals	$253.0	$210.9	$99.8
D&S West	129.8	118.6	114.2
D&S East	185.4	116.9	112.2
Consolidated	$568.2	$446.4	$326.2

Orders and Backlog for the Year Ended and As of December 31, 2018 Compared to the Year Ended and As of December 31, 2017

Orders for 2018 were $1,142.4 million compared to $861.5 million for 2017, representing an increase of $280.9 million, or 32.6% (11.7% organically), and set multiple annual order records. Consolidated orders include $11.2 million in orders related to VRV (E&C: $2.5 million, D&S East: $8.7 million) for the year ended December 31, 2018. Consolidated backlog includes $81.6 million in backlog related to VRV (E&C: $39.3 million, D&S East: $42.3 million) as of December 31, 2018.

E&C segment orders for 2018 were $388.0 million compared to $243.6 million for 2017, an increase of $144.4 million. E&C segment orders includes $203.7 million and $31.3 million in orders related to Hudson for the years ended December 31, 2018 and 2017, respectively, as well as orders related to VRV for 2018 as discussed above. Included in 2018 orders was a $28 million order for our Hudson Products air cooled heat exchangers on a large LNG project, as well as a $13 million order for equipment for a natural gas liquids fractionation project. These orders shipped partially in 2018, and the remainder will ship in 2019. Excluding Hudson and VRV, E&C orders decreased by $30.5 million, which was primarily driven by the inclusion of large equipment orders within our Systems business and Lifecycle Services work for a large plant, which were reflected in 2017 E&C segment orders. Order flow in the E&C segment is historically volatile due to project size and it is not unusual to see order intake change significantly year over year.

E&C segment backlog totaled $253.0 million at December 31, 2018, compared to $210.9 million as of December 31, 2017, an increase of $42.1 million. E&C segment backlog as of December 31, 2018 and December 31, 2017 includes $89.0 million and $65.8 million related to Hudson, respectively. E&C segment backlog as of December 31, 2018 also includes backlog related to VRV as discussed above. Also included in the E&C segment backlog is approximately $40 million related to the previously announced Magnolia LNG order where production release is delayed into late 2019.

D&S West segment orders for 2018 were $477.4 million compared to $407.1 million for 2017, an increase of $70.3 million. The increase in D&S West segment orders over the prior year was driven by increases across all product applications, especially LNG vehicle tanks within packaged gas industrial applications. D&S West segment backlog totaled $129.8 million at December 31, 2018 compared to $118.6 million as of December 31, 2017, an increase of $11.2 million.

D&S East segment orders for 2018 were $277.0 million compared to $210.8 million for 2017, an increase of $66.2 million, and includes orders for 2018 related to VRV as discussed above. The increase in D&S East segment orders over the prior year was mainly driven by increases in bulk standard tanks within bulk industrial gas applications and cryogenic trailers, primarily in Europe as demand for LNG fueling stations in Europe is increasing and key customers continue to order LNG fuel systems for over the road trucking. Orders also increased in Asia, especially engineered tanks within bulk industrial gas applications. D&S East segment backlog totaled $185.4 million at December 31, 2018, compared to $116.9 million as of December 31, 2017, an increase of $68.5 million. D&S East segment backlog as of December 31, 2018 also includes backlog related to VRV as discussed above.

Orders and Backlog for the Year Ended and As of December 31, 2017 Compared to the Year Ended and As of December 31, 2016

Orders for 2017 were $861.5 million compared to $708.4 million for 2016, representing an increase of $153.1 million, or 21.6%.

E&C segment orders for 2017 were $243.6 million compared to $110.2 million for 2016, an increase of $133.4 million. E&C segment backlog totaled $210.9 million at December 31, 2017, compared to $99.8 million as of December 31, 2016, an increase of $111.1 million. The increases in orders and backlog were impacted by the inclusion of Hudson since we acquired them on September 20, 2017, the results include $31.3 million of Hudson orders in 2017 and $65.8 million of Hudson backlog. Even considering the impact of Hudson, both E&C's orders and backlog have increased as natural gas demand, from Petrochemical and LNG export projects drove new gas transmission pipelines creating further opportunities for Chart's projects. Included in the E&C segment backlog is approximately $40 million related to the previously announced Magnolia LNG order where production release is delayed into early 2019.

D&S West segment orders for 2017 were $407.1 million compared to $374.3 million for 2016, an increase of $32.8 million, or 8.8%. D&S West segment backlog totaled $118.6 million at December 31, 2017 compared to $114.2 million as of December 31, 2016. The increase in D&S West segment orders and backlog was primarily attributable to packaged gas applications and cryobiological storage.

D&S East segment orders for 2017 were $210.8 million compared to $223.9 million for 2016, a decrease of $13.1 million or 5.9%. The decrease in D&S East segment orders was primarily attributable to LNG applications partially offset by an increase in bulk industrial gas applications. D&S East segment backlog totaled $116.9 million at December 31, 2017, compared to $112.2 million as of December 31, 2016.

Liquidity and Capital Resources

Debt Instruments and Related Covenants

2024 Notes: On November 6, 2017, we issued 1.00% Convertible Senior Subordinated Notes due 2024 (the "2024 Notes"), the outstanding aggregate principal amount of such notes being $258.8 million at December 31, 2018. The 2024 Notes bear interest at a fixed rate of 1.0% per year, payable semiannually in arrears on May 15 and November 15 of each year, and will mature on November 15, 2024, unless converted or repurchased. The effective interest rate at issuance, under generally accepted accounting principles, was 4.8%. Upon conversion, it is our intention to settle the principal amount of the 2024 Notes in cash and excess conversion value in shares of our common stock. The initial conversion price of $58.725 per share represents a conversion premium of 35% over the last reported sale price of our common stock on October 31, 2017, the date of the 2024 Notes offering, which was $43.50 per share. The 2024 Notes are classified as long-term liabilities at December 31, 2018. At the end of the fourth quarter of 2018, events for early conversion were not met; and thus, the 2024 Notes were not convertible as of, and for the fiscal quarter beginning January 1, 2019. There have been no conversions as of the date of this filing. In the event that holders of 2024 Notes elect to convert, we expect to fund any cash settlement of any such conversion from cash balances or borrowings under our senior secured revolving credit facility. As discussed in Note 9, "Debt and Credit Arrangements," of our consolidated financial statements located elsewhere in this report, we entered into privately-negotiated convertible note hedge transactions related to the 2024 Notes, which are expected to reduce the potential dilution upon any future conversion of the 2024 Notes.

2018 Notes: On August 1, 2018, our 2.00% Convertible Senior Subordinated Notes due August 2018 (the "2018 Notes") matured. The aggregate outstanding principal was $57.1 million at August 1, 2018, and during the year ended December 31, 2018, we settled upon maturity the 2018 Notes for total cash consideration of $57.1 million.

Senior Secured Revolving Credit Facility: On October 26, 2018, we amended our five-year senior secured revolving credit facility (the "SSRCF"), which matures on November 3, 2022, to among other things, increase the size of the facility from $450.0 million to $550.0 million. As so amended, the SSRCF includes a $25.0 million sub-limit for the issuance of swingline loans and a $100.0 million base sub-limit along with a $100.0 million discretionary sub-limit to be used for letters of credit. There is a foreign currency limit of $250.0 million under the SSRCF which can be used for foreign currency denominated letters of credit and borrowings in a foreign currency, in each case in currencies agreed upon with the lenders. In addition, the facility permits borrowings up to a $250.0 million sub-limit to be made by our wholly-owned subsidiaries, Chart Industries Luxembourg S.à r.l. ("Chart Luxembourg") and Chart Asia Investment Company Limited ("Chart Asia"). The SSRCF also includes an expansion option permitting us to add up to an aggregate $225.0 million in term loans or revolving credit commitments from its lenders. Loans under the SSRCF bear interest at either (a) the Adjusted Base Rate, or (b) the Adjusted LIBOR (each as discussed in Note 9, "Debt and Credit Arrangements," of our consolidated financial statements located elsewhere in this report), plus, in each case, a margin that varies with our leverage ratio. Significant financial covenants for the SSRCF include a leverage ratio and an interest coverage ratio. At December 31, 2018, there were $329.3 million in borrowings outstanding under the SSRCF, bearing interest at 4.1% on a weighted-average basis and $47.6 million in letters of credit and bank guarantees supported by the SSRCF. At December 31, 2018 the SSRCF had availability of $173.1 million. We were in compliance with all covenants, including its financial covenants, at December 31, 2018.

Foreign Facilities – China: Chart Cryogenic Engineering Systems (Changzhou) Company Limited ("CCESC"), a wholly-owned subsidiary of the Company, CAIRE Medical Technology (Chengdu) Co., Ltd. (formerly known as Chart BioMedical (Chengdu) Co., Ltd., a wholly-owned subsidiary of the Company, and Chart Cryogenic Distribution Equipment (Changzhou) Company Limited ("CCDEC"), a joint venture of Company, maintain joint banking facilities (the "China Facilities") which include a revolving facility with 50.0 million Chinese yuan (equivalent to $7.3 million) in borrowing capacity which can be utilized for either revolving loans, bonds/guarantees, or bank draft acceptances. Any borrowings made by CCESC, CCDEC or Chengdu under the China Facilities are guaranteed by Company. At December 31, 2018, there were 33.5 million Chinese yuan (equivalent to $4.9 million) outstanding under this facility bearing interest at 5.00%.

Chart Cryogenic Distribution Equipment (Changzhou) Company Limited ("CCDEC"), a joint venture of Company maintained an unsecured credit facility whereby CCDEC was able to borrow up to 70.0 million Chinese yuan (equivalent to $10.2 million) for working capital purposes. This facility is effective until August 28, 2019. There were no borrowings under this facility during its term.

CCESC has a term loan that is secured by certain CCESC land use rights and allows for up to 86.6 million Chinese yuan (equivalent to $12.6 million) in borrowings. The loan has a term of eight years with semi-annual installment payments of at least 10.0 million Chinese yuan and a final maturity date of May 26, 2024. At December 31, 2018, there was 6.6 million Chinese yuan (equivalent to $1.0 million) outstanding on this loan, bearing interest at 5.39%.

CCESC and CCDEC, together, had a combined total of 13.0 million Chinese yuan (equivalent to $1.9 million), in bank guarantees at December 31, 2018 under the China Facilities, unsecured credit facility and term loan discussed above.

Foreign Facilities – India: VRV Asia Pacific Private Limited, a wholly-owned subsidiary of the Company, maintains a secured credit facility with capacity of up to 600.0 million Indian rupees (equivalent to $8.6 million), which can be utilized for overdraft facilities, working capital demand loans, bank guarantees, letters of credit, or export packing credits. At December 31, 2018, there was 368.9 million Indian rupees (equivalent to $5.3 million) outstanding as overdraft facilities, working capital demand loans, and export packing credits bearing interest at 8.24%. At December

31, 2018, there was 144.0 million Indian rupees (equivalent to $2.1 million) outstanding as letters of credit and bank guarantees which are not subject to interest charges.

Foreign Facilities – Europe: Chart Ferox, a.s. ("Ferox"), a wholly-owned subsidiary of the Company, maintains a secured credit facility with capacity of up to 135.0 million Czech koruna (equivalent to $6.0 million) and two secured credit facilities with capacity of up to 7.0 million euros (equivalent to $8.0 million). All three facilities (the "Ferox Credit Facilities") allow Ferox to request bank guarantees and letters of credit. None of these facilities allow revolving credit borrowings. Under two of the facilities, Ferox must pay letter of credit and guarantee fees equal to 0.70% per annum on the face amount of each guarantee or letter of credit, and under one facility, Ferox must pay the letter of credit and guarantee fees equal to 0.50%. Ferox's land, buildings, and

cash collateral secure the credit facilities. At December 31, 2018, there were bank guarantees of 166.3 million Czech koruna (equivalent to $7.4 million) supported by the Ferox Credit Facilities.
Chart Luxembourg maintains an overdraft facility with $5.0 million in borrowing capacity. There were no borrowings under the Chart Luxembourg facility as of December 31, 2018.
Our debt and related covenants are further described in Note 9, “Debt and Credit Arrangements,” of our consolidated financial statements included elsewhere in this report.
Sources and Uses of Cash
Our cash and cash equivalents totaled $118.1 million as of December 31, 2018, a decrease of $4.5 million from the balance at December 31, 2017. Our foreign subsidiaries held cash of approximately $71.4 million and $110.5 million at December 31, 2018 and December 31, 2017, respectively, to meet their liquidity needs. No material restrictions exist to accessing cash held by our foreign subsidiaries. We expect to meet our U.S. funding needs without repatriating non-U.S. cash and incurring incremental U.S. taxes. Cash equivalents are primarily invested in money market funds that invest in high quality, short-term instruments, such as U.S. government obligations, certificates of deposit, repurchase obligations, and commercial paper issued by corporations that have been highly rated by at least one nationally recognized rating organization, and in the case of cash equivalents in China, obligations of local banks.
We believe that our existing cash and cash equivalents, funds available under our SSRCF or other financing alternatives, and cash provided by operations will be sufficient to meet our normal working capital needs and investments in properties, facilities, and equipment for the foreseeable future.
Years Ended December 31, 2018 and 2017
Cash provided by operating activities during 2018 was $119.0 million, an increase of $74.7 million from 2017, largely due to higher net income.
Cash used in investing activities was $260.6 million and $477.8 million during 2018 and 2017, respectively. During 2018, we used $225.8 million of cash for the VRV and Skaff acquisitions (euro 188.7 million or $213.3 million equivalent and $12.5, respectively) and $35.6 million for capital expenditures mainly related to the capacity expansion of the brazed aluminum heat exchanger facility in La Crosse, Wisconsin and the capacity increase in Ball Ground, Georgia, to support demand for LNG vehicle tanks. See below for discussion regarding the composition of cash used in investing activities during 2017.
Cash provided by financing activities during 2018 and 2017 was $38.2 million and $275.2 million, respectively. During 2018, we borrowed $405.4 million on our SSRCF (euro 140.0 million or $160.3 million equivalent plus $245.1 million) mainly to fund the VRV and Skaff acquisitions, the settlement of the 2018 Notes and working capital needs. We repaid $315.1 million in SSRCF borrowings during 2018 (euro 55.0 million $63.0 million equivalent plus $252.1 million). We also borrowed 40.0 million Chinese yuan (equivalent to $6.3 million) and repaid 11.5 million Chinese yuan (equivalent to $1.7 million) on certain of our China facilities. We repaid 40.0 million Chinese yuan (equivalent to $5.9 million) on the CCESC term loan. We received $10.8 million in proceeds from stock option exercises and used $2.7 million for the purchase of common stock which was surrendered to cover tax withholding elections during 2018. See below for discussion regarding the composition of cash provided by financing activities during 2017.
Years Ended December 31, 2017 and 2016
Cash provided by operating activities during 2017 was $44.3 million, a decrease of $125.0 million from 2016, largely due to increases in working capital, due to higher accounts receivables and inventory, driven by higher sales and increases in operations. Cash provided by operating activities during 2016 was $169.3 million, largely due to improvements in working capital, including greater cash collections during 2016, and reductions in inventory. Also, 2016 cash flows reflect the $16.7 million receipt of the representation and warranty insurance recovery proceeds.
Cash used in investing activities was $477.8 million and $17.0 million during 2017 and 2016, respectively. During 2017, we used $446.1 million of cash for the Hudson, Hetsco and VCT acquisitions ($419.5 million, $23.2 million and $3.4 million, respectively) and $33.0 million for capital expenditures, partially offset by $1.3 million of cash provided by the sale of assets and government grants. Cash used in investing activities in 2016 was primarily for capital expenditures.

Cash provided by financing activities during 2017 and 2016 was $275.2 million and $7.7 million, respectively. During 2017 we borrowed $236.1 million (net of repayments) from our revolving credit facilities. We received proceeds from the issuance of convertible notes and warrants of $304.8 million of which $194.9 million was used to repay a portion of the previously issued 2018 Notes and $59.5 million to purchase a bond hedge related to the 2024 Notes. We also made $8.2 million in payments for debt issuance costs related to the 2024 Notes and SSRCF. Also during 2017, we received $2.0 million in proceeds from stock option exercises, and we used $2.0 million for the purchase of common stock which was surrendered to cover tax withholdings during 2017. During 2016, we borrowed 111.6 million Chinese yuan (equivalent to $17.0 million) and repaid 60.0 million Chinese yuan (equivalent to $9.0 million) on our China Facilities. Also during 2016, we received $0.4 million in proceeds from stock option exercises, and we used $0.7 million for the purchase of common stock which was surrendered to cover tax withholdings during 2016.

Inventories, net

Our inventories, net, balance was $233.1 million at December 31, 2018 compared to $173.7 million at December 31, 2017, representing an increase of $59.4 million. The VRV acquisition added $49.0 million to our inventories, net balance at December 31, 2018. The VRV acquisition is further described in Note 12, “Business Combinations,” to our consolidated financial statements included elsewhere in this report.

Cash Requirements

We do not currently anticipate any unusual cash requirements for working capital needs for the year ending December 31, 2019. Management anticipates we will be able to satisfy cash requirements for our ongoing business for the foreseeable future with cash generated by operations, existing cash balances and available borrowings under our credit facilities. We expect capital expenditures for 2019 to be in the range of $35.0 million to $40.0 million.

Contractual Obligations

Our known contractual obligations as of December 31, 2018 and cash requirements resulting from those obligations are as follows (all dollar amounts in millions):

	Payments Due by Period				
	Total	Less Than 1 Year	1 – 3 Years	3 – 5 Years	More Than 5 Years
Gross debt [(1)]	$599.3	$11.2	$—	$329.3	$258.8
Contractual convertible notes interest	15.6	5.2	5.2	5.2	—
Operating leases	39.6	7.9	12.6	9.9	9.2
Pension obligations [(2)]	6.0	0.4	2.3	3.3	—
Tax Cuts and Jobs Act tax liability	2.2	0.3	0.5	0.5	0.9
Total contractual cash obligations	$662.7	$25.0	$20.6	$348.2	$268.9

(1) The $258.8 million principal balance of the 2024 Notes will mature on November 15, 2024.

(2) The planned funding of the pension obligations is based upon actuarial and management estimates taking into consideration the current status of the plan.

Not included in the table above are contingent consideration arrangements from prior acquisitions with a potential payout range of $0.0 million to $11.3 million.

Our commercial commitments as of December 31, 2018, which include standby letters of credit and bank guarantees, represent potential cash requirements resulting from contingent events that require performance by us or our subsidiaries pursuant to funding commitments, and are as follows (all dollar amounts in millions):

	Total	Expiring in 2019	Expiring in 2020 and beyond
Standby letters of credit	$35.4	$ 10.5	$ 24.9
Bank guarantees	23.6	14.8	8.8
Total commercial commitments	$59.0	$ 25.3	$ 33.7

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements.

Contingencies

We are involved with environmental compliance, investigation, monitoring, and remediation activities at certain of our operating facilities or formerly owned manufacturing facilities and accrue for these activities when commitments or remediation plans have been developed and when costs are probable and can be reasonably estimated. Historical annual cash expenditures for these activities have been charged against the related environmental reserves. Future expenditures relating to these environmental remediation efforts are expected to be made over the next 7 years as ongoing costs of remediation programs. Management believes that any additional liability in excess of amounts accrued, which may result from the resolution of such matters, should not have a material adverse effect on our financial position, liquidity, cash flows or results of operations.

We are occasionally subject to various legal claims related to performance under contracts, product liability, taxes, employment matters, environmental matters, intellectual property, and other matters, several of which claims assert substantial damages, in the ordinary course of our business. Based on our historical experience in litigating these claims, as well as our current assessment of the underlying merits of the claims and applicable insurance, if any, we believe the resolution of these legal claims will not have a material adverse effect on our financial position, liquidity, cash flows or results of operations. Future developments may, however, result in resolution of these legal claims in a way that could have a material adverse effect. See Item 1A. “Risk Factors” and Item 3, “Legal Proceedings” for further information.

Foreign Operations

During 2018, we had operations in Asia, Australia, Europe, and Latin America, which accounted for approximately 44% of consolidated sales and 42% of total assets at December 31, 2018. Functional currencies used by these operations include the U.S. dollar, Chinese yuan, the euro, the British pound, the Japanese yen and the Indian rupee. We are exposed to foreign currency exchange risk as a result of transactions by these subsidiaries in currencies other than their functional currencies, and from transactions by our domestic operations in currencies other than the U.S. dollar. The majority of these functional currencies and the other currencies in which we record transactions are fairly stable, although we experienced variability in the current year as more fully discussed in Item 7A. The use of these currencies, combined with the use of foreign currency forward purchase and sale contracts, has enabled us to be sheltered from significant gains or losses resulting from foreign currency transactions. This situation could change if these currencies experience significant fluctuations or the volume of forward contracts changes.

Application of Critical Accounting Policies

Our consolidated financial statements have been prepared in accordance with U.S. generally accepted accounting principles and are based on the selection and application of significant accounting policies, which require management to make estimates and assumptions about future events that affect the amounts reported in the financial statements and accompanying notes. Actual results could differ materially from those estimates. Management believes the following are the more critical judgmental areas in the application of its accounting policies that affect its financial position and results of operations.

Goodwill and Indefinite-Lived Intangible Assets. We evaluate goodwill and indefinite-lived intangible assets for impairment on an annual basis, as of October 1 or whenever events or changes in circumstances indicate that an evaluation should be completed. A significant amount of judgment is involved in determining if an indicator of impairment has occurred. Such indicators may include deterioration in general economic conditions, negative developments in equity and credit markets, a decline in stock price and market capitalization, adverse changes in the markets in which we operate, and a trend of negative or declining cash flows over multiple periods. The fair value that could be realized in an actual transaction may differ from that used to evaluate the impairment of goodwill.

Goodwill is analyzed on a reporting unit basis. The reporting units are the same as our operating and reportable segments: E&C, D&S West and D&S East. We first evaluate qualitative factors, such as macroeconomic conditions and our overall financial performance to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount, including goodwill. We then evaluate how significant each of the identified factors could be to the fair value or carrying amount of a reporting unit and weigh these factors in totality in forming a conclusion of whether or not it is more likely than not that the fair value of a reporting unit is less than its carrying amount (the “Step 0 Test”). If we determine that it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, the first step of the goodwill impairment test is not necessary. Otherwise, we would proceed to the first step of the goodwill impairment test.

Alternatively, we may also bypass the Step 0 Test and proceed directly to the first step of the goodwill impairment test. Under the first step (“Step 1”), we estimate the fair value of our reporting units by considering income and market approaches to develop fair value estimates, which are weighted to arrive at a fair value estimate for each reporting unit. With respect to the income approach, a model has been developed to estimate the fair value of each reporting unit. This fair value model incorporates estimates of future cash flows, estimates of allocations of certain assets and cash flows among reporting units, estimates of future growth rates, and management’s judgment regarding the applicable discount rates to use to discount such estimates of cash flows.

With respect to the market approach, a guideline company method is employed whereby pricing multiples are derived from companies with similar assets or businesses to estimate fair value of each reporting unit. If the fair value of the reporting unit exceeds the carrying amount of the net assets assigned to that reporting unit, then goodwill is not impaired and no further testing is required. However, if the fair value of the reporting unit is less than its carrying amount, the impairment charge is based on the excess of a reporting unit's carrying amount over its fair value (i.e., we would measure the charge based on the result from Step 1).

In order to assess the reasonableness of the calculated fair values of our reporting units, we also compare the sum of the reporting units' fair values to our market capitalization and calculate an implied control premium (the excess of the sum of the reporting units' fair values over the market capitalization). We evaluate the control premium by comparing it to control premiums of recent comparable transactions. If the implied control premium is not reasonable in light of this assessment, we reevaluate our fair value estimates of the reporting units by adjusting the discount rates and other assumptions as necessary.

Changes to the assumptions and estimates used throughout the steps described above may result in a significantly different estimate of the fair value of the reporting units, which could result in a different assessment of the recoverability of goodwill and result in future impairment charges.

With respect to indefinite-lived intangible assets, we first evaluate relevant events and circumstances to determine whether it is more likely than not that the fair value of an indefinite-lived intangible asset is less than its carrying amount. If, in weighing all relevant events and circumstances in totality, we determine that it is not more likely than not that an indefinite-lived intangible asset is impaired, no further action is necessary. Otherwise, we would determine the fair value of indefinite-lived intangible assets and perform a quantitative impairment assessment by comparing the indefinite-lived intangible asset's fair value to its carrying amount. We may bypass such a qualitative assessment and proceed directly to the quantitative assessment. We estimate the fair value of our indefinite-lived assets using the income approach. This may include the relief from royalty method or use of a model similar to the one described above related to goodwill which estimates the future cash flows attributed to the indefinite-lived intangible asset and then discounting these cash flows back to a present value. Under the relief from royalty method, fair value is estimated by discounting the royalty savings, as well as any tax benefits related to ownership to a present value. The fair value from either approach is compared to the carrying value and an impairment is recorded if the fair value is determined to be less than the carrying value.

2018 and 2017 Goodwill and Indefinite-Lived Intangible Assets Impairment Assessments

As of October 1, 2018 and 2017 ("annual assessment dates") we elected to bypass the Step 0 test and based on our Step 1 test, we determined that the fair value of each of our reporting units was greater than its respective carrying value at each annual assessment date and, therefore, no further action was necessary. Furthermore, as of the annual assessment dates, we also elected to bypass the qualitative assessment for the indefinite-lived intangible assets and based on our quantitative assessments, we determined that the fair value of each of the indefinite-lived intangible assets was greater than its respective carrying value, therefore, no further action was necessary.

Our E&C reporting unit is the reporting unit with the least amount of excess fair value over its carrying amount due to recent acquisitions that have been integrated into the E&C reporting unit. Estimates used to determine fair value in the E&C reporting unit included the expectation of certain significant orders for equipment in several mid- to large-scale LNG projects for which we believe there is a high probability of obtaining such orders starting in 2019. These projects are in various stages of approval and some are contractually bound and/or in late stages of approval. While we believe there is some risk that the orders will not be obtained, obtained in an amount lower than what we are anticipating and/or anticipated orders may be delayed as a result of overall delays in the LNG infrastructure build out due to regulatory and macroeconomic factors, we believe that these projects will generate sales primarily from 2019 to 2023. During the last growth cycle in the global LNG infrastructure build out, E&C reporting unit sales increased by 48% between 2010 and 2011 and 58% between 2011 and 2012. We used this information to assist us in making certain future assumptions regarding the impact of LNG projects in assessing our recoverability of goodwill. We performed a sensitivity analysis on the estimated fair value of our E&C reporting unit noting that a delay in timing of execution of these larger projects would negatively impact our projected operating margins. Further, we noted that extended delays or cancellation of expected future large LNG projects could lead to an impairment of our E&C

reporting unit, which could have a material impact on our consolidated financial statements.
Goodwill at December 31, 2018 and 2017 was $520.7 million and $459.7 million (attributed to the segments as follows: E&C: $295.8 million and $275.1 million; D&S West: $151.3 million and $147.3 million; and D&S East: $73.6 million and $37.3 million), respectively.
Long-Lived Assets. We monitor our property, plant and equipment, and finite-lived intangible assets for impairment indicators on an ongoing basis. If impairment indicators exist, assets are grouped and tested at the lowest level for which identifiable cash flows are available and we perform the required analysis and record impairment charges if applicable. In conducting its analysis,

we compare the undiscounted cash flows expected to be generated from the long-lived assets to the related net book values. If the undiscounted cash flows exceed the net book value, the long-lived assets are considered not to be impaired. If the net book value exceeds the undiscounted cash flows, an impairment loss is measured and recognized. An impairment loss is measured as the difference between the net book value and the fair value of the long-lived assets. Fair value is estimated from discounted future net cash flows (for assets held for use) or net realizable value (for assets held for sale). In assessing the recoverability of our long-lived assets, a significant amount of judgment is involved in estimating the future cash flows, discount rates and other factors necessary to determine the fair value of the respective assets. If these estimates or the related assumptions change in the future, we may be required to record impairment charges for these assets in the period such determination was made. We amortize intangible assets that have finite lives over their estimated useful lives.

2018 Long-Lived Asset Impairments: None.

2017 Long-Lived Asset Impairments: None.

2016 Long-Lived Asset Impairments: During the third quarter of 2016, we identified impairment indicators that suggested the carrying value of a certain asset group in China within the D&S East segment may not be recoverable. The primary impairment indicators included recently completed projections of future cash flows and the associated impact on the long-range strategic plan forecasts, lower than expected cash flows attributed to this asset group and poor market conditions. An undiscounted cash flow test performed for this asset group indicated it was not recoverable. The fair value of the asset group was established using a discounted cash flow model which utilized Level 3 inputs in the fair value hierarchy. As a result of the long-lived asset impairment assessment performed, we recorded long-lived asset impairment charges on our D&S East reporting unit of $1.2 million. The impairment charges were $0.5 million related to finite-lived intangible assets and $0.7 million related to tangible property, plant and equipment. There were no remaining long-lived assets recorded on the consolidated balance sheet for this asset group as of December 31, 2016.

Convertible Debt. We determined that the conversion option within our 1.00% Convertible Senior Subordinated Notes due November 2024 (the “2024 Notes”) was not clearly and closely related to the debt instrument host, however, the conversion option met a scope exception to derivative instrument accounting since the conversion feature is indexed to our common stock and meets equity classification criteria. Convertible debt instruments exempt from derivative accounting and subject to cash settlement of the conversion option are recognized by bifurcating the principal balance into a liability component and an equity component where the fair value of the liability component is estimated by calculating the present value of its cash flows discounted at an interest rate that we would have received for similar debt instruments that have no conversion rights (the “straight-debt rate”), and the equity component is the residual amount, net of tax, which creates a discount on the 2024 Notes. We recognize non-cash interest accretion expense related to the carrying amount of the 2024 Notes which is accreted back to its principal amount over the expected life of the debt, which is also the stated life of the debt.

Business Combinations. We account for business combinations in accordance with Accounting Standards Codification (“ASC”) 805, “Business Combinations.” We recognize and measure identifiable assets acquired and liabilities assumed based on their estimated fair values. The excess of the consideration transferred over the fair value of the net assets acquired, including identifiable intangible assets, is assigned to goodwill. As additional information becomes available, we may further revise the preliminary acquisition consideration allocation during the remainder of the measurement period, which shall not exceed twelve months from the closing of the acquisition.

Identifiable finite-lived intangible assets generally consist of customer relationships, unpatented technology, patents and trademarks and trade names and are amortized over their estimate useful lives which generally range from 2 to 15 years. Identifiable indefinite-lived intangible assets generally consist of trademarks and trade names and are subject to impairment testing on at least an annual basis. We estimate the fair value of identifiable intangible assets under income approaches where the fair value models incorporate estimates of future cash flows, estimates of allocations of certain assets and cash flows, estimates of future growth rates, and management’s judgment regarding the applicable discount rates to use to discount such estimates of cash flows.

We expense transaction-related costs, including legal, consulting, accounting and other costs, in the periods in which the costs are incurred.

Revenue Recognition: Revenue is recognized when (or as) we satisfy performance obligations by transferring a promised good or service, an asset, to a customer. An asset is transferred to a customer when, or as, the customer obtains control over that asset. In most contracts, the transaction price includes both fixed and variable consideration. The variable consideration contained within our contracts with customers includes discounts, rebates, refunds, credits, price concessions, incentives, performance bonuses, penalties and other similar items. When a contract includes variable consideration, we evaluate the estimate of the variable consideration to determine whether the estimate needs to be constrained; therefore, we include the variable consideration in the transaction price only to the extent that it is probable that a significant reversal of the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. Variable consideration

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estimates are updated at each reporting date. When a contract includes multiple performance obligations, the contract price is allocated among the performance obligations based upon the stand alone selling prices. When the period between when we transfer a promised good or service to a customer and when the customer pays for that good or service is expected, at contract inception, to be one year or less, we do not adjust for the effects of a significant financing component.

For brazed aluminum heat exchangers, air cooled heat exchangers, cold boxes, liquefied natural gas fueling stations, engineered tanks, and repair services, most contracts contain language that transfers control to the customer over time. For these contracts, revenue is recognized as we satisfy the performance obligations by an allocation of the transaction price to the accounting period computed using input methods such as costs incurred. Input methods recognize revenue on the basis of the entity's efforts or inputs to the satisfaction of a performance obligation relative to the total expected inputs to the satisfaction of that performance obligation. The costs incurred input method measures progress toward the satisfaction of the performance obligation by multiplying the transaction price of the performance obligation by the percentage of incurred costs as of the balance sheet date to the total estimated costs at completion after giving effect to the most current estimates. Timing of amounts billed on contracts varies from contract to contract and could cause significant variation in working capital needs. Revisions to estimated cost to complete that result from inefficiencies in our performance that were not expected in the pricing of the contract are expensed in the period in which these inefficiencies become known. Contract modifications can change a contract's scope, price, or both. Approved contract modifications are accounted for as either a separate contract or as part of the existing contract depending on the nature of the modification.

For standard industrial gas and LNG tanks and some products identified in the prior paragraph with contract language that does not meet the over time recognition requirements, the contract with the customer contains language that transfers control to the customer at a point in time. For these contracts, revenue is recognized when we satisfy our performance obligation to the customer. Timing of amounts billed on contracts varies from contract to contract. The specific point in time when control transfers depends on the contract with the customer, contract terms that provide for a present obligation to pay, physical possession, legal title, risk and rewards of ownership, acceptance of the asset, and bill-and-hold arrangements may impact the point in time when control transfers to the customer. We recognize revenue under bill-and-hold arrangements when control transfers and the reason for the arrangement is substantive, the product is separately identified as belonging to the customer, the product is ready for physical transfer and we do not have the ability to use the product or direct it to another customer.

Incremental contract costs are expensed when incurred when the amortization period of the asset that would have been recognized is one year or less; otherwise, incremental contract costs are recognized as an asset and amortized over time as promised goods and services are transferred to a customer. When losses are expected to be incurred on a contract, we recognize the entire anticipated loss in the accounting period when the loss becomes evident. The loss is recognized when the current estimate of the consideration we expect to receive, modified to include unconstrained variable consideration instead of constrained variable consideration, is less than the current estimate of total costs for the contract.

Taxes assessed by a governmental authority that are both imposed on and concurrent with a specific revenue-producing transaction, that are collected by us from a customer, are excluded from revenue.

Shipping and handling fee revenues and the related expenses are reported as fulfillment revenues and expenses for all customers because we have adopted the practical expedient contained in ASC 606-10-25-18B. Therefore, all shipping and handling costs associated with outbound freight are accounted for as a fulfillment costs and are included in cost of sales.

Income Taxes. The Company and its U.S. subsidiaries file a consolidated federal income tax return. Deferred income taxes are provided for temporary differences between financial reporting and the consolidated tax return in accordance with the liability method. A valuation allowance is provided against net deferred tax assets when conditions indicate that it is more likely than not that the benefit related to such assets will not be realized. In assessing the need for a valuation allowance against deferred tax assets, we consider all available evidence, including past operating results, estimates of future taxable income, and the feasibility of tax planning strategies. In the event that we change our determination as to the amount of deferred tax assets that can be realized, the valuation allowance will be adjusted

with a corresponding impact to the provision for income taxes in the period in which such determination is made.
We utilize a two-step approach for the recognition and measurement of uncertain tax positions. The first step is to evaluate the tax position and determine whether it is more likely than not that the position will be sustained upon examination by tax authorities. The second step is to measure the tax benefit as the largest amount that is more likely than not of being realized upon settlement.
Interest and penalties related to income taxes are accounted for as income tax expense (benefit), net on the consolidated statements of income.

Recent Accounting Standards

For disclosures regarding recent accounting standards, refer to Note 2, “Significant Accounting Policies,” of our consolidated financial statements included elsewhere in this report.

Forward-Looking Statements

We are making this statement in order to satisfy the “safe harbor” provisions contained in the Private Securities Litigation Reform Act of 1995. This Annual Report on Form 10-K includes “forward-looking statements.” These forward-looking statements include statements relating to our business, including statements regarding revenues, cost synergies and earnings related to our recent VRV Acquisition. In some cases, forward-looking statements may be identified by terminology such as “may,” “should,” “expects,” “anticipates,” “believes,” “projects,” “forecasts,” “continue” or t negative of such terms or comparable terminology. Forward-looking statements contained herein (including future cash contractual obligations, liquidity, cash flow, orders, results of operations, projected revenues, and trends, among other matters) or in other statements made by us are made based on management’s expectations and beliefs concerning future events impacting us and are subject to uncertainties and factors relating to our operations and business environment, all of which are difficult to predict and many of which are beyond our control, that could cause our actual results to differ materially from those matters expressed or implied by forward-looking statements.

The risk factors discussed in Item 1A. “Risk Factors” and the factors discussed in Item 7. “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” among others, could affect our future performance and liquidity and value of our securities and could cause our actual results to differ materially from those expressed or implied by forward-looking statements made by us or on our behalf. These factors should not be construed as exhaustive and there may also be other risks that we are unable to predict at this time. All forward-looking statements included in this Report are expressly qualified in their entirety by these cautionary statements.

All forward-looking statements attributable to us or persons acting on our behalf apply only as of the date of this Annual Report and are expressly qualified in their entirety by the cautionary statements included in this Annual Report. We undertake no obligation to update or revise forward-looking statements which may be made to reflect events or circumstances that arise after the filing date of this document or to reflect the occurrence of unanticipated events, except as otherwise required by law.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

In the normal course of business, our operations are exposed to fluctuations in interest rates and foreign currency values that can affect the cost of operating and financing. Accordingly, we address a portion of these risks through a program of risk management.

Interest Rate Risk: Our primary interest rate risk exposure results from the SSRCF's various floating rate pricing mechanisms. If interest rates were to increase 100 basis points (1 percent) from the weighted-average interest rate of 4.1% at December 31, 2018, and assuming no changes in the $329.3 million of borrowings outstanding under the SSRCF at December 31, 2018, our additional annual expense would be approximately $3.3 million on a pre-tax basis.

Foreign Currency Exchange Rate Risk: We operate in the United States and other foreign countries, which creates exposure to foreign currency exchange fluctuations in the normal course of business, which can impact our financial position, results of operations, cash flow, and competitive position. The financial statements of foreign subsidiaries are translated into their U.S. dollar equivalents at end-of-period exchange rates for assets and liabilities, while income and expenses are translated at average monthly exchange rates. Translation gains and losses are components of other comprehensive income (loss) as reported in the consolidated statements of comprehensive income. Translation exposure is primarily with the euro, the Czech koruna, the Chinese yuan, and the Japanese yen. During 2018, both the Chinese yuan and euro decreased in relation to the U.S. dollar by 5%. At December 31, 2018, a hypothetical further 10% strengthening of the U.S. dollar would not materially affect our financial statements.

Chart's primary transaction exchange rate exposures are with the euro, the Chinese yuan, the Japanese yen, the Czech koruna, the Indian rupee, the Australian dollar, and the British pound. Transaction gains and losses arising from fluctuations in currency exchange rates on transactions denominated in currencies other than the functional currency are recognized in the consolidated statements of income as a component of foreign currency loss. We enter into foreign exchange forward contracts to hedge anticipated and firmly committed foreign currency transactions. We do not use derivative financial instruments for speculative or trading purposes. The terms of the contracts are generally one year or less. At December 31, 2018, a hypothetical 10% weakening of the U.S. dollar would not materially affect our outstanding foreign exchange forward contracts.

Market Price Sensitive Instruments

In connection with the pricing of the 2024 Notes, we entered into privately-negotiated convertible note hedge transactions (the "Note Hedge Transactions") with certain parties, including affiliates of the initial purchasers of the 2024 Notes (the "Option Counterparties"). These Note Hedge Transactions are expected to reduce the potential dilution upon any future conversion the 2024 Notes.

We also entered into separate, privately-negotiated warrant transactions with the Option Counterparties to acquire up to 4.41 million shares of our common stock. The warrant transactions will have a dilutive effect with respect to our common stock to the extent that the price per share of our common stock exceeds the strike price of the warrants unless we elect, subject to certain conditions, to settle the warrants in cash. The strike price of the warrant transactions related to the 2024 Notes was initially $71.775 per share. Further information is located in Note 9, "Debt and Credit Arrangements," of our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Item 8. Financial Statements and Supplementary Data

Our Financial Statements and the accompanying Notes that are filed as part of this Annual Report are listed under Item 15. "Exhibits and Financial Statement Schedules" and are set forth beginning on page F-1 immediately following the signature page of this Form 10-K and are incorporated into this Item 8 by reference.

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

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

As of December 31, 2018, an evaluation was performed under the supervision and with the participation of our management including our Chief Executive Officer and Chief Financial Officer, of the effectiveness of the design and operation of our disclosure controls and procedures pursuant to Rule 13a-15 under the Securities and Exchange Act of 1934, as amended (the "Exchange Act"). Based upon that evaluation, such officers concluded that our disclosure controls and procedures are effective to ensure that information required to be disclosed by us in the reports we file or submit under the Exchange Act (1) is recorded, processed, summarized and reported within the time periods specified in the Securities and Exchange Commission's rules and forms and (2) is accumulated and communicated to our management including the Chief Executive Officer and Chief Financial Officer, as appropriate to allow for timely decisions regarding required disclosure.

Management's Report on Internal Control Over Financial Reporting

Management's Report on Internal Control Over Financial Reporting is set forth on page F-1 of this Annual Report on Form 10-K and incorporated herein by reference. Management used the updated Internal Control-Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission to perform the evaluation.

The effectiveness of our internal control over financial reporting as of December 31, 2018 has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in our report which is set forth in Item 8. "Financial Statements and Supplementary Data," on page F-3 under the caption "Report of Independent Registered Public Accounting Firm" and incorporated herein by reference.

The Company did not include an evaluation of the internal control over financial reporting of VRV S.r.l. and its subsidiaries and Skaff Cryogenics and Cryo-Lease, LLC, which, combined, constituted $342.1 million and $153.2 million of total and net assets, respectively, as of December 31, 2018, and $19.4 million and $2.4 million of revenues and net loss, respectively, for the year then ended.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting that occurred during our most recent fiscal quarter that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance

Information required by this item as to the Directors of the Company appearing under the caption “Election of Directors” in our 2019 Proxy Statement is incorporated herein by reference. Information required by this item as to the Executive Officers of the Company is included as Item 4A of this Annual Report on Form 10-K as permitted by Instruction 3 to Item 401(b) of Regulation S-K. Information required by Item 405 is set forth in the 2019 Proxy Statement under the heading “Section 16(a) Beneficial Ownership Reporting Compliance,” which information is incorporated herein by reference. Information required by Items 406 and 407(c)(3), (d)(4) and (d)(5) of Regulation S-K is set forth in the 2019 Proxy Statement under the headings “Information Regarding Meetings and Committees of the Board of Directors,” “Code of Ethical Business Conduct and Officer Code of Ethics” and “Stockholder Communications with the Board,” which information is incorporated herein by reference.

The Charters of the Audit Committee, Compensation Committee and Nominations and Corporate Governance Committee and the Corporate Governance Guidelines, Officer Code of Ethics and Code of Ethical Business Conduct are available free of charge on our website at www.chartindustries.com and in print to any stockholder who requests a copy. Requests for copies should be directed to Secretary, Chart Industries, Inc., 3055 Torrington Drive, Ball Ground, Georgia 30107. We intend to disclose any amendments to the Code of Ethical Business Conduct or Officer Code of Ethics and any waiver of the Code of Ethical Business Conduct or Officer Code of Ethics granted to any Director or Executive Officer of the Company on our website.

Set forth below is a list of the members of our Board of Directors as of February 22, 2019:

Directors

STEVEN W. KRABLIN (2) (3)
Chairman of the Board
Retired President, Chief Executive Officer and Chairman of the Board
T-3 Energy Services, Inc.
Oilfield services company that manufactures products used in the drilling, production and transportation of oil and gas

JILLIAN C. EVANKO
Chief Executive Officer and President
Chart Industries, Inc.

W. DOUGLAS BROWN (1) (2)
Retired Vice President, General Counsel and Secretary
Air Products and Chemicals, Inc.
Supplier of industrial gases, performance materials, and equipment and services

CAREY CHEN (1) (3)
Executive Chairman and President of Cincinnati Incorporated
Manufacturer of advanced equipment for the metal fabrication industry

MICHAEL L. MOLININI (1) (3)
Retired Chief Executive Officer and President
Airgas, Inc.
Supplier of gases, welding equipment and supplies, and safety products

ELIZABETH G. SPOMER [2] [3]
Retired Executive Vice President
Veresen Inc. (former owner of Jordan Cove LNG LLC)
Retired President and Chief Executive Officer
Jordan Cove LNG LLC, a wholly owned subsidiary of Pembina Pipeline Corporation
Diversified energy infrastructure company

THOMAS L. WILLIAMS [1] [2]
Chairman of the Board and Chief Executive Officer
Parker Hannifin Corporation
Manufacturer of motion and control products

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(1) Compensation Committee
(2) Nominations and Corporate Governance Committee
(3) Audit Committee

Item 11. Executive Compensation

The information required by Item 402 of Regulation S-K is set forth in the 2019 Proxy Statement under the heading "Executive and Director Compensation," which information is incorporated herein by reference. The information required by Items 407(e)(4) and 407(e)(5) of Regulation S-K is set forth in the 2019 Proxy Statement under the headings "Compensation Committee Interlocks and Insider Participation" and "Compensation Committee Report," respectively, which information is incorporated herein by reference.

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

The information required by this item is set forth in the 2019 Proxy Statement under the headings "Security Ownership of Certain Beneficial Owners" and "Equity Compensation Plan Information," which information is incorporated herein by reference.

Item 13. Certain Relationships, Related Transactions, and Director Independence

The information required by this item is set forth in the 2019 Proxy Statement under the headings "Related Party Transactions" and "Director Independence," which information is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services

The information required by this item is set forth in the 2019 Proxy Statement under the heading "Principal Accounting Fees and Services," which information is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following documents are filed as part of this 2018 Annual Report on Form 10-K:

1. Financial Statements. The following consolidated financial statements of the Company and its subsidiaries and the reports of the Company's independent registered public accounting firm are incorporated by reference in Item 8:

Management's Report on Internal Control over Financial Reporting
Reports of Independent Registered Public Accounting Firm
Consolidated Balance Sheets at December 31, 2018 and 2017
Consolidated Statements of Income for the Years Ended December 31, 2018, 2017 and 2016
Consolidated Statements of Comprehensive Income for the Years Ended December 31, 2018, 2017 and 2016
Consolidated Statements of Cash Flows for the Years Ended December 31, 2018, 2017 and 2016
Consolidated Statements of Equity for the Years Ended December 31, 2018, 2017 and 2016
Notes to Consolidated Financial Statements

2. Financial Statement Schedules. The following additional information should be read in conjunction with the consolidated financial statements:

Schedule II Valuation and Qualifying Accounts for the Years Ended December 31, 2018, 2017 and 2016
All other financial statement schedules have been omitted since they are either not required, not applicable, or the information is otherwise included.

3. Exhibits. See the Index to Exhibits at page E-1 of this Annual Report on Form 10-K.

Item 16. Form 10–K Summary

None.

SIGNATURES

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

Chart Industries, Inc.

By: /s/ Jillian C. Evanko
Jillian C. Evanko
Chief Executive Officer and President
(Principal Executive Officer)

Date: February 22, 2019

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

By:

/s/ Steven W. Krablin Steven W. Krablin	Chairman of the Board, Director
/s/ Jillian C. Evanko Jillian C. Evanko	Chief Executive Officer and President, Director (Principal Executive Officer)
/s/ Jeffrey R. Lass Jeffrey R. Lass	Vice President and Chief Financial Officer (Principal Financial Officer)
/s/ Michael L. Schmit Michael L. Schmit	Chief Accounting Officer and Corporate Controller (Principal Accounting Officer)
/s/ W. Douglas Brown W. Douglas Brown	Director
/s/ Carey Chen Carey Chen	Director
/s/ Michael L. Molinini Michael L. Molinini	Director
/s/ Elizabeth G. Spomer Elizabeth G. Spomer	Director
/s/ Thomas L. Williams Thomas L. Williams	Director

Date: February 22, 2019

INDEX TO FINANCIAL STATEMENTS

Audited Consolidated Financial Statements:

MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

Management of Chart Industries, Inc. and its subsidiaries (the "Company") is responsible for establishing and maintaining adequate internal control over financial reporting. The Company's internal control over financial reporting is a process designed under the supervision of the Company's principal executive and financial officers to provide reasonable assurance regarding the reliability of financial reporting and the preparation of the Company's financial statements for external reporting purposes in accordance with U.S. generally accepted accounting principles.

The Company's internal control over financial reporting includes policies and procedures that:

- Pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect transactions and dispositions of assets of the Company;
- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with U.S. generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and the directors of the Company; and
- 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 Company's financial statements.

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

Management has assessed the effectiveness of its internal control over financial reporting as of December 31, 2018 based on the framework established in Internal Control — Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 Framework) (the "COSO criteria"). Management did not include an evaluation of the internal control over financial reporting of VRV S.r.l. and its subsidiaries and Skaff Cryogenics and Cryo-Lease, LLC, which, combined, constituted $342.1 million and $153.2 million of total and net assets, respectively, as of December 31, 2018, and $19.4 million and $2.4 million of sales and net loss, respectively, for the year then ended.

Based on this assessment, management has determined that the Company's internal control over financial reporting is effective as of December 31, 2018.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2018 has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in their report appearing below, which expresses an unqualified opinion on the effectiveness of the Company's internal control over financial reporting as of December 31, 2018.

/s/ Jillian C. Evanko	/s/ Jeffrey R. Lass
Jillian C. Evanko	Jeffrey R. Lass
Chief Executive Officer and President	Vice President and Chief Financial Officer

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM
To the Shareholders and the Board of Directors of
Chart Industries, Inc. and Subsidiaries

Opinion on the Financial Statements
We have audited the accompanying consolidated balance sheets of Chart Industries, Inc. and Subsidiaries (the Company) as of December 31, 2018 and 2017, the related consolidated statements of income, comprehensive income, equity and cash flows for each of the three years in the period ended December 31, 2018, and the related notes and the financial statement schedule listed in the index at Item 15(a) 2 (collectively referred to as the “consolidated financial statements”). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 22, 2019 expressed an unqualified opinion thereon.

Adoption of New Accounting Standard
As discussed in Note 1 to the consolidated financial statements, the Company changed its method for accounting for revenue in 2018 as a result of the adoption of Accounting Standards Update (ASU) No. 2014-09, Revenue from Contracts with Customers (Topic 606), and the amendments in ASUs 2015-14, 2016-08, 2016-10 and 2016-12 effective January 1, 2018.

Basis for Opinion
These financial statements are the responsibility of the Company‘s management. Our responsibility is to express an opinion on the Company‘s financial statements based on our audits. We are a public accounting firm registered with the 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 audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the 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 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 financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company’s auditor since 1991.

Atlanta, Georgia
February 22, 2019

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM
To the Shareholders and the Board of Directors of
Chart Industries, Inc. and Subsidiaries

Opinion on Internal Control over Financial Reporting
We have audited Chart Industries, Inc. and Subsidiaries' internal control over financial reporting as of December 31,2018, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Chart Industries, Inc. and Subsidiaries (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31,
2018, based on the COSO criteria.

As indicated in the accompanying Management's Report on Internal Control Over Financial Reporting, management's assessment of and conclusion on the effectiveness of internal control over financial reporting did not include the internal controls of VRV S.r.l. (VRV), as well as Skaff Cryogenics and Cryo-Lease, LLC (together, Skaff), all of which are included in the 2018 consolidated financial statements of the Company and constituted 18% and 17% of total and net assets, respectively, as of December 31, 2018 and 2% of sales and a 3% reduction of net income for the year then ended. Our audit of internal control over financial reporting of the Company also did not include an evaluation of internal control over financial reporting of VRV and Skaff.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2018 and 2017, and the related consolidated statements of income, comprehensive income, equity, and cash flows for each of the three years in the period ended December 31, 2018, and the related notes and the financial statement schedule listed in the index at Item 15(a) 2 and our report dated February 22, 2019 expressed an unqualified opinion thereon.

Basis for Opinion
The Company's management is responsible 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 internal control over financial reporting based on our audit. We are a public accounting firm registered with the 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 audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

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.

/s/ Ernst & Young LLP

Atlanta, Georgia
February 22, 2019

CHART INDUSTRIES, INC. AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(Dollars in millions, except per share amounts)

	December 31,	
	2018	2017
ASSETS		
Current Assets		
Cash and cash equivalents	$118.1	$122.6
Accounts receivable, less allowances of $8.5 and $9.1	194.8	196.4
Inventories, net	233.1	173.7
Unbilled contract revenue	54.5	36.5
Prepaid expenses	14.0	14.4
Other current assets	47.2	23.7
Current assets of discontinued operations	—	66.7
Total Current Assets	661.7	634.0
Property, plant and equipment, net	361.1	285.0
Goodwill	520.7	459.7
Identifiable intangible assets, net	330.4	286.4
Other assets	23.8	21.4
Non-current assets of discontinued operations	—	38.2
TOTAL ASSETS	$1,897.7	$1,724.7
LIABILITIES AND EQUITY		
Current Liabilities		
Accounts payable	$125.5	$105.4
Customer advances and billings in excess of contract revenue	130.0	109.6
Accrued salaries, wages and benefits	46.6	46.4
Current portion of warranty reserve	8.6	11.5
Short-term debt and current portion of long-term debt	11.2	58.9
Other current liabilities	44.7	39.9
Current liabilities of discontinued operations	—	15.9
Total Current Liabilities	366.6	387.6
Long-term debt	533.2	439.2
Long-term deferred tax liabilities	76.4	62.1
Accrued pension liabilities	11.7	9.4
Other long-term liabilities	20.8	18.6
Non-current liabilities of discontinued operations	—	2.6
Total Liabilities	1,008.7	919.5
Equity		
Common stock, par value $0.01 per share — 150,000,000 shares authorized, 31,363,650 and 30,804,832 shares issued and outstanding at December 31, 2018 and 2017, respectively	0.3	0.3
Additional paid-in capital	460.2	445.7
Retained earnings	453.9	364.3
Accumulated other comprehensive loss	(29.9)	(8.1)
Total Chart Industries, Inc. Shareholders' Equity	884.5	802.2
Noncontrolling interests	4.5	3.0
Total Equity	889.0	805.2
TOTAL LIABILITIES AND EQUITY	$1,897.7	$1,724.7

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

CHART INDUSTRIES, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF INCOME
(Dollars and shares in millions, except per share amounts)

	Year Ended December 31,		
	2018	2017	2016
Sales	$1,084.3	$842.9	$722.0
Cost of sales	788.4	611.3	512.3
Gross profit	295.9	231.6	209.7
Selling, general and administrative expenses	181.9	180.9	158.7
Amortization expense	21.9	12.2	8.8
Asset impairments	—	—	1.2
Operating expenses	203.8	193.1	168.7
Operating income	92.1	38.5	41.0
Other expenses:			
Interest expense, net	21.4	17.3	15.1
Loss on extinguishment of debt	—	4.9	—
Financing costs amortization	1.3	1.3	1.3
Foreign currency loss	0.4	3.9	0.5
Other expenses, net	23.1	27.4	16.9
Income from continuing operations before income taxes	69.0	11.1	24.1
Income tax expense (benefit):			
Current	8.4	14.8	(4.4)
Deferred	5.0	(31.4)	15.0
Income tax expense (benefit), net	13.4	(16.6)	10.6
Net income from continuing operations	55.6	27.7	13.5
Income from discontinued operations, net of tax	34.4	1.8	11.2
Net income	90.0	29.5	24.7
Less: Income (loss) attributable to noncontrolling interests of continuing operations, net of taxes	2.0	1.5	(3.5)
Net income attributable to Chart Industries, Inc.	$88.0	$28.0	$28.2
Net income attributable to Chart Industries, Inc.			
Income from continuing operations	53.6	26.2	17.0
Income from discontinued operations	34.4	1.8	11.2
Net income attributable to Chart Industries, Inc.	$88.0	$28.0	$28.2
Basic earnings per common share attributable to Chart Industries, Inc.			
Income from continuing operations	$1.73	$0.85	$0.55
Income from discontinued operations	1.10	0.06	0.37
Net income attributable to Chart Industries, Inc.	$2.83	$0.91	$0.92
Diluted earnings per common share attributable to Chart Industries, Inc.			
Income from continuing operations	$1.67	$0.84	$0.55
Income from discontinued operations	1.06	0.05	0.36
Net income attributable to Chart Industries, Inc.	$2.73	$0.89	$0.91
Weighted-average number of common shares outstanding:			
Basic	31.05	30.74	30.58
Diluted	32.20	31.34	30.98

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

CHART INDUSTRIES, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(Dollars in millions)

	Year Ended December 31, 2018	2017	2016
Net income	$ 90.0	$ 29.5	$ 24.7
Other comprehensive (loss) income:			
Foreign currency translation adjustments	(19.7)	26.9	(12.2)
Defined benefit pension plan:			
Actuarial (loss) gain on remeasurement	(3.5)	2.4	1.5
Amortization of net loss	0.9	1.2	1.5
Defined benefit pension plan	(2.6)	3.6	3.0
Other comprehensive (loss) income, before tax	(22.3)	30.5	(9.2)
Income tax benefit (expense) related to defined benefit pension plan	0.5	(3.3)	(1.1)
Other comprehensive (loss) income, net of taxes	(21.8)	27.2	(10.3)
Comprehensive income	68.2	56.7	14.4
Less: Comprehensive (income) loss attributable to noncontrolling interests, net of taxes	(2.0)	(1.6)	3.5
Comprehensive income attributable to Chart Industries, Inc.	$ 66.2	$ 55.1	$ 17.9

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

CHART INDUSTRIES, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(Dollars in millions)

	Year Ended December 31,		
	2018	2017	2016
OPERATING ACTIVITIES			
Net income	$ 90.0	$ 29.5	$ 24.7
Less: Income from discontinued operations	34.4	1.8	11.2
Income from continuing operations	55.6	27.7	13.5
Adjustments to reconcile net income to net cash provided by operating activities:			
Depreciation and amortization	50.8	37.6	33.1
Asset impairments	—	—	1.2
Interest accretion of convertible notes discount	9.1	12.8	12.5
Loss on extinguishment of debt	—	4.9	—
Financing costs amortization	1.3	1.3	1.3
Employee share-based compensation expense	4.9	10.6	10.1
Unrealized foreign currency transaction (gain) loss	(2.2)	0.3	0.5
Deferred income tax benefit	5.0	(31.4)	15.0
Other non-cash operating activities	(2.5)	2.3	1.3
Changes in assets and liabilities, net of acquisitions:			
Accounts receivable	25.5	(32.8)	35.8
Inventory	(14.1)	(22.0)	21.7
Unbilled contract revenues and other assets	(9.1)	3.5	(11.6)
Accounts payable and other liabilities	(10.2)	13.6	29.9
Customer advances and billings in excess of contract revenue	4.9	15.9	5.0
Net Cash Provided By Operating Activities	119.0	44.3	169.3
INVESTING ACTIVITIES			
Acquisition of businesses, net of cash acquired	(225.8)	(446.1)	(1.4)
Capital expenditures	(35.6)	(33.0)	(16.7)
Government grants	0.8	0.4	1.1
Proceeds from sale of assets	—	0.9	—
Net Cash Used In Investing Activities	(260.6)	(477.8)	(17.0)
FINANCING ACTIVITIES			
Borrowings on revolving credit facilities	411.7	302.2	3.8
Repayments on revolving credit facilities	(316.8)	(66.1)	(6.1)
Repurchase of convertible notes	(57.1)	(194.9)	—
Proceeds from issuance of convertible notes	—	258.8	—
Proceeds from issuance of warrants	—	46.0	—
Payments for call options related to convertible notes	—	(59.5)	—
Borrowings on term loan	—	—	13.2
Repayments on term loan	(5.9)	(3.1)	(2.9)
Payments for debt issuance costs	(1.4)	(8.2)	—
Proceeds from exercise of stock options	10.8	2.0	0.4
Common stock repurchases	(2.7)	(2.0)	(0.7)
Dividend distribution to noncontrolling interests	(0.4)	—	—
Net Cash Provided By Financing Activities	38.2	275.2	7.7

CHART INDUSTRIES, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS — (Continued)
(Dollars in millions)

	Year Ended December 31,		
	2018	2017	2016
DISCONTINUED OPERATIONS			
Cash (Used In) Provided By Operating Activities	(30.2)	2.7	1.5
Cash Provided by (Used In) Investing Activities [2]	132.7	(2.2)	(1.1)
Cash Provided By Discontinued Operations	102.5	0.5	0.4
Effect of exchange rate changes on cash and cash equivalents	(11.4)	7.2	(2.1)
Net (decrease) increase in cash, cash equivalents, restricted cash, and restricted cash equivalents	(12.3)	(150.6)	158.3
Cash, cash equivalents, restricted cash, and restricted cash equivalents at beginning of period	131.4	282.0	123.7
CASH, CASH EQUIVALENTS, RESTRICTED CASH, AND RESTRICTED CASH EQUIVALENTS AT END OF PERIOD [1]	$119.1	$131.4	$282.0

(1) Refer to Note 9, “Debt and Credit Arrangements,” and Note 12, “Business Combinations,” for further information regarding restricted cash and restricted cash equivalents balances.

(2) Includes proceeds from the sale of CAIRE of $133.5 for the year ended December 31, 2018.

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

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CHART INDUSTRIES, INC. AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF EQUITY
(Dollars and shares in millions)

	Common Stock Shares Outstanding	Common Stock Amount	Additional Paid-in Capital	Retained Earnings	Accumulated Other Comprehensive (Loss) Income	Non-controlling Interests	Total Equity
Balance at January 1, 2016	30.55	$ 0.3	$ 387.1	$ 308.1	$ (24.9)	$ 5.1	$ 675.7
Net Income (loss)	—	—	—	28.2	—	(3.5)	24.7
Other comprehensive loss	—	—	—	—	(10.3)	—	(10.3)
Share-based compensation expense	—	—	10.7	—	—	—	10.7
Common stock issued from share-based compensation plans	0.10	—	0.4	—	—	—	0.4
Excess tax deficiency from exercise of stock options	—	—	(1.7)	—	—	—	(1.7)
Common stock repurchases	(0.04)	—	(0.7)	—	—	—	(0.7)
Other	—	—	—	—	—	(0.2)	(0.2)
Balance at December 31, 2016	30.61	0.3	395.8	336.3	(35.2)	1.4	698.6
Net income	—	—	—	28.0	—	1.5	29.5
Other comprehensive income	—	—	—	—	27.1	0.1	27.2
Equity component of convertible notes issuance, net of deferred financing fees and deferred taxes	—	—	36.6	—	—	—	36.6
Proceeds from issuance of warrants	—	—	46.0	—	—	—	46.0
Purchase of call options, net of deferred taxes	—	—	(38.1)	—	—	—	(38.1)
Repurchase of convertible notes	—	—	(5.8)	—	—	—	(5.8)
Share-based compensation expense	—	—	11.1	—	—	—	11.1
Common stock issued from share-based compensation plans	0.25	—	2.0	—	—	—	2.0
Common stock repurchases	(0.05)	—	(2.0)	—	—	—	(2.0)
Other	—	—	0.1	—	—	—	0.1
Balance at December 31, 2017	30.81	0.3	445.7	364.3	(8.1)	3.0	805.2
Net income	—	—	—	88.0	—	2.0	90.0
Cumulative effect of account change	—	—	—	1.6	—	—	1.6
Other comprehensive loss	—	—	—	—	(21.8)	—	(21.8)
Share-based compensation expense	—	—	6.9	—	—	—	6.9
Common stock issued from share-based compensation plans	0.60	—	10.3	—	—	—	10.3
Common stock repurchases	(0.05)	—	(2.7)	—	—	—	(2.7)
Dividend distribution to noncontrolling interest	—	—	—	—	—	(0.4)	(0.4)
Other	—	—	—	—	—	(0.1)	(0.1)
Balance at December 31, 2018	31.36	$ 0.3	$ 460.2	$ 453.9	$ (29.9)	$ 4.5	$ 889.0

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

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
(Dollars and shares in millions, except per share amounts)

NOTE 1 — Nature of Operations and Principles of Consolidation

Nature of Operations: Chart Industries, Inc. and its consolidated subsidiaries (herein referred to as the "Company," "Chart," "we," "us," or "our"), is a leading diversified global manufacturer of highly engineered equipment for the industrial gas, energy, and biomedical industries. Chart's equipment and engineered systems are primarily used for low-temperature and cryogenic applications utilizing our expertise in cryogenic systems and equipment which operate at low temperatures sometimes approaching absolute zero (0 Kelvin; -273° Centigrade; -459° Fahrenheit). We have domestic operations located across the United States, including principal executive offices located in Georgia, and an international presence in Asia, Australia, Europe, and Latin America.

On December 20, 2018, we closed the sale of our oxygen-related products business to NGK SPARK PLUG CO., LTD. The strategic decision to divest the oxygen-related products business reflects our strategy and capital allocation approach to focus on our core capabilities and offerings. Refer to Note 3, "Discontinued Operations," for further information.

On November 15, 2018, Chart completed the previously announced acquisition of VRV S.r.l. and its subsidiaries (collectively "VRV"). VRV, which has operations in Italy, France and India, is a diversified multinational corporation with highly automated, purpose-built facilities for the design and manufacture of pressure equipment serving the industrial gas and energy end markets.

On January 2, 2018, we completed the acquisition of Skaff Cryogenics and Cryo-Lease, LLC (together "Skaff"). Skaff provides quality repair service and re-manufacturing of cryogenic and liquefied natural gas storage tanks and trailers and also maintains a portfolio of cryogenic storage equipment that is rented to customers for temporary and permanent needs. Skaff is headquartered in Brentwood, New Hampshire and provides services and equipment to customers in North America.

On September 20, 2017, we completed the acquisition of RCHPH Holdings, Inc. ("Hudson"). Hudson designs, manufactures, sells and services products used in refining, heating, ventilation and air conditioning (HVAC), petrochemical, natural gas, power generation, industrial and commercial end markets.

For further information regarding the VRV, Skaff and Hudson acquisitions, refer to Note 12, "Business Combinations."

Principles of Consolidation: The consolidated financial statements include the accounts of Chart Industries, Inc. and its subsidiaries. Intercompany accounts and transactions are eliminated in consolidation.

Recently Adopted Accounting Standards: In March 2018, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2018-05, "Income Taxes (Topic 740), Amendments to SEC Paragraphs Pursuant to SEC Staff Accounting Bulletin No. 118." This ASU adds various Securities and Exchange Commission ("SEC") paragraphs pursuant to the issuance of the December 2017 SEC Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act ("SAB 118"), which was effective immediately. The SEC issued SAB 118 to address concerns about reporting entities' ability to timely comply with the accounting requirements to recognize all of the effects of the Tax Cuts and Jobs Act in the period of enactment. SAB 118 allowed disclosure that timely determination of some or all of the income tax effects from the Tax Cuts and Jobs Act were incomplete by the due date of the 2017 financial statements and if possible to provide a reasonable estimate. In 2017, we accounted for the tax effects of the Tax Cuts and Jobs Act under the guidance of SAB 118, on a provisional basis. In 2018, we finalized our analyses under SAB 118. For further information, see Note 15, "Income Taxes."

In May 2017, the FASB issued ASU 2017-09, "Compensation – Stock Compensation (Topic 718): Scope of Modification Accounting." The FASB issued this guidance to provide clarity as to when modification accounting should be applied when there is a change to the terms or conditions of a share-based payment award in order to prevent diversity in practice. This ASU requires modification accounting to be applied unless all of the following conditions exist: (1) the fair value of the modified award is the same as the fair value of the original award before the original award is modified; if the modification does not affect any of the inputs to the valuation, the entity is not required to estimate the value immediately before and after the modification; (2) the vesting conditions of the modified award are the same as the vesting conditions of the original award before it was modified; and (3) the classification of the modified award as an equity instrument or a liability instrument is the same as the classification of the original award before it was modified. This guidance is applied prospectively for annual periods and interim periods beginning after December 15, 2017. We adopted this guidance effective January 1, 2018. The adoption of this guidance did not have a material impact on our financial position, results of operations, and disclosures.

In March 2017, the FASB issued ASU 2017-07, "Compensation – Retirement Benefits (Topic 715): Improving the Presentation of Net Periodic Pension Cost and Net Periodic Postretirement Benefit Cost." The new guidance requires companies

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

with sponsored defined benefit pension and/or other postretirement benefit plans to present the service cost component of net periodic benefit cost in the same income statement line item as other compensation costs. The other components of net periodic benefit cost will be presented separately and not included in operating income. In addition, only service costs are eligible to be capitalized as an asset. This standard is effective for fiscal years beginning after December 15, 2017, including interim periods within those years, and this guidance will generally be applied retrospectively, whereas the capitalization of the service cost component will be applied prospectively. We adopted this guidance effective January 1, 2018. The adoption of this guidance did not have a material impact on our financial position, results of operations, and disclosures.

In January 2017, the FASB issued ASU 2017-04, "Intangibles - Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment." The new guidance eliminates the requirement to calculate the implied fair value of goodwill (Step 2 of the current guidance's goodwill impairment test) to measure a goodwill impairment charge. Instead, entities will record an impairment charge based on the excess of a reporting unit's carrying amount over its fair value (i.e., measure the charge based on current guidance's Step 1). We have adopted this guidance as of January 1, 2018. This guidance will only have an impact on future periods' financial position, results of operations, and disclosures if a goodwill impairment occurs.

In January 2017, the FASB issued ASU 2017-01 "Business Combinations (Topic 805): Clarifying the Definition of a Business." This ASU provides guidance to evaluate whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. If substantially all of the fair value of the gross assets acquired (or disposed of) is concentrated in a single asset or a group of similar assets, the assets acquired (or disposed of) are not considered a business. This guidance is applied prospectively for annual periods and interim periods beginning after December 15, 2017. We adopted this guidance effective January 1, 2018. The adoption of this guidance did not have a material impact on our financial position, results of operations, and disclosures.

In August 2016, the FASB issued ASU 2016-15, "Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments." The FASB issued this update to clarify how entities should classify certain cash receipts and cash payments on the statement of cash flows. The new guidance also clarifies how the predominance principle should be applied when cash receipts and cash payments have aspects of more than one class of cash flows. This standard is effective for fiscal years beginning after December 15, 2017, including interim periods within those years, and this guidance will generally be applied retrospectively. We adopted this guidance effective January 1, 2018. The adoption of this guidance did not have a material impact on our financial position, results of operations, and disclosures.

In May 2014, the FASB issued ASU 2014-09, "Revenue from Contracts with Customers (Topic 606)" and subsequently issued additional guidance that modified ASU 2014-09. ASU 2014-09 and the subsequent modifications are identified as Accounting Standards Codification ("ASC") 606 ("ASC 606"). ASC 606 replaces existing revenue recognition rules with a comprehensive revenue measurement and recognition standard and provides for expanded disclosure requirements. This update requires entities to recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. ASC 606 applies to all contracts with customers except those that are within the scope of other topics in the FASB Accounting Standards Codification.

On January 1, 2018, we adopted ASC 606 using the modified retrospective method. We applied this standard to contracts that were not completed as of the adoption date. We recognized the cumulative effect of initially applying ASC 606 as an adjustment to the opening balance of retained earnings. The comparative information has not been restated and continues to be presented according to accounting standards in effect for those periods.

Impacts on Financial Statements

The following table summarizes the cumulative effect of the changes to our consolidated balance sheet as of December 31, 2018 from the adoption of ASC 606:

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

	Balance at December 31, 2017	Adjustments due to ASC 606	Balance at January 1, 2018
Assets			
Inventories, net	$ 173.7	$ (10.5)	$ 163.2
Unbilled contract revenue	36.5	6.5	43.0
Prepaid expenses	14.4	(1.6)	12.8
Liabilities			
Accounts payable	$ 105.4	$ 0.2	$ 105.6
Customer advances and billings in excess of contract revenue	109.6	(7.8)	101.8
Other current liabilities	39.9	0.1	40.0
Long-term deferred tax liabilities	62.1	0.3	62.4
Equity			
Retained earnings	$ 364.3	$ 1.6	$ 365.9

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NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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The following tables summarize the current period impacts of adopting ASC 606 on our audited consolidated balance sheet and statement of operations:

	December 31, 2018		
	As Reported	Balances without adoption of ASC 606	Effect of adoption Higher (Lower)
Assets			
Accounts receivable, net of allowances	$194.8	$ 194.7	$ 0.1
Inventories, net	233.1	254.1	(21.0)
Unbilled contract revenue	54.5	46.5	8.0
Other current assets	47.2	47.3	(0.1)
Liabilities			
Customer advances and billings in excess of contract revenue	130.0	149.6	(19.6)
Other current liabilities	44.7	43.6	1.1
Long-term deferred tax liabilities	76.4	75.1	1.3
Equity			
Retained earnings	$453.9	$ 449.7	$ 4.2

	Year Ended December 31, 2018		
	As Reported	Balances without adoption of ASC 606	Effect of adoption Higher (Lower)
Sales	$1,084.3	$1,071.2	$ 13.1
Cost of sales	788.4	778.7	9.7
Selling, general and administrative expenses	181.9	182.1	(0.2)
Income tax expense	13.4	12.3	1.1
Net income from continuing operations attributable to Chart Industries, Inc.	88.0	85.4	2.6
Net income from continuing operations attributable to Chart Industries, Inc. per common share:			
Basic	$1.73	$1.65	$ 0.08
Diluted	$1.67	$1.59	$ 0.08

NOTE 2 — Significant Accounting Policies

Use of Estimates: The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements. These estimates may also affect the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates and assumptions.

Cash, Cash Equivalents, Restricted Cash, and Restricted Cash Equivalents: We consider all investments with an initial maturity of three months or less when purchased to be cash equivalents. See the Debt and Credit Arrangements and Business Combinations notes for additional information about restricted cash and restricted cash equivalents, which is included in other current assets and other assets in the accompanying consolidated balance sheets.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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Accounts Receivable, Net of Allowances: Accounts receivable includes amounts billed and currently due from customers. The amounts due are stated at their net estimated realizable value. We maintain an allowance for doubtful accounts to provide for the estimated amount of receivables that will not be collected. The allowance is based upon an assessment of customer creditworthiness, historical payment experience, the age of outstanding receivables and collateral to the extent applicable. Past-due trade receivable balances are written off when our internal collection efforts have been unsuccessful. As a practical expedient, we do not adjust the promised amount of consideration for the effects of a significant financing component when we expect, at contract inception, that the period between our transfer of a promised product or service to a customer and when the customer pays for that product or service will be one year or less. We do not typically include extended payment terms in our contracts with customers.

Inventories: Inventories are stated at the lower of cost or net realizable value with cost being determined by the first-in, first-out ("FIFO") method. We determine inventory valuation reserves based on a combination of factors. In circumstances where we are aware of a specific problem in the valuation of a certain item, a specific reserve is recorded to reduce the item to its net realizable value. We also recognize reserves based on the actual usage in recent history and projected usage in the near-term.

Unbilled Contract Revenue: Unbilled contract revenue represents contract assets resulting from revenue recognized over time in excess of the amount billed to the customer and the amount billed to the customer is not just subject to the passage of time. Billing requirements vary by contract but are generally structured around the completion of certain milestones. These contract assets are generally classified as current.

Property, Plant and Equipment: Capital expenditures for property, plant and equipment are recorded at cost. Expenditures for maintenance and repairs are charged to expense as incurred, whereas major improvements that extend the useful life are capitalized. The cost of applicable assets is depreciated over their estimated useful lives. Depreciation is computed using the straight-line method for financial reporting purposes and accelerated methods for income tax purposes.

Long-lived Assets: We monitor our property, plant, equipment, and finite-lived intangible assets for impairment indicators on an ongoing basis. If impairment indicators exist, assets are grouped and tested at the lowest level for which identifiable cash flows are available. We perform the required analysis and record impairment charges, if applicable. In conducting our analysis, we compare the undiscounted cash flows expected to be generated from the long-lived assets to the related net book values. If the undiscounted cash flows exceed the net book value, the long-lived assets are considered not to be impaired. If the net book value exceeds the undiscounted cash flows, an impairment loss is measured and recognized. An impairment loss is measured as the difference between the net book value and the fair value of the long-lived assets. Fair value is estimated from discounted future net cash flows (for assets held and used) or net realizable value (for assets held for sale). Changes in economic or operating conditions impacting these estimates and assumptions could result in the impairment of long-lived assets. We amortize intangible assets that have finite lives over their estimated useful lives.

Goodwill and Indefinite-Lived Intangible Assets: Goodwill is recognized as the excess cost of an acquired entity over the net amount assigned to assets acquired and liabilities assumed. We do not amortize goodwill or indefinite-lived intangible assets, but review them for impairment annually in the fourth quarter or whenever events or changes in circumstances indicate that an evaluation should be completed.

Goodwill is analyzed on a reporting unit basis. The reporting units are the same as the operating and reportable segments: Energy & Chemicals ("E&C"), Distribution & Storage Western Hemisphere ("D&S West") and Distribution & Storage Eastern Hemisphere ("D&S East"). We first evaluate qualitative factors, such as macroeconomic conditions and our overall financial performance to determine whether it is more likely than not that the fair value of a reporting unit is less than its carrying amount, including goodwill. We then evaluate how significant each of the identified factors could be to the fair value or carrying amount of a reporting unit and weigh these factors in totality in forming a conclusion of whether or not it is more likely than not that the fair value of a reporting unit is less than its carrying amount (the "Step 0 Test"). If we determine that it is not more likely than not that the fair value of a reporting unit is less than its carrying amount, the first step of the goodwill impairment test is not necessary. Otherwise, we would proceed to the first step of the goodwill impairment test.

Alternatively, we may also bypass the Step 0 Test and proceed directly to the first step of the goodwill impairment test. Under the first step ("Step 1"), we estimate the fair value of the reporting units by considering income and market approaches to develop fair value estimates, which are weighted to arrive at a fair value estimate for each reporting unit. With respect to the income approach, a model has been developed to estimate the fair value of each reporting unit. This fair value model incorporates estimates of future cash flows, estimates of allocations of certain assets and cash flows among reporting units, estimates of future growth rates and management's judgment regarding the applicable discount rates to use to discount such estimates of cash flows.

With respect to the market approach, a guideline company method is employed whereby pricing multiples are derived from companies with similar assets or businesses to estimate fair value of each reporting unit. If the fair value of the reporting unit exceeds the carrying amount of the net assets assigned to that reporting unit, then goodwill is not impaired and no further testing is required. However, if the fair value of the reporting unit is less than its carrying amount, the impairment charge is based on the excess of a reporting unit's carrying amount over its fair value (i.e., we would measure the charge based on the result from Step 1).

In order to assess the reasonableness of the calculated fair values of the reporting units, we also compare the sum of the reporting units' fair values to the market capitalization and calculate an implied control premium (the excess of the sum of the reporting units' fair values over the market capitalization). We evaluate the control premium by comparing it to control premiums of recent comparable transactions. If the implied control premium is not reasonable in light of this assessment, we reevaluate the fair value estimates of the reporting units by adjusting the discount rates and other assumptions as necessary.

Changes to the assumptions and estimates used throughout the steps described above may result in a significantly different estimate of the fair value of the reporting units, which could result in a different assessment of the recoverability of goodwill and result in future impairment charges.

With respect to indefinite-lived intangible assets, we first evaluate relevant events and circumstances to determine whether it is more likely than not that the fair value of an indefinite-lived intangible asset is less than its carrying amount. If, in weighing all relevant events and circumstances in totality, we determine that it is more likely than not that an indefinite-lived intangible asset is not impaired, no further action is necessary. Otherwise, we would determine the fair value of indefinite-lived intangible assets and perform a quantitative impairment assessment by comparing the indefinite-lived intangible asset's fair value to its carrying amount. We may bypass such a qualitative assessment and proceed directly to the quantitative assessment. We estimate the fair value of the indefinite-lived assets using the income approach. This may include the relief from royalty method or use of a model similar to the one described above related to goodwill which estimates the future cash flows attributed to the indefinite-lived intangible asset and then discounting these cash flows back to a present value. Under the relief from royalty method, fair value is estimated by discounting the royalty savings, as well as any tax benefits related to ownership to a present value. The fair value from either approach is compared to the carrying value and an impairment is recorded if the fair value is determined to be less than the carrying value.

See Note 8, "Goodwill and Intangible Assets," for more information relating to goodwill and indefinite-lived intangible assets.

Customer Advances and Billings in Excess of Contract Revenue: Our contract liabilities consist of advance customer payments, billings in excess of revenue recognized and deferred revenue. Our contract assets and liabilities are reported in a net position on a contract-by-contract basis at the end of each reporting period. We classify advance customer payments and billings in excess of revenue recognized as current. We classify deferred revenue as current or non-current based on the timing of when we expect to recognize revenue. The current portion of deferred revenue is included in customer advances and billings in excess of contract revenue in our audited consolidated balance sheets. Long-term deferred revenue is included in other long-term liabilities in our audited consolidated balance sheets.

Convertible Debt: We determined that the conversion option within our 1.00% Convertible Senior Subordinated Notes due November 2024 (the "2024 Notes") was not clearly and closely related to the debt instrument host, however, the conversion option met a scope exception to derivative instrument accounting since the conversion feature is indexed to our common stock and meets equity classification criteria. Convertible debt instruments exempt from derivative accounting and subject to cash settlement of the conversion option are recognized by bifurcating the principal balance into a liability component and an equity component where the fair value of the liability component is estimated by calculating the present value of its cash flows discounted at an interest rate that we would have received for similar debt instruments that have no conversion rights (the "straight-debt rate"), and the equity component is the residual amount, net of tax, which creates a discount on the 2024 Notes. We recognize non-cash interest accretion expense related to the carrying amount of the 2024 Notes which is accreted back to its principal amount over the expected life of the debt, which is also the stated life of the debt.

Financial Instruments: The fair values of cash equivalents, accounts receivable, accounts payable and short-term bank debt approximate their carrying amount because of the short maturity of these instruments.

To minimize credit risk from trade receivables, we review the financial condition of potential customers in relation to established credit requirements before sales credit is extended and monitor the financial condition and payment history of customers

CHART INDUSTRIES, INC. AND SUBSIDIARIES
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to help ensure timely collections and to minimize losses. Additionally, for certain domestic and foreign customers, particularly in the E&C segment, we require advance payments, letters of credit, bankers' acceptances, and other such guarantees of payment. Certain customers also require us to issue letters of credit or performance bonds, particularly in instances where advance payments are involved, as a condition of placing the order.

Fair Value Measurements: We measure our financial assets and liabilities at fair value on a recurring basis using a three-tier fair value hierarchy, which prioritizes the inputs used in the valuation methodologies. The three levels of inputs used to measure fair value are as follows:

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 reflecting our own assumptions, consistent with reasonably available assumptions made by other market participants. These valuations require significant judgment.

Derivative Financial Instruments: We utilize certain derivative financial instruments to enhance our ability to manage foreign currency risk that exists as part of ongoing business operations. Derivative instruments are entered into for periods consistent with related underlying exposures and do not constitute positions independent of those exposures. We do not enter into contracts for speculative purposes nor are we a party to any leveraged derivative instrument. We are exposed to foreign currency exchange risk as a result of transactions in currencies other than the functional currency of certain subsidiaries. We utilize foreign currency forward purchase and sale contracts to manage the volatility associated with foreign currency purchases and certain intercompany transactions in the normal course of business. Contracts typically have maturities of less than one year. Principal currencies include the U.S. dollar, the euro, the Chinese yuan, the Czech koruna, the Australian dollar, the British pound, the Canadian dollar, the Indian rupee and the Japanese yen. Our foreign currency forward contracts do not qualify as hedges as defined by accounting guidance. Foreign currency forward contracts are measured at fair value and recorded on the consolidated balance sheets as other current liabilities or assets. Changes in their fair value are recorded in the consolidated statements of income as foreign currency gains or losses. Our foreign currency forward contracts are not exchange traded instruments and, accordingly, the valuation is performed using Level 2 inputs as defined above. Gains or losses on settled or expired contracts are recorded in the consolidated statements of income as foreign currency gains or losses.

Product Warranties: We provide product warranties with varying terms and durations for the majority of our products. We estimate product warranty costs and accrue for these costs as products are sold with a charge to cost of sales. Factors considered in estimating warranty costs include historical and projected warranty claims, historical and projected cost-per-claim, and knowledge of specific product issues that are outside of typical experience. Warranty accruals are evaluated and adjusted as necessary based on actual claims experience and changes in future claim and cost estimates.

Business Combinations: We account for business combinations in accordance with ASC 805, "Business Combinations." We recognize and measure identifiable assets acquired and liabilities assumed based on their estimated fair values. The excess of the consideration transferred over the fair value of the net assets acquired, including identifiable intangible assets, is assigned to goodwill. As additional information becomes available, we may further revise the preliminary acquisition consideration allocation during the remainder of the measurement period, which shall not exceed twelve months from the closing of the acquisition.

Identifiable finite-lived intangible assets generally consist of customer relationships, unpatented technology, patents and trademarks and trade names and are amortized over their estimate useful lives which generally range from 2 to 15 years. Identifiable indefinite-lived intangible assets generally consist of trademarks and trade names and are subject to impairment testing on at least an annual basis. We estimate the fair value of identifiable intangible assets under income approaches where the fair value models incorporate estimates of future cash flows, estimates of allocations of certain assets and cash flows, estimates of future growth rates, and management's judgment regarding the applicable discount rates to use to discount such estimates of cash flows.

We expense transaction related costs, including legal, consulting, accounting and other costs, in the periods in which the costs are incurred.

Revenue Recognition: Revenue is recognized when (or as) we satisfy performance obligations by transferring a promised good or service, an asset, to a customer. An asset is transferred to a customer when, or as, the customer obtains control over that asset. In most contracts, the transaction price includes both fixed and variable consideration. The variable consideration contained within our contracts with customers includes discounts, rebates, refunds, credits, price concessions, incentives, performance

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bonuses, penalties and other similar items. When a contract includes variable consideration, we evaluate the estimate of the variable consideration to determine whether the estimate needs to be constrained; therefore, we include the variable consideration in the transaction price only to the extent that it is probable that a significant reversal of the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. Variable consideration estimates are updated at each reporting date. When a contract includes multiple performance obligations, the contract price is allocated among the performance obligations based upon the stand alone selling prices. When the period between when we transfer a promised good or service to a customer and when the customer pays for that good or service is expected, at contract inception, to be one year or less, we do not adjust for the effects of a significant financing component.

For brazed aluminum heat exchangers, air cooled heat exchangers, cold boxes, liquefied natural gas fueling stations, engineered tanks, and repair services, most contracts contain language that transfers control to the customer over time. For these contracts, revenue is recognized as we satisfy the performance obligations by an allocation of the transaction price to the accounting period computed using input methods such as costs incurred. Input methods recognize revenue on the basis of the entity's efforts or inputs to the satisfaction of a performance obligation relative to the total expected inputs to the satisfaction of that performance obligation. The costs incurred input method measures progress toward the satisfaction of the performance obligation by multiplying the transaction price of the performance obligation by the percentage of incurred costs as of the balance sheet date to the total estimated costs at completion after giving effect to the most current estimates. Timing of amounts billed on contracts varies from contract to contract and could cause significant variation in working capital needs. Revisions to estimated cost to complete that result from inefficiencies in our performance that were not expected in the pricing of the contract are expensed in the period in which these inefficiencies become known. Contract modifications can change a contract's scope, price, or both. Approved contract modifications are accounted for as either a separate contract or as part of the existing contract depending on the nature of the modification.

For standard industrial gas and LNG tanks and some products identified in the prior paragraph with contract language that does not meet the over time recognition requirements, the contract with the customer contains language that transfers control to the customer at a point in time. For these contracts, revenue is recognized when we satisfy our performance obligation to the customer. Timing of amounts billed on contracts varies from contract to contract. The specific point in time when control transfers depends on the contract with the customer, contract terms that provide for a present obligation to pay, physical possession, legal title, risk and rewards of ownership, acceptance of the asset, and bill-and-hold arrangements may impact the point in time when control transfers to the customer. We recognize revenue under bill-and-hold arrangements when control transfers and the reason for the arrangement is substantive, the product is separately identified as belonging to the customer, the product is ready for physical transfer and we do not have the ability to use the product or direct it to another customer.

Incremental contract costs are expensed when incurred when the amortization period of the asset that would have been recognized is one year or less; otherwise, incremental contract costs are recognized as an asset and amortized over time as promised goods and services are transferred to a customer. When losses are expected to be incurred on a contract, we recognize the entire anticipated loss in the accounting period when the loss becomes evident. The loss is recognized when the current estimate of the consideration we expect to receive, modified to include unconstrained variable consideration instead of constrained variable consideration, is less than the current estimate of total costs for the contract.

Taxes assessed by a governmental authority that are both imposed on and concurrent with a specific revenue-producing transaction, that are collected by us from a customer, are excluded from revenue.

Shipping and handling fee revenues and the related expenses are reported as fulfillment revenues and expenses for all customers because we have adopted the practical expedient contained in ASC 606-10-25-18B. Therefore, all shipping and handling costs associated with outbound freight are accounted for as fulfillment costs and are included in cost of sales. Amounts billed to customers for shipping are classified as sales, and the related costs are classified as cost of sales on the consolidated statements of income. Shipping revenue of $11.4, $8.5, and $6.9 for the years ended December 31, 2018, 2017 and 2016, respectively, are included in sales. Shipping costs of $16.9, $11.1, and $9.5 for the years ended December 31, 2018, 2017 and 2016, respectively, are included in cost of sales.

Cost of Sales: Manufacturing expenses associated with sales are included in cost of sales. Cost of sales includes all materials, direct and indirect labor, inbound freight, purchasing and receiving, inspection, internal transfers, and distribution and warehousing of inventory. In addition, shop supplies, facility maintenance costs, manufacturing engineering, project management, and depreciation expense for assets used in the manufacturing process are included in cost of sales on the consolidated statements of income.

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Selling, General and Administrative ("SG&A") Expenses: SG&A expenses include selling, marketing, customer service, product management, design engineering, and other administrative expenses not directly supporting the manufacturing process, as well as depreciation and amortization expense associated with non-manufacturing assets. In addition, SG&A expenses include corporate operating expenses for executive management, accounting, tax, treasury, corporate development, human resources, information technology, investor relations, legal, internal audit and risk management.
Advertising Costs: We incurred advertising costs of $4.0, $4.2, and $3.8 for the years ended December 31, 2018, 2017 and 2016, respectively. Such costs are expensed as incurred and included in SG&A expenses in the consolidated statements of income.
Research and Development Costs: We incurred research and development costs of $11.1, $7.1, and $7.6 for the years ended December 31, 2018, 2017 and 2016, respectively. Such costs are expensed as incurred and included in SG&A expenses in the consolidated statements of income.
Foreign Currency Translation: The functional currency for the majority of our foreign operations is the applicable local currency. The translation from the applicable foreign currencies to U.S. dollars is performed for asset and liability accounts using exchange rates in effect at the balance sheet date and for revenue and expense accounts using the average exchange rate during the period. The resulting translation adjustments are recorded as a component of other comprehensive (loss) income in the consolidated statements of comprehensive income. Remeasurement from local to functional currencies is included in cost sales or foreign currency loss in the consolidated statements of income. Gains or losses resulting from foreign currency transactions are charged to net income in the consolidated statements of income as incurred.
Income Taxes: The Company and its U.S. subsidiaries file a consolidated federal income tax return. Deferred income taxes are provided for temporary differences between financial reporting and the consolidated tax return in accordance with the liability method. A valuation allowance is provided against net deferred tax assets when conditions indicate that it is more likely than not that the benefit related to such assets will not be realized. In assessing the need for a valuation allowance against deferred tax assets, we consider all available evidence, including past operating results, estimates of future taxable income, and the feasibility of tax planning strategies. In the event that we change our determination as to the amount of deferred tax assets that can be realized, the valuation allowance will be adjusted with a corresponding impact to the provision for income taxes in the period in which such determination is made.
We utilize a two-step approach for the recognition and measurement of uncertain tax positions. The first step is to evaluate the tax position and determine whether it is more likely than not that the position will be sustained upon examination by tax authorities. The second step is to measure the tax benefit as the largest amount that is more likely than not of being realized upon settlement.
Interest and penalties related to income taxes are accounted for as income tax expense in the consolidated statements of income.
We have accounted for the tax effects of the Tax Cuts and Jobs Act, which was signed into law on December 22, 2017. The Tax Act, among other things, reduced the U.S. federal corporate tax rate from 35% to 21%, requires companies to pay a one-time transition tax on certain unrepatriated earnings of foreign subsidiaries, requires a current inclusion in U.S. federal taxable income of certain earnings of foreign corporations, and creates a new limitation on deductible interest expense. In 2017, we accounted for the tax effects of the Tax Cuts and Jobs Act under the guidance of SAB 118, on a provisional basis. In 2018, we finalized our analyses under SAB 118. For further information, see Note 15, "Income Taxes."
Share-based Compensation: We measure share-based compensation expense for share-based payments to employees and directors, including grants of employee stock options, restricted stock, restricted stock units and performance units based on the grant-date fair value. The fair value of stock options is calculated using the Black-Scholes pricing model and is recognized on an accelerated basis over the vesting period. The grant-date fair value calculation under the Black-Scholes pricing model requires the use of variables such as exercise term of the option, future volatility,

dividend yield, and risk-free interest rate. The fair value of restricted stock and restricted stock units is based on Chart's market price on the date of grant and is generally recognized on an accelerated basis over the vesting period. The fair value of performance units is based on Chart's market price on the date of grant and pre-determined performance conditions as determined by the Compensation Committee of the Board of Directors and is recognized on a straight-line basis over the performance measurement period based on the probability that the performance conditions will be achieved. We reassess the vesting probability of performance units each reporting period and adjust share-based compensation expense based on our probability assessment. Share-based compensation expense for all awards considers estimated forfeitures.

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During the year, we may repurchase shares of common stock from equity plan participants to satisfy tax withholding obligations relating to the vesting or payment of equity awards. All such repurchased shares are retired in the period in which the repurchases occur.

Defined Benefit Pension Plans: We sponsor two defined benefit pension plans including the Chart Pension Plan, which has been frozen since February 2006, and a noncontributory defined benefit plan that we acquired as part of the Hudson acquisition (the "Hudson Plan"). The Hudson Plan is closed to new participants and not considered significant to our consolidated financial statements.

The funded status is measured as the difference between the fair value of the plan assets and the projected benefit obligation. The change in the funded status of the plan is recognized in the year in which the change occurs through accumulated other comprehensive loss. Our funding policy is to contribute at least the minimum funding amounts required by law. Management has chosen policies according to accounting guidance that allow the use of a calculated value of plan assets, which generally reduces the volatility of expense (income) from changes in pension liability discount rates and the performance of the pension plan's assets.

Recently Issued Accounting Standards: In August 2018, the FASB issued 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." This ASU clarifies the accounting treatment for implementation costs for cloud computing arrangements (hosting arrangements) that is a service contract. This guidance is effective for fiscal years beginning after December 15, 2019, including interim periods within that fiscal year. Early adoption is permitted. We are currently assessing the effect that this ASU will have on our financial position, results of operations, and disclosures.

In August 2018, the FASB issued ASU 2018-14, "Compensation – Retirement Benefits – Defined Benefit Plans – General (Subtopic 715-20): Disclosure Framework—Changes to the Disclosure Requirements for Defined Benefit Plans." This ASU adds, modifies and clarifies several disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. This guidance is effective for fiscal years ending after December 15, 2020. Early adoption is permitted. We are currently assessing the effect that this ASU will have on our financial position, results of operations, and disclosures.

In August 2018, the FASB issued ASU 2018-13, "Fair Value Measurement (Topic 820): Disclosure Framework – Changes to the Disclosure Requirements for Fair Value Measurement." This ASU adds, modifies and removes several disclosure requirements relative to the three levels of inputs used to measure fair value in accordance with Topic 820, "Fair Value Measurement." This guidance is effective for fiscal years beginning after December 15, 2019, including interim periods within that fiscal year. Early adoption is permitted. We are currently assessing the effect that this ASU will have on our financial position, results of operations, and disclosures.

In July 2018, the FASB issued ASU 2018-09, "Codification Improvements." This ASU makes amendments to multiple codification Topics. The transition and effective date guidance is based on the facts and circumstances of each amendment. Some of the amendments in this ASU do not require transition guidance and will be effective upon issuance of this ASU. However, many of the amendments in this ASU do have transition guidance with effective dates for annual periods beginning after December 15, 2018. We are currently assessing the effect that this ASU will have on our financial position, results of operations, and disclosures.

In February 2018, the FASB issued ASU 2018-02, "Income Statement – Reporting Comprehensive Income (Topic 220): Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income." The FASB issued the update to provide amended guidance to "allow a reclassification from accumulated other comprehensive income to retained earnings for stranded tax effects resulting from the Tax Cuts and Jobs Act." Additionally, under the new guidance an entity will be required to provide certain disclosures regarding stranded tax effects. The guidance is effective for fiscal years beginning after December 15, 2018, including interim periods within those years, and the guidance may be applied either in the period of adoption or retrospectively to each period (or periods) in which the effect of the change in the U.S. federal income tax rate in the Tax Cuts and Jobs Act is recognized. Early adoption is permitted. We are currently assessing the effect that the ASU will have on our financial position, results of operations, and disclosures.

In August 2017, the FASB issued ASU 2017-12, “Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities.” The ASU expands and enhances hedge accounting to become more closely aligned with an entity’s risk management activities through hedging strategies. The ASU provides changes to both the designation and measurement guidance for qualifying hedging relationships and the presentation of hedge results in the financial statements and creates more transparency and better understandability around how economic results are presented in the financial statements. In addition, the new guidance makes certain targeted improvements to ease the application of accounting guidance relative to hedge effectiveness. The guidance will be applied prospectively for annual periods and interim periods beginning after December 15, 2018. Early adoption is permitted. We are currently assessing the effect that the ASU will have on our financial position, results of operations, and disclosures.

In June 2016, the FASB issued ASU 2016-13, “Financial Instruments—Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments” and subsequently issued additional guidance that modified ASU 2016-13. ASU 2016-13 and the subsequent modifications are identified as ASC 326.” The standard requires an entity to change its accounting approach in determining impairment of certain financial instruments, including trade receivables, from an “incurred loss” to a “current expected credit loss” model. The standard will be effective for fiscal years beginning after December 15, 2019, including interim periods within such fiscal years. Early adoption is permitted. We are currently assessing the effect that ASC 326 will have on our financial position, results of operations, and disclosures.

In February 2016, the FASB issued ASU 2016-02, “Leases (Topic 842)” and subsequently issued additional guidance that modified ASU 2016-02. ASU 2016-02 and the subsequent modifications are identified as “ASC 842.” The FASB issued ASC 842 to require the recognition of lease assets and lease liabilities on the balance sheet of lessees. The standard will be effective for fiscal years beginning after December 15, 2018, including interim periods within such fiscal years. ASC 842 requires a modified retrospective transition method with the option to elect a package of practical expedients. Early adoption is permitted.

We expect adoption to increase liabilities and assets recorded on our consolidated balance sheet due to the addition of right-of-use assets and lease liabilities and our total right-of-use assets. We also expect that adoption of ASC 842 will increase the level of disclosures related to leases and require changes to our internal controls to support recognition and disclosure requirements under the new standard. As of December 31, 2018, we had $39.6 million of undiscounted future minimum lease payments for non-cancelable operating leases as discussed in Note 18, “Lease Commitments.” While we are substantially complete, we are currently still in the process of finalizing our evaluation of the effect that ASC 842 will have on our consolidated financial statements and disclosures. We expect to complete our accounting assessment and determine the quantitative impact of adoption during the first quarter of 2019.

NOTE 3 — Discontinued Operations

On December 20, 2018, we closed the sale of our oxygen-related products business, which was formerly within our BioMedical segment prior to our strategic realignment in the third quarter of 2018 discussed in Note 4, “Segment and Geographic Information,” to NGK SPARK PLUG CO., LTD. for $133.5 (the “Divestiture”). The strategic decision to divest the oxygen-related products business reflects our strategy and capital allocation approach to focus on our core capabilities and offerings. We recorded a gain on the Divestiture of $34.3 for the year ended December 31, 2018.

As a result of the Divestiture, the asset group, which included our respiratory and on-site generation systems businesses, met the criteria to be held for sale in the balance sheet as of December 31, 2017. Furthermore, we determined that the assets held for sale qualified for discontinued operations for the years ended December 31, 2018, 2017 and 2016. As such, the financial results of the respiratory therapy and on-site generation systems businesses are reflected in our consolidated statements of income and consolidated statements of comprehensive income as discontinued operations for all periods presented. Interest expense of $3.2, $2.1 and $2.2 was allocated to discontinued operations for the years ended December 31, 2018, 2017 and 2016, respectively, based on the net assets of the discontinued operations as a percentage of the net assets of Chart. Current and non-current assets and liabilities of discontinued operations are reflected in the audited consolidated balance sheet as of December 31, 2017.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

Summarized Financial Information of Discontinued Operations
The following table represents income from discontinued operations, net of tax:

	Year Ended December 31,		
	2018	2017	2016
Sales	$ 157.0	$ 145.9	$ 137.2
Cost of sales	115.8	105.4	80.5
Selling, general and administrative expenses	32.7	34.2	37.2
Amortization expense	2.3	2.8	3.1
Operating income [(1)]	6.2	3.5	16.4
Interest expense, net	3.2	2.1	2.2
Other expense (income), net	0.1	(1.1)	(0.1)
Income before income taxes	2.9	2.5	14.3
Income tax expense	2.8	0.7	3.1
Income from discontinued operations before gain on sale of business	0.1	1.8	11.2
Gain on sale of business, net of taxes of $2.6	34.3	—	—
Income from discontinued operations, net of tax	$ 34.4	$ 1.8	$ 11.2

(1) Includes depreciation expense of $1.7, $1.6, and $1.4 for the years ended December 31, 2018, 2017 and 2016, respectively.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

The following table represents the assets and liabilities from discontinued operations:

	December 31, 2017
Accounts receivable, net	$ 26.3
Inventories, net	35.2
Unbilled contract revenue	0.5
Prepaid expenses	1.0
Deferred income taxes	3.7
Current assets of discontinued operations	$ 66.7
Property, plant, and equipment, net	12.6
Goodwill	9.1
Identifiable intangible assets, net	16.1
Other assets	0.4
Non-current assets of discontinued operations	$ 38.2
Accounts payable	8.6
Customer advances and billings in excess of contract revenue	0.6
Accrued salaries, wages, and benefits	2.7
Current portion of warranty reserve	2.6
Other current liabilities	1.4
Current liabilities of discontinued operations	$ 15.9
Long-term deferred tax liabilities	0.4
Other long-term liabilities	2.2
Non-current liabilities of discontinued operations	$ 2.6

NOTE 4 — Segment and Geographic Information

As previously reported in our Annual Report on Form 10-K for the year ended December 31, 2017, the structure of our internal organization was divided into the following reportable segments, which were also our operating segments: Energy & Chemicals (“E&C”), Distribution & Storage (“D&S”), and BioMedical. During 2018, we executed a strategic realignment of our segment structure and divided our D&S segment into two segments: Distribution & Storage Western Hemisphere (“D&S West”) and Distribution & Storage Eastern Hemisphere (“D&S East”). We have split responsibility for D&S West and D&S East under different business leaders and associated internal reporting responsibilities. We believe these changes will facilitate our growth strategies, better align with our customer needs, and provide improved transparency of business results to our shareholders.

As a result of the divestiture of the respiratory therapy and on-site generation systems businesses described in Note 3, “Discontinued Operations,” and the acquisition or VRV as described in Note 12, “Business Combinations,” our reportable and operational segments now include: E&C, D&S West and D&S East. Our reportable segments are business units that are each managed separately. Our E&C segment manufactures, offers, and distributes distinct products with different production processes as compared to both our D&S West and D&S East segments. Our D&S West segment has principal operations in the United States and Latin America and primarily serves the Americas geographic region while our D&S East segment has principal operations in Europe and Asia and primarily serves the geographic regions of Europe, Middle East and Asia. Our D&S West segment also includes cryobiological storage manufacturing and distribution operations in the U.S., Europe and Asia, which serve customers around the world. Corporate includes operating expenses for executive management, accounting, tax, treasury, corporate development, human resources, information technology, investor relations, legal, internal audit, and risk management. Corporate support functions are not currently allocated to the segments.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

We evaluate performance and allocate resources based on operating income as determined in our audited consolidated statements of income.

Segment Financial Information

	Year Ended December 31, 2018					
	Energy & Chemicals	D&S West	D&S East	Intersegment Eliminations	Corporate	Consolidated
Sales to external customers	$390.5	$455.5	$246.3	$ (8.0)	$ —	$ 1,084.3
Depreciation and amortization expense	27.0	11.2	11.1	—	1.5	50.8
Operating income (loss) [1] [2] [3] [5]	25.5	101.2	19.3	(2.5)	(51.4)	92.1
Capital expenditures	15.5	6.0	10.4	—	3.7	35.6
	Year Ended December 31, 2017					
	Energy & Chemicals	D&S West	D&S East	Intersegment Eliminations	Corporate	Consolidated
Sales to external customers	$225.6	$400.6	$232.3	$ (15.6)	$ —	$ 842.9
Depreciation and amortization expense	15.3	10.6	9.5	—	2.2	37.6
Operating income (loss) [1] [4]	5.1	85.2	14.2	(3.6)	(62.4)	38.5
Capital expenditures	15.5	4.1	11.1	—	2.3	33.0
	Year Ended December 31, 2016					
	Energy & Chemicals	D&S West	D&S East	Intersegment Eliminations	Corporate	Consolidated
Sales to external customers	$154.3	$378.1	$197.6	$ (8.0)	$ —	$ 722.0
Depreciation and amortization expense	10.0	11.7	8.3	—	3.1	33.1
Operating (loss) income [1] [4] [6]	13.3	75.6	0.3	(2.1)	(46.1)	41.0
Capital expenditures	3.3	3.9	8.6	—	0.5	16.3

(1) Includes restructuring costs of $4.4, $11.2 and $9.5 for the years ended December 31, 2018, 2017 and 2016, respectively.

(2) Includes an expense of $4.0 recorded to cost of sales related to the estimated costs of the aluminum cryobiological tank recall for the year ended December 31, 2018.

(3) Includes transaction-related costs of $2.1 for the year ended December 31, 2018, which were mainly related to the VRV acquisition. Includes integration costs of $0.8 related to the VRV acquisition for the year ended December 31, 2018.

(4) Includes transaction-related costs of $10.1 and $0.4 for the year ended December 31, 2017 and 2016, respectively.

(5) During the year ended December 31, 2018, we recorded net severance costs of $2.3 primarily related to headcount reductions associated with the strategic realignment of our segment structure, which includes $1.8 in payroll severance costs partially offset by a $0.9 credit due to related share-based compensation forfeitures for 2018. Includes net severance costs of $1.4 related to the departure of our former CEO, which includes $3.2 in payroll severance costs partially offset by a $1.8 credit due to related share-based compensation forfeitures for 2018.

(6) Includes asset impairment charges of $1.2 attributed to our D&S East segment.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

Product Sales Information

	Year Ended December 31, 2018				
	Energy & Chemicals	D&S West	D&S East	Intersegment Eliminations	Consolidated
Natural gas processing (including petrochemical) applications	$262.1	$—	$—	$ —	$ 262.1
Liquefied natural gas (LNG) applications	40.6	71.7	65.3	(2.0)	175.6
Industrial gas production applications	13.6	—	—	—	13.6
HVAC, power and refining applications	74.2	—	—	—	74.2
Bulk industrial gas applications	—	148.5	126.1	(1.0)	273.6
Packaged gas industrial applications	—	153.4	54.9	(3.5)	204.8
Cryobiological storage	—	81.9	—	(1.5)	80.4
Total	$390.5	$455.5	$246.3	$ (8.0)	$ 1,084.3

	Year Ended December 31, 2017				
	Energy & Chemicals	D&S West	D&S East	Intersegment Eliminations	Consolidated
Natural gas processing (including petrochemical) applications	$152.9	$—	$—	$ —	$ 152.9
Liquefied natural gas (LNG) applications	29.5	58.0	80.2	(0.2)	167.5
Industrial gas production applications	22.4	—	—	—	22.4
HVAC, power and refining applications	20.8	—	—	—	20.8
Bulk industrial gas applications	—	129.6	93.4	(0.5)	222.5
Packaged gas industrial applications	—	136.0	58.7	(14.9)	179.8
Cryobiological storage	—	77.0	—	—	77.0
Total	$225.6	$400.6	$232.3	$ (15.6)	$ 842.9

	Year Ended December 31, 2016				
	Energy & Chemicals	D&S West	D&S East	Intersegment Eliminations	Consolidated
Natural gas processing (including petrochemical) applications	$105.4	$—	$—	$ —	$ 105.4
Liquefied natural gas (LNG) applications	38.2	45.9	67.0	(4.2)	146.9
Industrial gas production applications	10.7	—	—	—	10.7
HVAC, power and refining applications	—	—	—	—	—
Bulk industrial gas applications	—	141.4	90.1	(0.8)	230.7
Packaged gas industrial applications	—	120.2	40.5	(3.0)	157.7
Cryobiological storage	—	70.6	—	—	70.6
Total	$154.3	$378.1	$197.6	$ (8.0)	$ 722.0

Sales to Praxair and Linde, which combined in 2018, exceeded 10% of consolidated sales in 2018 on a combined basis and represented approximately $121.6 or 11.2% of consolidated sales in 2018 (attributable to all of our segments). Sales to Air Liquide, exceeded 10% of consolidated sales in 2016, and represented approximately $90.6 or 12.5% of consolidated sales in 2016 (attributable to all of our segments). In 2017, no single customer accounted for more than 10% of consolidated sales.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

	Total Assets for the Year Ended December 31,	
	2018	2017
Energy & Chemicals (1) (2)	$889.2	$782.9
D&S West	420.3	415.7
D&S East (1)	496.1	327.3
Corporate	92.1	93.9
Total assets of discontinued operations	—	104.9
Consolidated	$1,897.7	$1,724.7

(1) Total assets at December 31, 2018 includes $327.8 related to VRV (E&C $145.8, D&S East $182.0) of which $64.0 (E&C $27.4, D&S East $36.6) and $66.4 (E&C $33.2, D&S East $33.2) represented acquired goodwill and identifiable intangible assets, net, respectively. See Note 12, "Business Combinations," for further information related to the VRV acquisition.

(2) Total assets at December 31, 2017 includes $572.8 related to Hudson of which $238.3 and $211.0 represented acquired goodwill and identifiable intangible assets, net, respectively. See Note 12, "Business Combinations," for further information related to the Hudson acquisition.

Geographic Information

Net sales by geographic area are reported by the destination of sales. Net property, plant and equipment by geographic area are reported by country of domicile.

	Sales for the Year Ended December 31,		
	2018	2017	2016
United States	$604.8	$475.0	$378.0
Foreign			
China	115.1	101.3	84.7
Other foreign countries	364.4	266.6	259.3
Total Foreign	479.5	367.9	344.0
Total	$1,084.3	$842.9	$722.0

	Property, plant and equipment, net as of December 31,	
	2018	2017
United States	$176.8	$166.6
Foreign		
China	77.2	82.4
Italy	52.9	2.0
Czech Republic	21.5	20.5
India	19.8	—
Germany	12.9	13.4
Other foreign countries	—	0.1
Total Foreign	184.3	118.4
Total	$361.1	$285.0

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

NOTE 5 — Revenue
Disaggregation of Revenue
The following table represents a disaggregation of revenue by timing of revenue along with the reportable segment for each category:

	Year Ended December 31, 2018				
	Energy & Chemicals	D&S West	D&S East	Intersegment Eliminations	Consolidated
Point in time	$136.2	$405.3	$222.9	$ (6.2)	$ 758.2
Over time	254.3	50.2	23.4	(1.8)	326.1
Total	$390.5	$455.5	$246.3	$ (8.0)	$ 1,084.3

Refer to Note 4, "Segment and Geographic Information," for a table of revenue disaggregated by product application along with the reportable segment for each category.
Contract Balances
The following table represents changes in our contract assets and contract liabilities balances:

	December 31, 2018	January 1, 2018	Year-to-date Change ($)	Year-to-date Change (%)
Contract assets				
Accounts receivable, net of allowances	$ 194.8	$196.4	$ (1.6)	0.8 %
Unbilled contract revenue	54.5	43.0	11.5	(26.7)%
Contract liabilities				
Customer advances and billings in excess of contract revenue	$ 130.0	$101.8	$ 28.2	(27.7)%
Long-term deferred revenue	1.4	1.7	(0.3)	17.6 %

Revenue recognized for the years ended December 31, 2018 and 2017, that was included in the contract liabilities balance at the beginning of each year was $83.7 and $56.7, respectively. The amount of revenue recognized during the full year ended December 31, 2018 from performance obligations satisfied or partially satisfied in previous periods as a result of changes in the estimates of variable consideration related to long-term contracts, was not significant.
Remaining Performance Obligations
Remaining performance obligations represent the transaction price of firm signed purchase orders or other written contractual commitments from customers for which work has not been performed, or is partially completed, and excludes unexercised contract options and potential orders. As of December 31, 2018, the estimated revenue expected to be recognized in the future related to remaining performance obligations was $568.2. We expect to recognize revenue on approximately 91.8% of the remaining performance obligations over the next 12 months and 0.4% of the remaining performance obligations over the next 13 to 24 months, with the remaining balance recognized thereafter.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

NOTE 6 — Inventories

The following table summarizes the components of inventory:

	December 31,	
	2018	2017
Raw materials and supplies	$97.7	$72.1
Work in process	53.0	37.1
Finished goods	82.4	64.5
Total inventories, net	$233.1	$173.7

Our inventories, net, balance was $233.1 at December 31, 2018 compared to $173.7 at December 31, 2017, representing an increase of $59.4. The VRV acquisition added $49.0 to our inventories, net balance at December 31, 2018. The VRV acquisition is further described in Note 12, “Business Combinations,” to our consolidated financial statements included elsewhere in this report.

The allowance for excess and obsolete inventory balance at December 31, 2018 and 2017 was $9.0 and $7.1, respectively.

NOTE 7 — Property, Plant and Equipment

The following table summarizes the components of property, plant and equipment:

		December 31,	
Classification	Estimated Useful Life	2018	2017
Land and buildings	20-35 years	$287.0	$221.5
Machinery and equipment	3-12 years	214.7	189.6
Computer equipment, furniture and fixtures	3-7 years	38.5	35.3
Construction in process		30.9	25.4
Total property, plant and equipment, gross		571.1	471.8
Less: accumulated depreciation		(210.0)	(186.8)
Total property, plant and equipment, net		$361.1	$285.0

Depreciation expense was $28.9, $25.3 and $24.2 for the years ended December 31, 2018, 2017 and 2016, respectively.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

NOTE 8 — Goodwill and Intangible Assets
Goodwill
The following table represents the changes in goodwill by segment:

	Energy & Chemicals	D&S West	D&S East	Consolidated
Balance at January 1, 2017	$ 27.9	$ 146.2	$ 34.8	$ 208.9
Foreign currency translation adjustments and other	0.1	(0.1)	2.5	2.5
Goodwill acquired during the year	247.1	1.2	—	248.3
Balance at December 31, 2017	275.1	147.3	37.3	459.7
Foreign currency translation adjustments and other	(1.1)	(0.7)	0.2	(1.6)
Goodwill acquired during the year	27.1	4.7	36.1	67.9
Purchase price adjustment (1)	(5.3)	—	—	(5.3)
Balance at December 31, 2018	$ 295.8	$ 151.3	$ 73.6	$ 520.7
Accumulated goodwill impairment loss at December 31, 2018, December 31, 2017 and January 1, 2017	$ 64.6	$ 82.5	$—	$ 147.1

(1) During 2018, we recorded $5.3 in purchase price adjustments related to the Hudson acquisition. For further information, see Note 12, “Business Combinations.”

Intangible Assets
The following table displays the gross carrying amount and accumulated amortization for finite-lived intangible assets and indefinite-lived intangible assets (exclusive of goodwill) [1]:

	Weighted-average Estimated Useful Life	December 31, 2018 Gross Carrying Amount	December 31, 2018 Accumulated Amortization	December 31, 2017 Gross Carrying Amount	December 31, 2017 Accumulated Amortization
Finite-lived intangible assets:					
Customer relationships	14 years	$254.0	$ (92.0)	$226.5	$ (74.9)
Unpatented technology	12 years	39.4	(5.1)	22.6	(2.6)
Land use rights	50 years	12.2	(1.3)	13.4	(1.2)
Trademarks and trade names	14 years	13.5	(1.1)	3.4	(1.7)
Patents and other	7 years	14.0	(1.5)	2.6	(0.6)
Total finite-lived intangible assets	14 years	$333.1	$ (101.0)	$268.5	$ (81.0)
Indefinite-lived intangible assets:					
Trademarks and trade names		98.3	—	98.9	—
Total intangible assets		$431.4	$ (101.0)	$367.4	$ (81.0)

(1) Amounts include the impact of foreign currency translation. Fully amortized or impaired amounts are written off.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

Amortization expense for intangible assets subject to amortization was $21.9, $12.2 and $8.8 for the years ended December 31, 2018, 2017 and 2016, respectively. We estimate amortization expense to be recognized during the next five years as follows:

For the Year Ending December 31,	
2019	$29.3
2020	27.0
2021	20.0
2022	19.8
2023	19.5

See Note 12, “Business Combinations,” for further information related to intangible assets acquired during 2018 and 2017.

Government Grants

We received certain government grants related to land use rights for capacity expansion in China (“China Government Grants”). China Government Grants are generally recorded in other current liabilities and other long-term liabilities in the consolidated balance sheets and generally recognized into income over the useful life of the associated assets (10 to 50 years).

China Government Grants are presented in our consolidated balance sheets as follows:

	December 31,	
	2018	2017
Current	$ 0.5	$ 0.5
Long-term	7.7	8.7
Total China Government Grants	$ 8.2	$ 9.2

We also received government grants from certain local jurisdictions within the United States, which are recorded in other assets in the consolidated balance sheets and were not significant for the periods presented.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

NOTE 9 — Debt and Credit Arrangements
Summary of Outstanding Borrowings
The following table represents the components of our borrowings:

	December 31,	
	2018	2017
Convertible notes due November 2024:		
Principal amount	$258.8	$258.8
Unamortized discount	(50.4)	(57.6)
Unamortized debt issuance costs	(4.5)	(5.1)
Convertible notes due November 2024, net of unamortized discount and debt issuance costs	203.9	196.1
Convertible notes due August 2018:		
Principal amount	—	57.1
Unamortized discount	—	(1.9)
Unamortized debt issuance costs	—	(0.1)
Convertible notes due August 2018, net of unamortized discount and debt issuance costs	—	55.1
Senior secured revolving credit facility due November 2022	329.3	239.0
Foreign facilities	11.2	7.9
Total debt, net of unamortized discount and debt issuance costs	544.4	498.1
Less: current maturities (1)	(11.2)	(58.9)
Long-term debt	$533.2	$439.2

(1) Current maturities at December 31, 2017 includes $55.1 of Convertible notes due August 2018, net of unamortized discount and debt issuance costs.

2024 Convertible Notes

On November 6, 2017, we issued 1.00% Convertible Senior Subordinated Notes due November 2024 (the “2024 Notes”) in the aggregate principal amount of $258.8, pursuant to an Indenture, dated as of such date (the “Indenture”). The 2024 Notes bear interest at an annual rate of 1.00%, payable on May 15 and November 15 of each year, beginning on May 15, 2018, and will mature on November 15, 2024 unless earlier converted or repurchased.

The 2024 Notes are senior subordinated unsecured obligations of the Company and are not guaranteed by any of our subsidiaries. The 2024 Notes are senior in right of payment to our future subordinated debt, equal in right of payment with the Company’s future senior subordinated debt and are subordinated in right of payment to our existing and future senior indebtedness, including indebtedness under our existing credit agreement.

A conversion of the 2024 Notes may be settled in cash, shares of our common stock or a combination of cash and shares of our common stock, at our election (subject to, and in accordance with, the settlement provisions of the Indenture). The initial conversion rate for the 2024 Notes is 17.0285 shares of common stock (subject to adjustment as provided for in the Indenture) per $1,000 principal amount of the 2024 Notes, which is equal to an initial conversion price of approximately $58.725 per share, representing a conversion premium of approximately 35% above the closing price of our common stock of $43.50 per share on October 31, 2017. In addition, following certain corporate events that occur prior to the maturity date as described in the Indenture, we will pay a make-whole premium by increasing the conversion rate for a holder who elects to convert its 2024 Notes in connection with such a corporate event in certain circumstances. For purposes of calculating earnings per share, if the average market price of our common stock exceeds the applicable conversion price during the periods reported, shares contingently issuable under the 2024 Notes will have a dilutive effect with respect to our common stock. Because our closing common stock price of $65.03 at the end of the period exceeded the conversion price of $58.725, the if-converted value exceeded the principal amount of the 2024

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Notes by approximately $27.8 at December 31, 2018. As described below, we entered into convertible note hedge transactions, which are expected to reduce the potential dilution with respect to our common stock upon conversion of the 2024 Notes.

Holders of the 2024 Notes may convert their 2024 Notes at their option at any time prior to the close of business on the business day immediately preceding August 15, 2024 only under the following circumstances: (1) during any fiscal quarter commencing after December 31, 2017 (and only during such fiscal quarter), if the last reported sale price of our common stock for at least 20 trading days (whether or not consecutive) during the period of 30 consecutive trading days ending on, and including, the last trading day of the immediately preceding fiscal quarter is greater than or equal to 130% of the applicable conversion price for the 2024 Notes on each applicable trading day; (2) during the five business day period after any 10 consecutive trading day period (the “measurement period”) in which the “trading price” (as defined in the Indenture) per one thousand U.S. dollar principal amount of Notes for each trading day of such measurement period was less than 97% of the product of the last reported sale price of our common stock and the applicable conversion rate for the 2024 Notes on each such trading day; or (3) upon the occurrence of specified corporate events described in the Indenture.

On or after August 15, 2024 until the close of business on the second scheduled trading day immediately preceding November 15, 2024, holders may convert their 2024 Notes at the option of the holder regardless of the foregoing circumstances. Upon conversion, we may settle the conversion by paying or delivering either shares of our common stock, solely cash, or a combination of cash and shares of our common stock, at our election. It is our intention to settle the principal amount of the 2024 Notes in cash and excess conversion value in shares of our common stock.

We reassess the convertibility of the 2024 Notes and the related balance sheet classification on a quarterly basis. As of December 31, 2018, events for early conversion were not met, and thus the 2024 Notes were not convertible as of and for the fiscal quarter beginning January 1, 2019. There have been no conversions as of the date of this filing.

We allocated the gross proceeds of the 2024 Notes between the liability and equity components of the 2024 Notes. The initial liability component of $200.1, which was recorded as long-term debt, represents the fair value of similar debt instruments that have no conversion rights. The initial equity component of $58.7, which was recorded as additional paid-in capital, represents the debt discount and was calculated as the difference between the fair value of the liability component and gross proceeds of the 2024 Notes. The liability component was recognized at the present value of its associated cash flows using a 4.8% straight-debt rate (as defined in Note 2) and is being accreted to interest expense over the term of the 2024 Notes.

We recorded $5.3 in deferred debt issuance costs associated with the 2024 Notes, which are being amortized over the term of the 2024 Notes using the effective interest method. We also recorded $1.5 in equity issuance costs, which was recorded as a reduction to additional paid-in capital in the December 31, 2017 consolidated balance sheet.

The following table summarizes interest accretion of the 2024 Notes discount, 1.0% contractual interest coupon and financing costs amortization associated with the 2024 Notes:

	Year Ended December 31,	
	2018	2017
2024 Notes, interest accretion of convertible notes discount	$ 7.2	$ 1.1
2024 Notes, 1.0% contractual interest coupon	2.6	0.4
2024 Notes, total interest expense	$ 9.8	$ 1.5
2024 Notes, financing costs amortization	$ 0.6	$ 0.1

Convertible Note Hedge and Warrant Transactions Associated with the 2024 Notes

In connection with the pricing of the 2024 Notes, we entered into convertible note hedge transactions (the “Note Hedge Transactions”) with certain parties, including the initial purchasers of the 2024 Notes (the “Option Counterparties”). The Note Hedge Transactions are expected generally to reduce the potential dilution upon any future conversion of the

2024 Notes. Payments for the Note Hedge Transactions totaled approximately $59.5 and were recorded as a reduction to additional paid-in capital in the December 31, 2017 consolidated balance sheet.
We also entered into separate, privately negotiated warrant transactions (the “Warrant Transactions”) with the Option Counterparties to acquire up to 4.41 shares of our common stock. Proceeds received from the issuance of the Warrant Transactions totaled approximately $46.0 and were recorded as an addition to additional paid-in capital in the December 31, 2017 consolidated

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balance sheet. The strike price of the Warrant Transactions will initially be $71.775 per share (subject to adjustment), which is approximately 65% above the last reported sale price of our common stock on October 31, 2017. The Warrant Transactions could have a dilutive effect to our stockholders to the extent that the market price per share of our common stock, as measured under the terms of the Warrant Transactions, exceeds the applicable strike price of the warrants.

The Note Hedge Transactions and Warrant Transactions effectively increased the conversion price of the 2024 Notes. The net cost of the Note Hedge Transactions and Warrant Transactions was approximately $13.5.

2018 Convertible Notes

On August 1, 2018, our 2.00% Convertible Senior Subordinated Notes due August 2018 (the "2018 Notes") matured. The aggregate outstanding principal was $57.1 at August 1, 2018. During the nine months ended September 30, 2018, we settled upon maturity the 2018 Notes for total cash consideration of $57.1. Additionally, $0.6 of interest, which had previously been accrued, was paid at settlement.

The following table summarizes interest accretion of the 2018 Notes discount, 2.0% contractual interest coupon, loss on extinguishment of debt and financing costs amortization associated with the 2018 Notes:

	Year Ended December 31,		
	2018	2017	2016
2018 Notes, interest accretion of convertible notes discount	$1.9	$11.8	$12.5
2018 Notes, 2.0% contractual interest coupon	1.0	4.3	5.0
2018 Notes, total interest expense	$2.9	$16.1	$17.5
2018 Notes, loss on extinguishment of debt, bond cost portion	—	4.3	—
2018 Notes, write off of unamortized debt issuance costs	—	0.4	—
2018 Notes, total loss on extinguishment of debt [1]	$—	$4.7	$—
2018 Notes, financing costs amortization	$0.1	$0.6	$0.7

(1) During the year ended December 31, 2017, we wrote off $0.2 of unamortized debt issuance costs related to our senior secured revolving credit facility. When combined with the total loss on extinguishment associated with the 2018 Notes, consolidated loss on extinguishment was $4.9.

Convertible Note Hedge, Capped Call and Warrant Transactions Associated with the 2018 Notes

The convertible note hedge and capped call transactions associated with the 2018 Notes expired in August, with immaterial exercises. Approximately 90% of the separate warrants associated with the 2018 Notes expired without exercise prior to the date of this filing. Based on our current stock price and the warrants' $84.96 per share strike price, we anticipate that some or all of the warrants that remain outstanding will be exercised before they finally expire on February 26, 2019. We do not expect these exercises to be material.

Senior Secured Revolving Credit Facility

On October 26, 2018, we amended our five-year senior secured revolving credit facility (the "SSRCF"), which matures on November 3, 2022, to among other things, increase the size of the facility from $450.0 to $550.0. As so amended, the SSRCF includes a $25.0 sub-limit for the issuance of swingline loans and a $100.0 base sub-limit along with a $100.0 discretionary sub-limit to be used for letters of credit. There is a foreign currency limit of $250.0 under the SSRCF which can be used for foreign currency denominated letters of credit and borrowings in a foreign currency, in each case in currencies agreed upon with the lenders. In addition, the facility permits borrowings up to a $250.0 sub-limit to be made by our wholly-owned subsidiaries, Chart Industries Luxembourg S.à r.l. ("Chart Luxembourg") and Chart Asia Investment Company Limited ("Chart Asia"). The SSRCF also includes an expansion option permitting us to add up to an aggregate $225.0 in term loans or revolving credit commitments from its lenders.

Revolving loans under the SSRCF bear interest, at the applicable Borrower's election, at a rate per annum equal to either (i) the greatest of (a) the Prime Rate (as defined in the SSRCF) in effect on such day, (b) the NYFRB Rate (as defined in the

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SSRCF) in effect on such day plus 1/2 of 1.0% and (c) the Adjusted LIBOR (as defined in the SSRCF) for a one-month interest period on such day (or if such day is not a business day, the immediately preceding business day) plus 1.0% (the "Adjusted Base Rate"), plus a margin that varies with our leverage ratio, or (ii) the Adjusted LIBOR (as defined in the SSRCF) for the relevant interest period in effect for such day, plus a margin that varies with our leverage ratio.

In addition, we are required to pay a commitment fee of between 0.20% and 0.375% of the unused revolver balance and a letter of credit participation fee equal to the daily aggregate letter of credit exposure at the rate per annum equal to the Applicable Margin for Eurocurrency Revolving Facility Borrowings (as defined in the SSRCF, ranging from 1.5% to 2.5%, depending on the leverage ratio calculated at each fiscal quarter end). A fronting fee must be paid on each letter of credit that is issued equal to 0.125% per annum of the stated dollar amount of the letter of credit.

Significant financial covenants for the SSRCF include a maximum leverage ratio of 4.50 for the four fiscal quarter-period ending December 31, 2018, with such required ratio stepping down over five subsequent quarters until it reaches 3.50 for each such period ending on or after March 31, 2020, and a minimum interest coverage to EBITDA ratio of 3.00. The required leverage ratio can be relaxed on up to two occasions, upon notification to the lenders, to 4.00 for up to four consecutive fiscal quarters, for acquisitions and plant expansions of $100.0 or greater. The SSRCF contains a number of other customary covenants including, but not limited to, restrictions on our ability to incur additional indebtedness, create liens or other encumbrances, sell assets, enter into sale and lease-back transactions, make certain payments, investments, loans, advances or guarantees, make acquisitions and engage in mergers or consolidations and pay dividends or distributions. At December 31, 2018, we were in compliance with all covenants.

We recorded $3.2 in deferred debt issuance costs associated with the SSRCF which are being amortized over the five-year term of the SSRCF. At December 31, 2018, unamortized debt issuance costs associated with the SSRCF were $3.1.

At December 31, 2018, there were $329.3 in borrowings outstanding under the SSRCF ("SSRCF Borrowings"), bearing interest at 4.1% on a weighted-average basis and $47.6 in letters of credit issued and bank guarantees supported by the SSRCF. At December 31, 2018, the SSRCF had availability of $173.1. The obligations under the SSRCF are guaranteed by the Company and substantially all of its U.S. subsidiaries and secured by substantially all of the assets of Chart and our U.S. subsidiaries and 65% of the capital stock of our material non-U.S. subsidiaries (as defined by the SSRCF) that are owned by U.S. subsidiaries.

The following table summarizes interest expense and financing costs amortization associated with the SSRCF:

	Year Ended December 31,		
	2018	2017	2016
SSRCF, interest expense	$11.8	$2.7	$—
SSRCF, financing costs amortization	$0.6	$0.6	$0.6

Foreign Facilities – China

Chart Cryogenic Engineering Systems (Changzhou) Company Limited ("CCESC"), a wholly-owned subsidiary of the Company, CAIRE Medical Technology (Chengdu) Co., Ltd. (formerly known as Chart BioMedical (Chengdu) Co., Ltd., a wholly-owned subsidiary of the Company, and Chart Cryogenic Distribution Equipment (Changzhou) Company Limited ("CCDEC"), a joint venture of the Company, maintain joint banking facilities (the "China Facilities") which include a revolving facility with 50.0 million Chinese yuan (equivalent to $7.3) in borrowing capacity which can be utilized for either revolving loans, bonds/guarantees, or bank draft acceptances. Any borrowings made by CCESC, CCDEC or Chengdu under the China Facilities are guaranteed by the Company. At December 31, 2018, there was 33.5 million Chinese yuan (equivalent to $4.9) outstanding under this facility, bearing interest at 5.00%.

Chart Cryogenic Distribution Equipment (Changzhou) Company Limited ("CCDEC"), a joint venture of the Company, maintained an unsecured credit facility whereby CCDEC was able to borrow up to 70.0 million Chinese yuan (equivalent to $10.2) for working capital purposes. This facility is effective until August 28, 2019. There were no

borrowings under this facility during its term.
CCESC has a term loan that is secured by certain CCESC land use rights and allows for up to 86.6 million Chinese yuan (equivalent to $12.6) in borrowings. The loan has a term of eight years with semi-annual installment payments of at least 10.0 million Chinese yuan and a final maturity date of May 26, 2024. At December 31, 2018, there was 6.6 million Chinese yuan (equivalent to $1.0) outstanding on this loan, bearing interest at 5.39%.

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CCESC and CCDEC, together, had a combined total of 13.0 million Chinese yuan (equivalent to $1.9), in bank guarantees at December 31, 2018 under the China Facilities, unsecured credit facility and term loan discussed above.

Foreign Facilities – India

VRV Asia Pacific Private Limited, a wholly-owned subsidiary of the Company, maintains a secured credit facility with capacity of up to 600.0 million Indian rupees (equivalent to $8.6), which can be utilized for overdraft facilities, working capital demand loans, bank guarantees, letters of credit, or export packing credits. At December 31, 2018, there was 368.9 million Indian rupees (equivalent to $5.3) outstanding as overdraft facilities, working capital demand loans, and export packing credits bearing interest at 8.24%. At December 31, 2018, there was 144.0 million Indian rupees (equivalent to $2.1) outstanding as letters of credit and bank guarantees which are not subject to interest charges.

Foreign Facilities – Europe

Chart Ferox, a.s. ("Ferox"), a wholly-owned subsidiary of the Company, maintains a secured credit facility with capacity of up to 135.0 million Czech koruna (equivalent to $6.0) and two secured credit facilities with capacity of up to 7.0 million euros (equivalent to $8.0). All three facilities (the "Ferox Credit Facilities") allow Ferox to request bank guarantees and letters of credit. None of these facilities allow revolving credit borrowings. Under two of the facilities, Ferox must pay letter of credit and guarantee fees equal to 0.70% per annum on the face amount of each guarantee or letter of credit, and under one facility, Ferox must pay the letter of credit and guarantee fees equal to 0.50%. Ferox's land, buildings, and cash collateral secure the credit facilities. At December 31, 2018 there were bank guarantees of 166.3 million Czech koruna (equivalent to $7.4) supported by the Ferox Credit Facilities.

Chart Luxembourg maintains an overdraft facility with $5.0 in borrowing capacity. There were no borrowings under the Chart Luxembourg facility as of December 31, 2018.

Scheduled Annual Maturities

The scheduled annual maturities of debt at December 31, 2018, are as follows:

Year	Amount
2019 (1) (2)	$ 11.2
2022	329.3
2024	258.8
Total	$ 599.3

(1) Includes $11.2 current maturities related to foreign facilities.

(2) As noted above, the CCESC term loan matures on May 26, 2024, however, the remaining outstanding balance of 6.6 million Chinese yuan (equivalent to $1.0) is below the minimum required semi-annual installment payment amount of 10.0 million Chinese yuan and therefore is scheduled to be paid in 2019.

Cash paid for interest during the years ended December 31, 2018, 2017 and 2016 was $15.9, $9.3, and $5.6, respectively.

Letters of Credit

Chart Energy & Chemicals, Inc., a wholly-owned subsidiary of the Company, had $1.0 and $6.4 in deposits in a bank outside of the SSRCF to secure letters of credit at December 31, 2018 and 2017, respectively. The deposits are treated as restricted cash and restricted cash equivalents in the consolidated balance sheets ($1.0 in other assets at December 31, 2018 and $5.4 in other current assets and $1.0 in other assets at December 31, 2017, respectively).

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Fair Value Disclosures
The fair value of the 2024 Notes was approximately 124% and 105% of their par value as of December 31, 2018 and 2017, respectively. The fair value of the 2018 Notes was approximately 99% of their par value as of December 31, 2017. The 2024 Notes are and the 2018 Notes were actively quoted instruments and, accordingly, the fair values of the 2024 Notes and 2018 Notes were determined using Level 1 inputs.
NOTE 10 — Financial Instruments and Derivative Financial Instruments
Concentrations of Credit Risks: We sell our products to gas producers, distributors and end-users across the industrial gas, hydrocarbon, chemical processing, respiratory therapy, and cryobiological storage industries in countries all over the world. Approximately 44%, 44%, and 48% of sales were to customers in foreign countries in 2018, 2017 and 2016, respectively.
Sales to Praxair and Linde, which combined in 2018, exceeded 10% of consolidated sales in 2018 on a combined basis and represented approximately $121.6 or 11.2% of consolidated sales in 2018 (attributable to all of our segments). Sales to Air Liquide, exceeded 10% of consolidated sales in 2016, and represented approximately $90.6 or 12.5% of consolidated sales in 2016 (attributable to all of our segments). In 2017, no single customer accounted for more than 10% of consolidated sales. Sales to our top ten customers accounted for 39%, 38% and 41% of consolidated sales in 2018, 2017 and 2016, respectively. Our sales to particular customers fluctuate from period to period, but the large industrial gas producer and distributor customers of ours tend to be a consistently large source of revenue for us.
We are subject to concentrations of credit risk with respect to our cash and cash equivalents, restricted cash and restricted cash equivalents and forward foreign currency exchange contracts. To minimize credit risk from these financial instruments, we enter into arrangements with major banks and other quality financial institutions and invest only in high-quality instruments. We do not expect any counterparties to fail to meet their obligations.
The changes in fair value with respect to our foreign currency forward contracts generated a net loss of $0.8 for the year ended December 31, 2018, a net gain of $0.5 for the year ended December 31, 2017 and a net loss of $0.8 for the year ended December 31, 2016.
NOTE 11 — Product Warranties
We provide product warranties with varying terms and durations for the majority of our products. We estimate our warranty reserve by considering historical and projected warranty claims, historical and projected cost-per-claim, and knowledge of specific product issues that are outside our typical experience. We record warranty expense in cost of sales in the consolidated statements of income. Product warranty claims not expected to occur within one year are included as part of other long-term liabilities in the consolidated balance sheets.
The following table represents changes in our consolidated warranty reserve:

	Year Ended December 31,		
	2018	2017	2016
Beginning Balance	$11.6	$11.6	$9.2
Issued - Warranty Expense	5.1	3.1	5.9
Acquired - Warranty Reserve	—	0.9	—
Change in Estimate - Warranty Expense	(1.6)	1.5	1.1
Warranty Usage	(6.2)	(5.5)	(4.6)
Ending Balance	$8.9	$11.6	$11.6

During the second quarter of 2018, we established a reserve related to a recall notice issued for certain aluminum cryobiological tanks in our D&S West segment manufactured in our New Prague, Minnesota facility during a limited time period. See Note 19, “Commitments and Contingencies,” for additional information.

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NOTE 12 — Business Combinations
VRV Acquisition
On November 15, 2018, Chart completed the previously announced acquisition VRV pursuant to the terms of the Amended and Restated Share Purchase Agreement (the “Amendment”) with the original parties as well as VRV that replaces in full the original Purchase Agreement. Immediately thereafter, we assigned all of our rights and obligations under the Amendment to VRV Holdings S.r.l. (“Holdings”), a newly formed Italian subsidiary of Chart. The Amendment provides for a revised transaction structure pursuant to which Holdings acquired VRV Technoservice S.r.l. (“VRV Technoservice”), a newly formed Italian company wholly owned by VRV (the “Acquisition”). Prior to the Acquisition, as contemplated in the Amendment, VRV contributed substantially all of its business to VRV Technoservice. VRV Technoservice changed its name to VRV S.r.l. following the Acquisition.
The Acquisition purchase price, which is subject to a working capital adjustment expected in the first quarter of 2019, was euro 188.7 million (equivalent to $213.3), inclusive of the base purchase price of euro 125.0 million (equivalent to $141.3) in cash and assumed indebtedness of VRV, which was paid off immediately at closing or shortly thereafter, of euro 63.7 million (equivalent to $72.0). Additional indebtedness of VRV of euro 4.4 million (equivalent to $4.9) was assumed at the acquisition date and not paid off, although we expect to pay it off in early 2019. All U.S. dollar equivalent dollar amounts are based on the exchange rate as of the acquisition date. We funded the Acquisition, including the subsequent payoff of assumed indebtedness, with borrowings of euro 140.0 million (equivalent to $160.3) from our senior secured revolving credit facility and the remainder with cash on hand.
VRV, which has operations in Italy, France and India, is a diversified multinational corporation with highly automated, purpose-built facilities for the design and manufacture of pressure equipment serving the cryogenic and energy & petrochemical end markets. VRV’s results are included in our E&C and D&S East segments from the date of Acquisition.
As defined in our significant accounting policy for business combinations in Note 2, we preliminarily allocated the Acquisition consideration to tangible and identifiable intangible assets acquired and liabilities assumed based on their preliminary estimated fair values as of the Acquisition date. The preliminary fair value of the acquired tangible and identifiable intangible assets were determined based on inputs that are unobservable and significant to the overall fair value measurement. It is also based on estimates and assumptions made by management at the time of the Acquisition. As such, this was classified as Level 3 fair value hierarchy measurements and disclosures.
The Acquisition consideration allocation below is preliminary, pending completion of the fair value analyses of acquired assets and liabilities as well as certain other analysis. Given the acquisition closed late in the fourth quarter, we expect significant adjustments in the purchase price allocation. Those areas that are subject to change, include the following:

- researching and analyzing the differences between Chart accounting policies and those used by VRV,
- finalizing the valuation of working capital accounts, including assessing collectibility of receivables and evaluation of saleability of inventory,
- completing our review of VRV’s revenue recognition policies, including assessing estimates utilized for projects using the percentage of completion method,
- gathering sufficient information to estimate the fair value of acquired intangible assets, including assessing projections and other assumptions used in our valuation models, and determining whether the intangible assets identified below represent a complete listing of acquired intangible assets, and
- evaluating income tax accounting considerations, including income tax effects of the above matters.

Where we are still in process of completing our analysis, we used our best estimate based on currently available information and past experience.
The preliminary estimated useful lives of identifiable finite-lived intangible assets range from 2 to 12 years. The excess of the purchase price over the estimated fair values is assigned to goodwill. The preliminary estimated goodwill was established due to benefits including the combination of strong engineering and manufacturing cultures

which will continue to further develop full service solutions for our worldwide customer base, as well as the benefits derived from the anticipated synergies of VRV integrating with Chart's E&C and D&S East segments. Goodwill recorded for the VRV acquisition is not expected to be deductible for tax purposes.

As additional information becomes available, we will further revise the preliminary Acquisition consideration allocation during the remainder of the measurement period, which shall not exceed twelve months from the closing of the Acquisition, and we believe such revisions or changes may be material.

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The following table summarizes the preliminary estimated fair values of the assets acquired and liabilities assumed in the VRV acquisition as of the acquisition date:

Net assets acquired:	
Identifiable intangible assets	$66.6
Property, plant and equipment	70.5
Goodwill	63.2
Other net assets	17.9
Debt	(4.9)
Net assets acquired	$213.3

Information regarding preliminary identifiable intangible assets acquired in the VRV acquisition is presented below:

	Weighted-average Estimated Useful Life	Preliminary Estimated Asset Fair Value
Finite-lived intangible assets:		
Customer relationships	12.0 years	$ 28.1
Unpatented technology	12.0 years	15.9
Other identifiable intangible assets [(1)]	4.0 years	11.8
Trademarks and trade names	14.0 years	10.8
Total finite-lived intangible assets acquired	9.0 years	$ 66.6

(1) Other identifiable intangible assets is included in “Patents and other” in Note 8, “Goodwill and Intangible Assets.”

The following unaudited supplemental pro forma sales are based on our historical consolidated financial statements and VRV’s historical consolidated financial statements as adjusted to give effect to the November 15, 2018 acquisition of VRV. The unaudited supplemental pro forma sales information for the periods presented gives effect to the Acquisition as if it had occurred on January 1, 2017. The unaudited supplemental pro forma sales for the years ended December 31, 2018 and 2017 for Chart Industries including VRV would have been approximately $1,200.0 and $950.0, respectively. It is impracticable to disclose the pro forma net income and pro forma net income per share information because of significant differences between Chart accounting policies following U.S. GAAP and those followed by VRV.

The unaudited pro forma sales information is presented for informational purposes only and is not necessarily indicative of the results of operations that actually would have resulted had the Acquisition been in effect at the beginning of the periods presented. In addition, the unaudited pro forma sales results are not intended to be a projection of future results and do not reflect any operating efficiencies or cost savings that might be achievable.

Skaff Acquisition

On January 2, 2018, we acquired 100% of the equity interests of Skaff for an approximate purchase price of $12.5, net of cash acquired. Skaff provides quality repair service and re-manufacturing of cryogenic and liquefied natural gas storage tanks and trailers and also maintains a portfolio of cryogenic storage equipment that is rented to customers for temporary and permanent needs. Skaff is headquartered in Brentwood, New Hampshire and provides services and equipment to customers in North America. Skaff’s results are included in the D&S West operating segment. Additional information related to the Skaff acquisition has not been presented because the impact on our consolidated results of income and financial position is not material.

Hudson Acquisition

On September 20, 2017, we completed the acquisition of Hudson. The acquisition purchase price was $419.5, net of cash acquired. Approximately $300.0 of the purchase price was funded through borrowings under our senior secured revolving credit facility, and the remainder of the purchase price was funded with cash on hand.

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Hudson, which has operations in the United States, China and Italy and a joint venture in Mexico, designs, manufactures, sells and services products used in refining, heating, ventilation and air conditioning (HVAC), petrochemical, natural gas, power generation, industrial and commercial end markets. Hudson is a North American leader in air-cooled heat exchangers and a global leader in axial flow cooling fans. Hudson's results of operations are included in our E&C segment.

We allocated the acquisition consideration to tangible and identifiable intangible assets acquired and liabilities assumed based on their estimated fair values as of the acquisition date. The fair value of the acquired tangible and identifiable intangible assets were determined based on inputs that are unobservable and significant to the overall fair value measurement. It is also based on estimates and assumptions made by management at the time of the acquisition. As such, this was classified as Level 3 fair value hierarchy measurements and disclosures.

We estimated the fair value of acquired unpatented technology and trademarks and trade names using the relief from royalty method. The fair values of acquired customer backlog and customer relationships were estimated using the multi-period excess earnings method. Under both the relief from royalty and multi-period excess earnings methods, the fair value models incorporate estimates of future cash flows, estimates of allocations of certain assets and cash flows, estimates of future growth rates, and management's judgment regarding the applicable discount rates to use to discount such estimates of cash flows. The estimated useful lives of identifiable finite-lived intangible assets range from 2 to 15 years.

Hudson complements our E&C segment with the addition of its Fin-Fan® brand and other air cooled heat exchangers which broaden E&C's end market diversity from primarily liquefied natural gas, industrial and natural gas to include HVAC, petrochemical and power generation. The addition of Hudson's fans business, known by the Tuf-Lite® and Cofimco® brands, allows E&C to offer a broader technology solution for our customers. Management anticipates the combination of strong engineering cultures will continue to further develop full service solutions for our customers. The estimated goodwill was established due to the benefits outlined above, as well as the benefits derived from the anticipated synergies of Hudson integrating with Chart's E&C segment. Goodwill recorded for the Hudson acquisition is not expected to be deductible for tax purposes.

The excess of the acquisition consideration over the estimated fair values for the acquired assets and assumed liabilities is assigned to goodwill. The purchase price allocation reported at December 31, 2017 was preliminary and was based on provisional fair values. During 2018, we received and analyzed new information about certain assets and liabilities, primarily related to taxes, as of the September 20, 2017 acquisition date and subsequently decreased other assets by $0.2, decreased deferred tax liabilities by $7.6, increased other current liabilities by $0.6 and increased other long-term liabilities by $1.5 for post-closing adjustments, based on this information.

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The following table summarizes the estimated fair values of the assets acquired and liabilities assumed in the Hudson acquisition, including the post-closing adjustments:

	December 31, 2018	Adjustments	As Previously Reported December 31, 2017
Net assets acquired:			
Goodwill	$ 233.0	$ (5.3)	$ 238.3
Identifiable intangible assets	211.0	—	211.0
Accounts receivable	34.6	—	34.6
Property, plant and equipment	29.4	—	29.4
Inventories	26.5	—	26.5
Other current assets [(1)]	8.1	—	8.1
Unbilled contract revenue	4.9	—	4.9
Other assets	2.7	(0.2)	2.9
Prepaid expenses	0.9	—	0.9
Deferred tax liabilities	(80.0)	7.6	(87.6)
Accounts payable	(21.2)	—	(21.2)
Customer advances and billings in excess of contract revenue	(17.4)	—	(17.4)
Accrued salaries, wages and benefits	(4.4)	—	(4.4)
Other current liabilities	(4.4)	(0.6)	(3.8)
Other long-term liabilities	(3.4)	(1.5)	(1.9)
Current portion of warranty reserve	(0.8)	—	(0.8)
Net assets acquired	$ 419.5	$ —	$ 419.5

(1) Pursuant to the provisions of the Merger Agreement, Hudson deposited $2.3 into a Rabbi Trust which represents amounts payable to eligible parties under Long-Term Incentive Agreements. This balance was treated as restricted cash and restricted cash equivalents in the December 31, 2017 consolidated balance sheets and was classified as other current assets. During 2018, the Rabbi Trust deposits were released to the eligible parties.

Information regarding identifiable intangible assets acquired in the Hudson acquisition is presented below:

	Weighted-average Estimated Useful Life	Preliminary Estimated Asset Fair Value
Finite-lived intangible assets:		
Customer relationships	13 years	$ 122.1
Unpatented technology	10 years	18.3
Customer backlog [(1)]	2 years	1.3
Total finite-lived intangible assets acquired	12 years	141.7
Indefinite-lived intangible assets:		
Trademarks and trade names		69.3
Total identifiable intangible assets acquired		$ 211.0

(1) Customer backlog acquired is included in “Patents and other” in Note 8, “Goodwill and Intangible Assets.”

For the year ended December 31, 2018, net sales, operating income and intangible assets amortization expense attributed to the acquired Hudson operations was $180.3, $19.0, and $12.0, respectively.
For the year ended December 31, 2017, net sales attributed to the acquired Hudson operations were $58.0. For the same period, Hudson contributed $6.4 to operating income which included $3.3 of intangible asset amortization expense. During the

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year ended December 31, 2017, we incurred $9.0 in transaction related costs related to the Hudson acquisition which were recorded in Corporate selling, general and administrative expenses in the consolidated statements of income.

Unaudited Supplemental Pro Forma Information

The following supplemental pro forma financial information is based on our historical consolidated financial statements and Hudson's historical consolidated financial statements as adjusted to give effect to the September 20, 2017 acquisition of Hudson. The supplemental pro forma financial information for the periods presented gives effect to the acquisition as if it had occurred on January 1, 2016.

The following adjustments are reflected in the unaudited pro forma financial table below:

- the effect of decreased interest expense related to the repayment of the Hudson term loan and revolving credit facility, net of the additional borrowing on the Chart senior secured revolving credit facility,
- amortization of acquired intangible assets,
- step-up depreciation of acquired property, plant and equipment,
- inventory fair value step-up expense,
- nonrecurring transaction related expenses incurred by Hudson directly attributable to the Hudson acquisition of $16.5 was adjusted out of the pro forma net income attributable to the Company for the year ended December 31, 2017, and
- nonrecurring transaction related expenses incurred by Chart directly related to the Hudson acquisition of $9.0 was adjusted out of the pro forma net income attributable to the Company for the year ended December 31, 2017.

This pro forma financial information is presented for informational purposes only and is not necessarily indicative of the results of operations that actually would have resulted had the acquisition been in effect at the beginning of the periods presented. In addition, the unaudited pro forma results are not intended to be a projection of future results and do not reflect any operating efficiencies or cost savings that might be achievable.

The following table presents pro forma sales, net income attributable to the Company, and net income attributable to the Company per common share data assuming Hudson was acquired at the beginning of the 2016 fiscal year, and assuming a 35% effective tax rate in both years:

	Year Ended December 31,	
	2017	2016
Pro forma sales	$984.1	$891.8
Pro forma net income attributable to Chart Industries, Inc.	15.0	5.9
Pro forma net income attributable to Chart Industries, Inc. per common share, basic	$0.49	$0.19
Pro forma net income attributable to Chart Industries, Inc. per common share, diluted	$0.48	$0.19

VCT Vogel GmbH Acquisition

On August 31, 2017, Chart Germany GmbH, a wholly-owned subsidiary of the Company, acquired 100% of the equity interests of VCT Vogel GmbH ("VCT") for a total purchase price of 3.6 million euros (equivalent to $4.2). VCT, located in Gablingen, Germany, services and repairs cryogenic and other mobile gas tank equipment and trucks. VCT also designs, manufactures and sells truck mounted drive and control systems for the operation of cryogenic pumps on trailers, rigid trucks and containers. VCT's results are included in our D&S East segment.

Additional information related to the VCT acquisition has not been presented because the impact on our consolidated results of operations and financial position is not material.

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Hetsco, Inc. Acquisition

On January 13, 2017, we acquired 100% of the equity interests in Hetsco, Inc. from Global Power Equipment Group, Inc. for a total purchase price of $22.8. Hetsco, Inc. is headquartered in Franklin, Indiana and provides emergency, specialty welding and construction services to natural gas processing, petrochemical, and air gas separation industries. Hetsco's results are included in our E&C segment since the date of acquisition.

Additional information related to the Hetsco, Inc. acquisition has not been presented because the impact on our consolidated results of operations and financial position is not material.

Contingent Consideration

The estimated fair value of contingent consideration relating to the 2015 Thermax acquisition of our D&S West segment, was $1.8 at the date of acquisition and was valued according to a discounted cash flow approach, which includes assumptions regarding the probability of achieving certain earnings targets and a discount rate applied to the potential payments. Potential payments may be paid before July 1, 2019 based on the attainment of certain earnings targets. The potential payments related to Thermax contingent consideration are between $0.0 and $11.3. Valuations are performed using Level 3 inputs and are evaluated on a quarterly basis based on forecasted sales and earnings targets. Contingent consideration liabilities are classified as other current liabilities and other long-term liabilities in the consolidated balance sheets. Changes in fair value of contingent consideration, including accretion, are recorded as selling, general, and administrative expenses in the consolidated statements of income.

For the year ended December 31, 2017, the fair value of contingent consideration decreased by $1.6, which was primarily driven by economic circumstances that significantly reduced the likelihood of achieving certain earnings targets for the duration of the remaining potential payout period. The fair value of contingent consideration liabilities was insignificant at both December 31, 2018 and December 31, 2017.

NOTE 13 — Accumulated Other Comprehensive Loss

The components of accumulated other comprehensive loss are as follows:

	December 31, 2018		
	Foreign currency translation adjustments	Pension liability adjustments, net of taxes	Accumulated other comprehensive loss
Beginning Balance	$2.2	$ (10.3)	$ (8.1)
Other comprehensive loss	(21.6)	(3.0)	(24.6)
Amounts reclassified from accumulated other comprehensive loss, net of income taxes [(1)]	1.9	0.9	2.8
Net current-period other comprehensive loss, net of taxes	(19.7)	(2.1)	(21.8)
Ending Balance	$(17.5)	$ (12.4)	$ (29.9)

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	December 31, 2017		
	Foreign currency translation adjustments	Pension liability adjustments, net of taxes	Accumulated other comprehensive loss
Beginning Balance	$(24.7)	$ (10.5)	$ (35.2)
Other comprehensive income (loss)	25.6	(0.6)	25.0
Amounts reclassified from accumulated other comprehensive loss, net of income taxes (2)	1.3	0.8	2.1
Net current-period other comprehensive income, net of taxes	26.9	0.2	27.1
Ending Balance	$2.2	$ (10.3)	$ (8.1)

(1) For the year ended December 31, 2018, $1.9 was reclassified from accumulated other comprehensive loss to foreign currency loss in the consolidated statements of income related to the Divestiture. This reclassification reduced the gain on sale of CAIRE. Refer to Note 3, “Discontinued Operations,” for further discussion.

(2) For the year ended December 31, 2017, $1.3 was reclassified from accumulated other comprehensive loss to foreign currency loss in the consolidated statements of income related to certain intercompany transactions.

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NOTE 14 — Earnings Per Share
The following table presents calculations of net income per share of common stock:

	Year Ended December 31,		
	2018	2017	2016
Net income attributable to Chart Industries, Inc.			
Income from continuing operations	$53.6	$26.2	$17.0
Income from discontinued operations	34.4	1.8	11.2
Net income attributable to Chart Industries, Inc.	$88.0	$28.0	$28.2
Earnings per common share – basic:			
Income from continuing operations	$1.73	$0.85	$0.55
Income from discontinued operations	1.10	0.06	0.37
Net income attributable to Chart Industries, Inc.	$2.83	$0.91	$0.92
Earnings per common share – diluted:			
Income from continuing operations	$1.67	$0.84	$0.55
Income from discontinued operations	1.06	0.05	0.36
Net income attributable to Chart Industries, Inc.	$2.73	$0.89	$0.91
Weighted average number of common shares outstanding — basic	31.05	30.74	30.58
Incremental shares issuable upon assumed conversion and exercise of share-based awards	0.77	0.60	0.40
Incremental shares issuable due to dilutive effect of the Convertible Notes	0.38	—	—
Incremental shares issuable due to dilutive effect of warrants	—	—	—
Weighted average number of common shares outstanding — diluted	32.20	31.34	30.98

Diluted earnings per share does not consider the following potential common shares as the effect would be anti-dilutive:

	Year Ended December 31,		
	2018	2017	2016
Share-based awards	0.22	0.40	0.56
Convertible note hedge and capped call transactions (1)	0.38	—	—
Warrants	5.18	5.18	3.37
Total anti-dilutive securities	5.78	5.58	3.93

(1) The convertible note hedge offsets any dilution upon actual conversion of the 2024 Notes up to a common stock price of $71.775 per share. For further information, refer to Note 9, “Debt and Credit Arrangements.”

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NOTE 15 — Income Taxes
On December 22, 2017, the Tax Cuts and Jobs Act ("Tax Act") was signed into law. The Tax Act, among other things, reduced the U.S. federal corporate tax rate from 35% to 21%, requires companies to pay a one-time transition tax on certain unrepatriated earnings of foreign subsidiaries, requires a current inclusion in U.S. federal taxable income of certain earnings of foreign corporations, and creates a new limitation on deductible interest expense. Consequently, we recorded a $22.5 net favorable tax benefit during the fourth quarter of 2017 related to the Tax Act. This benefit mainly consisted of a one-time, provisional benefit of $26.9 related to the remeasurement of certain of our deferred tax liabilities using the lower U.S. federal corporate tax rate of 21%. This was partially offset by (i) a one-time, provisional charge of $8.7 related to the deemed repatriation transition tax, which is a tax on previously untaxed accumulated earnings and profits of certain of our foreign subsidiaries, and (ii) a one-time tax expense and tax benefit of $4.5 and $8.7, respectively, related to our intent to amend pre-acquisition Hudson U.S. federal tax returns. The measurement period for purposes of SAB 118 ended on December 22, 2018. We have completed our analysis to determine the effect of the Tax Act, and as such, we have recorded an additional tax benefit $1.8 during the year ended December 31, 2018.
Reduction of U.S. federal corporate tax rate: The Tax Act reduces the U.S. federal corporate tax rate to 21% effective January 1, 2018. For certain of our deferred tax liabilities, we have recorded a provisional decrease of $26.9, with a corresponding adjustment to deferred income tax benefit $26.9 for the year ended December 31, 2017. We have finalized our calculations related to the U.S. federal corporate rate change and recorded an additional deferred tax benefit of $3.1 for certain of our deferred tax liabilities during the year ended December 31, 2018.
Deemed Repatriation Transition Tax: The Deemed Repatriation Transition Tax ("Transition Tax") is a tax on total post-1986 earnings and profits (E&P) of certain of our foreign subsidiaries. We were able to make a reasonable estimate of the Transition Tax and recorded (i) a one-time, provisional charge of $8.7 related to the deemed repatriation transition tax, and (ii) a one-time tax expense and tax benefit of $4.5 and $8.7, respectively, related to our intent to amend pre-acquisition Hudson U.S. federal tax returns. Upon further analysis of the Tax Act, Notices and Regulations issued and proposed by the U.S. Department of the Treasury and the Internal Revenue Service, we have finalized our calculation of the Transition Tax liability in 2018. We increased our December 2017 provisional expense by $1.3 as a result of (i) an increase to Transition Tax of $3.8, offset by (ii) a reduction to tax expense associated with our amended pre-acquisition Hudson U.S. federal tax returns of $2.5 during the year ended December 31, 2018. No additional income taxes have been provided for any remaining undistributed foreign earnings not subject to the Transition Tax, or any additional outside basis difference inherent in these entities since these amounts continue to be indefinitely reinvested in foreign operations. Determining the amount of unrecognized deferred tax liabilities related to any remaining undistributed foreign earnings not subject to the Transition Tax and additional outside basis difference in these entities (i.e., basis difference in excess of that subject to the one-time Transition Tax) is not practicable.
Global Intangible Low Taxed Income ("GILTI"), Foreign Derived Intangible Income ("FDII"), Base Erosion and Anti-Abuse Tax ("BEAT"), and IRC Section 163(j) interest limitation ("Interest Limitation"): For our calendar year beginning January 1, 2018, we became subject to several provisions of the Tax Act including computations under GILTI, FDII, BEAT and the Interest Limitation rules. For the GILTI and FDII computations, we recorded an estimate in our effective tax rate for the year ended December 31, 2018. For the BEAT and Interest Limitation computations, we have not recorded any amounts in our effective tax rate for the year ended December 31, 2018 because we currently estimate that these provisions of the Tax Act will not apply in 2018.
Valuation allowances: We assessed whether our valuation allowance analyses are affected by various aspects of the Tax Act (e.g. deemed repatriation of deferred foreign income, GILTI inclusions, FDII deductions and new categories of foreign tax credits). The GILTI provisions require us in our U.S. income tax return, to include foreign subsidiary earnings in excess of an allowable return on the foreign subsidiary's tangible assets. We determined that we will be subject to incremental U.S. tax on GILTI income beginning in 2018. We have elected to account for GILTI tax in the

period in which it is incurred, and therefore, we have not provided any provisional deferred tax impacts of GILTI in our consolidated financial statements for the year ended December 31, 2018.

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Income Before Income Taxes

Income (loss) before income taxes consists of the following:

	Year Ended December 31, 2018	2017	2016
United States	$32.0	$5.5	$30.1
Foreign	37.0	5.6	(6.0)
Income before income taxes	$69.0	$11.1	$24.1

Provision

Significant components of income tax expense (benefit) are as follows:

	Year Ended December 31, 2018	2017	2016
Current:			
Federal	$1.5	$8.7	$9.7
State and local	0.5	0.2	0.6
Foreign	6.4	5.9	(14.7)
Total current	8.4	14.8	(4.4)
Deferred:			
Federal	3.8	(30.7)	14.0
State and local	1.5	(0.2)	(0.1)
Foreign	(0.3)	(0.5)	1.1
Total deferred	5.0	(31.4)	15.0
Total income tax expense (benefit)	$13.4	$(16.6)	$10.6

Effective Tax Rate Reconciliation

The reconciliation of income taxes computed at the U.S. federal statutory tax rate to income tax expense (benefit) is as follows:

	Year Ended December 31, 2018	2017	2016
Income tax expense at U.S. statutory rate	$14.1	$3.6	$7.9
State income taxes, net of federal tax benefit	1.7	0.2	0.4
Foreign income, net of credit on foreign taxes	0.7	8.5	—
Effective tax rate differential of earnings outside of U.S.	2.6	(0.3)	0.5
Change in valuation allowance	38.4	7.6	6.8
Research & experimentation credits	(0.9)	(0.5)	(0.7)
Non-deductible items	0.4	0.7	0.7
Change in uncertain tax positions	0.2	0.1	(0.2)
Share-based compensation	(3.3)	—	—
Domestic production activities deduction	—	(0.4)	(1.2)
Tax effect of insurance proceeds	—	—	(6.0)
Capital loss carryover	(29.7)	—	—
Tax effect of 2017 tax reform federal rate change	(11.3)	(26.7)	—
Tax effect of carryforward foreign tax credits	(0.6)	(9.4)	—
Other items	1.1	—	2.4
Income tax expense (benefit)	$13.4	$(16.6)	$10.6

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Deferred Taxes

Deferred income taxes reflect the net tax effect of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of our deferred tax assets and liabilities are as follows:

	December 31,	
	2018	2017
Deferred tax assets:		
Accruals and reserves	$15.9	$11.7
Pensions	3.3	2.0
Inventory	2.2	4.1
Share-based compensation	6.5	6.6
Tax credit carryforwards	16.2	16.4
Foreign net operating loss carryforwards	11.2	11.7
State net operating loss carryforwards	0.6	2.0
Capital loss carryover	29.7	—
Other – net	13.5	0.2
Total deferred tax assets before valuation allowances	99.1	54.7
Valuation allowances	(65.2)	(26.8)
Total deferred tax assets, net of valuation allowances	$33.9	$27.9
Deferred tax liabilities:		
Property, plant and equipment	$15.4	$15.0
Goodwill and intangible assets	88.9	71.4
Convertible notes	(0.4)	(0.5)
Other – net	1.6	4.1
Total deferred tax liabilities	$105.5	$90.0
Net deferred tax liabilities	$71.6	$62.1
The net deferred tax liability is classified as follows:		
Other assets	$(4.8)	$—
Long-term deferred tax liabilities	76.4	62.1
Net deferred tax liabilities	$71.6	$62.1

Federal, State and Local Net Operating Loss Carryforwards: We have state net operating losses in various states which begin to expire in 2018. The gross deferred tax asset for the state net operating losses of $1.1 is substantially offset by a valuation allowance of $0.6.

Foreign Net Operating Loss and Tax Credit Carryforwards: As of December 31, 2018, cumulative foreign operating losses of $44.8 generated by Chart were available to reduce future taxable income. Approximately $44.8 of these operating losses expire between 2019 and 2028. The deferred tax asset for the foreign operating losses of $11.2 is substantially offset by a valuation allowance of $11.1. As of December 31, 2018, we have $1.0 of investment tax credits available to reduce our future tax liability. The gross deferred tax asset of $1.0 is fully offset by a valuation allowance due to uncertainties relating to our ability to fully use these credits prior to expiration.

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Other Tax Information

We previously considered the earnings in our non-U.S. subsidiaries to be indefinitely reinvested and, accordingly, recorded no deferred income taxes. As of December 31, 2017, we had undistributed foreign earnings of approximately $206.9. While the Tax Act subjected approximately $200.0 of undistributed foreign earnings to tax, an actual repatriation from our non-U.S. subsidiaries could still be subject to additional foreign withholding taxes and U.S. state taxes. We estimate that no previously unaccrued withholding taxes would be incurred if these undistributed earnings were distributed. The liability that arises from the amount of unrecognized U.S. state taxes is estimated to be insignificant. We have analyzed our global working capital and cash requirements as of December 31, 2018 and have determined that we do not plan to repatriate any earnings at this time.

Cash paid for income taxes during the years ended December 31, 2018, 2017 and 2016 was $13.2, $15.4, and $16.9, respectively.

Unrecognized Income Tax Benefits

The reconciliation of beginning to ending unrecognized tax benefits is as follows:

	Year Ended December 31,		
	2018	2017	2016
Unrecognized tax benefits at beginning of the year	$0.8	$0.8	$1.0
Additions for tax positions of prior years	0.9	0.1	—
Additions for tax positions acquired	1.4	—	—
Reductions for tax positions of prior years	(0.8)	(0.1)	—
Lapse of statutes of limitation	—	—	(0.2)
Unrecognized tax benefits at end of the year	$2.3	$0.8	$0.8

Included in the balance of unrecognized tax benefits at December 31, 2018 and 2017 were $0.1 and $0.6 of income tax benefits, respectively, which, if ultimately recognized, would impact our annual effective tax rate.

We accrued approximately $0.1 for the payment of interest and penalties at both December 31, 2018 and 2017.

We are subject to income taxes in the U.S. federal jurisdiction and various state and foreign jurisdictions. Tax regulations within each jurisdiction are subject to the interpretation of the related tax laws and regulations and require significant judgment to apply. With few exceptions, we are no longer subject to U.S. federal, state and local or non-U.S. income tax examinations by tax authorities for years prior to 2013.

Due to the expiration of various statutes of limitation, it is reasonably possible our unrecognized tax benefits at December 31, 2018 may decrease within the next twelve months, the amount by which was insignificant for disclosure.

NOTE 16 — Employee Benefit Plans

Defined Benefit Plan

We have a defined benefit pension plan which is frozen, that covers certain U.S. hourly and salary employees. The defined benefit plan provides benefits based primarily on the participants' years of service and compensation.

The components of net periodic pension (income) expense are as follows:

	Year Ended December 31,		
	2018	2017	2016
Interest cost	$2.1	$2.2	$2.3
Expected return on plan assets	(3.3)	(2.8)	(2.8)
Amortization of net loss	0.9	1.2	1.5
Total net periodic pension (income) expense	$(0.3)	$0.6	$1.0

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The changes in the projected benefit obligation and plan assets, the funded status of the plans and the amounts recognized in the consolidated balance sheets are as follows:

	December 31,	
	2018	2017
Change in projected benefit obligation:		
Projected benefit obligation at beginning of year	$57.0	$55.4
Interest cost	2.1	2.2
Benefits paid	(2.4)	(2.2)
Actuarial (losses) gains	(3.1)	1.6
Projected benefit obligation at year end	$53.6	$57.0
Change in plan assets:		
Fair value of plan assets at beginning of year	$48.5	$41.1
Actual return	(3.3)	6.6
Employer contributions	—	3.0
Benefits paid	(2.4)	(2.2)
Fair value of plan assets at year end	$42.8	$48.5
Funded status (Accrued pension liabilities) [1]	$(10.8)	$(8.5)
Unrecognized actuarial loss recognized in accumulated other comprehensive loss	$15.8	$13.2

(1) Accrued pension liabilities on the December 31, 2018 consolidated balance sheet includes $0.8 related to Hudson, which is not included in the table above.

The estimated net periodic pension expense for the defined benefit pension plan that will be amortized from accumulated other comprehensive loss over the next fiscal year is $0.6.

The actuarial assumptions used in determining pension plan information are as follows:

	December 31,		
	2018	2017	2016
Assumptions used to determine benefit obligation at year end:			
Discount rate	4.2%	3.7%	4.0%
Assumptions used to determine net periodic benefit cost:			
Discount rate	3.7%	4.0%	4.0%
Expected long-term weighted-average rate of return on plan assets	7.0%	7.0%	7.0%

The discount rate reflects the current rate at which the pension liabilities could be effectively settled at year end. In estimating this rate, we look to rates of return on high quality, fixed-income investments that receive one of the two highest ratings given by a recognized rating agency and the expected timing of benefit payments under the plan.

The expected return assumptions were developed using an averaging formula based upon the plans' investment guidelines, mix of asset classes, historical returns of equities and bonds, and expected future returns. We employ a total return investment approach whereby a mix of equities and fixed income investments are used to maximize the long-term return of plan assets for a prudent level of risk. Risk tolerance is established through careful consideration of short and long-term plan liabilities, plan funded status and corporate financial condition. The investment portfolio contains a diversified blend of equity and fixed-income investments. Furthermore, equity investments are diversified across U.S. and non-U.S. stocks, as well as growth, value, and small and large capitalizations. Investment risk is measured and monitored on an ongoing basis through quarterly investment portfolio reviews, annual liability measurements, and periodic asset/liability studies.

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The target allocations by asset category and fair values of the plan assets by asset class at December 31 are as follows:

		Fair Value					
	Target Allocations by Asset Category	Total		Level 2		Level 3	
Plan Assets:		2018	2017	2018	2017	2018	2017
Equity funds	60% – 68%	$30.0	$33.0	$30.0	$33.0	$—	$—
Fixed income funds	26% – 30%	12.6	12.6	12.6	12.6	—	—
Other investments	3% – 6%	0.2	2.9	—	—	0.2	2.9
Total		$42.8	$48.5	$42.6	$45.6	$0.2	$2.9

The plan assets are primarily invested in pooled separate funds. The fair values of equity securities and fixed income securities held in pooled separate funds are based on net asset value of the units of the funds as determined by the fund manager. These funds are similar in nature to retail mutual funds, but are typically more efficient for institutional investors. The fair value of pooled funds is determined by the value of the underlying assets held by the fund and the units outstanding. The value of the pooled funds is not directly observable, but is based on observable inputs. As such, these plan assets are valued using Level 2 inputs. Certain plan assets in the other investments asset category are invested in a general investment account where the fair value is derived from the liquidation value based on an actuarial formula as defined under terms of the investment contract. These plan assets were valued using unobservable inputs and, accordingly, the valuation was performed using Level 3 inputs.

The following table represents changes in the fair value of plan assets categorized as Level 3 from the preceding table:

Balance at January 1, 2017	$1.3
Purchases, sales and settlements, net	(2.4)
Transfers, net	4.0
Balance at December 31, 2017	$2.9
Purchases, sales and settlements, net	(2.8)
Transfers, net	0.1
Balance at December 31, 2018	$0.2

Our funding policy is to contribute at least the minimum funding amounts required by law. Based upon current actuarial estimates, we do not expect to contribute to our defined benefit pension plan until 2019. The following benefit payments are expected to be paid by the plan in each of the next five years and in the aggregate for the subsequent five years:

2019	$2.9
2020	3.0
2021	3.1
2022	3.2
2023	3.3
In aggregate during five years thereafter	17.2

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Hudson Defined Benefit Plan

As part of the Hudson acquisition (see Note 12, "Business Combinations") we acquired a noncontributory defined benefit plan (the "Hudson Plan") covering certain employees at a Hudson subsidiary who meet the plan's eligibility requirements. The Hudson Plan is closed to new participants. Our funding policy is to make the minimum annual contribution that is required by applicable regulations, plus such amounts as we may determine to be appropriate from time to time. At December 31, 2018 and 2017, the projected benefit obligation of the Hudson Plan was \$2.5 and \$2.8, respectively, and the fair value of plan assets was \$1.7 and \$1.9, respectively. Consequently, at December 31, 2018 and 2017, a liability of \$0.8 and \$0.9, respectively, was included in accrued pension liabilities on the consolidated balance sheets for the underfunded status of the Hudson Plan. Pension expense in 2018 and 2017 was not significant.

Multi-Employer Plan

We contribute to a multi-employer plan for certain collective bargaining U.S. employees. The risks of participating in this multi-employer plan are different from a single employer plan in the following aspects:

(a) Assets contributed to the multi-employer by one employer may be used to provide benefits to employees of other participating employers.

(b) If a participating employer ceases contributing to the plan, the unfunded obligations of the plan may be inherited by the remaining participating employers.

(c) If we choose to stop participating in the multi-employer plan, we may be required to pay those plans an amount based on the underfunded status of the plan, referred to as a withdrawal liability.

We have assessed and determined that the multi-employer plan to which we contribute is not significant to our financial statements. We do not expect to incur a withdrawal liability or expect to significantly increase our contribution over the remainder of the current contract period, which ends in February 2023. We made contributions to the bargaining unit supported multi-employer pension plan resulting in expense of \$0.4, \$0.3, and \$0.3 for the years ended December 31, 2018, 2017 and 2016, respectively. The reduction in contributions is due to fewer employees participating in this plan.

Defined Contribution Savings Plan

We have a defined contribution savings plan that covers most of our U.S. employees. Company contributions to the plan are based on employee contributions, and include a Company match and discretionary contributions. Expenses under the plan totaled \$8.7, \$8.2, and \$6.0 for the years ended December 31, 2018, 2017 and 2016, respectively.

Voluntary Deferred Income Plan

We provide additional retirement plan benefits to certain members of management under the Amended and Restated Chart Industries, Inc. Voluntary Deferred Income Plan. This is an unfunded plan. We recorded \$0.4, \$0.5, and \$0.3 of expense associated with this plan for the years ended December 31, 2018, 2017 and 2016, respectively.

NOTE 17 — Share-based Compensation

Under the 2017 Omnibus Equity Plan (the "2017 Omnibus Equity Plan") officers and employees (including our principal executive officer, principal financial officer and other "named executive officers") are eligible to be granted stock options, stock appreciation rights ("SARs"), restricted stock, restricted stock units ("RSUs"), performance shares and common shares. The maximum number of shares available for issuance is 1.70, which may be treasury shares or unissued shares. As of December 31, 2018, 0.12 stock options, 0.14 shares of restricted stock and RSUs, and 0.01 performance units were outstanding under the 2017 Omnibus Equity Plan.

Under the Amended and Restated 2009 Omnibus Equity Plan ("2009 Omnibus Equity Plan") which was originally approved by our shareholders in May 2009 and re-approved by shareholders in May 2012 as amended and restated, we could grant stock options, SARs, RSUs, restricted stock, performance shares, leveraged restricted shares, and common shares to employees and directors. The maximum number of shares available for issuance is 3.35, which could be treasury shares or unissued shares. As of December 31, 2018, 0.71 stock options, 0.13 shares of restricted stock and RSUs, and 0.03 performance units were outstanding under the 2009 Omnibus Equity Plan.

Under the Amended and Restated 2005 Stock Incentive Plan ("2005 Stock Incentive Plan") which became effective in October 2005, we could grant stock options, SARs, RSUs, stock awards, and performance based stock awards to employees and

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

directors. The maximum number of shares available for issuance is 2.44, which could be treasury shares or unissued shares. We no longer grant awards under the 2009 Omnibus Equity Plan and 2005 Stock Incentive Plan.
We recognized share-based compensation expense of $4.9, $10.6, and $10.1 for the years ended December 31, 2018, 2017 and 2016, respectively. This expense is included in selling, general and administrative expenses in the consolidated statements of income. The tax benefit related to share-based compensation, which was recorded in net income in the consolidated statement of income during the year ended December 31, 2018 was $1.3 (the tax benefit for 2017 was insignificant). For the year ended December 31, 2016, a tax benefit of $1.1 was recorded in additional paid-in capital in the consolidated balance sheet at December 31, 2016. As of December 31, 2018, total share-based compensation expense of $7.9 is expected to be recognized over the remaining weighted-average period of approximately 2.4 years.
Stock Options
We use a Black-Scholes option pricing model to estimate the fair value of stock options. The expected volatility is based on historical information. The risk-free rate is based on the U.S. Treasury yield in effect at the time of the grant. Weighted-average grant-date fair values of stock options and the assumptions used in estimating the fair values are as follows:

	Year Ended December 31,		
	2018	2017	2016
Weighted-average grant-date fair value per share	$26.67	$20.11	$10.31
Expected term (years)	5.5	5.4	5.2
Risk-free interest rate	2.30 %	2.00 %	1.67 %
Expected volatility	59.41 %	60.31 %	61.41 %

Stock options generally have a four-year graded vesting period, an exercise price equal to the fair market value of a share of common stock on the date of grant, and a contractual term of 10 years. The following table summarizes our stock option activity from continuing operations:

	December 31, 2018			
	Number of Shares	Weighted-average Exercise Price	Aggregate Intrinsic Value	Weighted- average Remaining Contractual Term
Outstanding at beginning of year	1.22	$ 32.64		
Granted	0.19	48.98		
Exercised	(0.41)	25.18		
Forfeited / Cancelled	(0.21)	40.31		
Outstanding at end of year	0.79	$ 38.46	$ 22.3	5.3 years
Vested and expected to vest at end of year	0.78	$ 38.39	$ 8.3	5.3 years
Exercisable at end of year	0.35	$ 45.22	$ 22.1	4.3 years

As of December 31, 2018, total unrecognized compensation cost related to stock options expected to be recognized over the weighted-average period of approximately 2.6 years is $1.9.
The total intrinsic value of options exercised during the years ended December 31, 2018, 2017 and 2016 was $18.8, $1.2, and $0.2, respectively. The total fair value of stock options vested during the years ended December 31, 2018, 2017 and 2016 was $3.7, $3.3, and $3.7, respectively.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

Restricted Stock and RSUs

Restricted stock and RSUs generally vest ratably over a three-year period and are valued based on our market price on the date of grant. The following table summarizes our unvested restricted stock and RSUs activity from continuing operations:

	December 31, 2018	
	Number of Shares	Weighted-Average Grant-Date Fair Value
Unvested at beginning of year	0.31	$ 28.54
Granted	0.17	51.99
Forfeited	(0.07)	38.41
Vested	(0.14)	27.47
Unvested at end of year	0.27	$ 41.01

As of December 31, 2018, total unrecognized compensation cost related to unvested restricted stock and RSUs expected to be recognized over the weighted-average period of approximately 2.4 years is $5.7.

The weighted-average grant-date fair value of restricted stock and RSUs granted during the years ended December 31, 2018, 2017, and 2016 was $51.99, $37.14, and $19.05, respectively. The total fair value of restricted stock and RSUs that vested during the years ended December 31, 2018, 2017, and 2016 was $7.3, $4.6, and $1.1, respectively.

Performance Units

Performance units are earned over a three-year period. Based on the attainment of pre-determined performance condition targets as determined by the Compensation Committee of the Board of Directors, performance units earned may be in the range of between 0% and 200%. The following table, which is stated at a 100% earned percentage, summarizes our performance units activity from continuing operations:

	December 31, 2018	
	Number of Shares	Weighted-Average Grant-Date Fair Value
Unvested at beginning of year	0.05	$ 25.71
Granted	0.02	49.38
Forfeited	(0.03)	36.88
Unvested at end of year	0.04	$ 27.49

As of December 31, 2018, total unrecognized compensation cost related to performance units expected to be recognized over a weighted-average period of approximately 1.7 years is $0.3.

The weighted-average grant-date fair value of performance units granted during the years ended December 31, 2018, 2017, and 2016 was $49.38, $37.34, and $19.69, respectively. The total fair value of performance units that vested during the years ended December 31, 2018, 2017, and 2016 was $0.1, $0.8, and $1.8, respectively.

Directors' Stock Grants

In 2018, 2017 and 2016, we granted the non-employee directors stock awards covering 0.01, 0.02, and 0.03 shares of common stock, respectively, which had fair values of $0.7, $0.7, and $0.6, respectively. These stock awards were fully vested on the grant date. Likewise, the fair values were recognized immediately on the grant date.

NOTE 18 — Lease Commitments

We incurred $8.0, $9.3, and $7.6 of rental expense under operating leases for the years ended December 31, 2018, 2017 and 2016, respectively. Certain leases contain rent escalation clauses and lease concessions that require additional rental payments in the later years of the term. Rent expense for these types of leases is recognized on a straight-line basis over the minimum lease term. In addition, we have the right, but no obligation, to renew certain leases for various renewal terms.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
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The following table summarizes future minimum lease payments for non-cancelable operating leases as of December 31, 2018:

2019	$7.9
2020	6.9
2021	5.7
2022	5.3
2023	4.6
Thereafter	9.2
Total future minimum lease payments	$39.6

NOTE 19 — Commitments and Contingencies

Environmental

We are subject to federal, state, local, and foreign environmental laws and regulations concerning, among other matters, waste water effluents, air emissions, and handling and disposal of hazardous materials, such as cleaning fluids. We are involved with environmental compliance, investigation, monitoring, and remediation activities at certain of our owned and formerly owned manufacturing facilities and at one owned facility that is leased to a third party, and, except for these continuing remediation efforts, believes we are currently in substantial compliance with all known environmental regulations. At December 31, 2018 and 2017, we had undiscounted accrued environmental reserves of $1.3 and $2.1, respectively. We accrue for certain environmental remediation-related activities for which commitments or remediation plans have been developed and for which costs can be reasonably estimated. These estimates are determined based upon currently available facts and circumstances regarding each facility. Actual costs incurred may vary from these estimates due to the inherent uncertainties involved. Future expenditures relating to these environmental remediation efforts are expected to be made over the next 7 years as ongoing costs of remediation programs.

Although we believe we have adequately provided for the cost of all known environmental conditions, the applicable regulatory agencies could insist upon different and more costly remediation than those we believe are adequate or required by existing law or third parties may seek to impose environmental liabilities on us. We believe that any additional liability in excess of amounts accrued which may result from the resolution of such matters will not have a material adverse effect on our financial position, liquidity, cash flows or results of operations.

Aluminum Cryobiological Tank Recall

In April 2018, we received several customer inquiries regarding the performance of certain aluminum cryobiological tanks (in the D&S West segment) manufactured at our New Prague, Minnesota facility. An investigation has determined that certain aluminum tanks manufactured at the facility during a limited certain period should be repaired or replaced. As such, on April 23, 2018, we issued a recall notice for the impacted product lines. Our D&S West segment recorded an expense of $4.0 to cost of sales during 2018 related to the estimated costs of the recall. The remaining liability is included in other current liabilities in the December 31, 2018 audited consolidated balance sheet. This estimated reserve is subject to adjustment to the extent additional developments arise in connection with this matter.

The following table represents the establishment of and changes in the aluminum cryobiological tank recall reserve:

Recall reserve - established April 2018	$3.8
Reserve usage	(3.9)
Change in estimate - expense	0.2
Balance at December 31, 2018	$0.1

Legal Proceedings

Stainless Steel Cryobiological Tank Legal Proceedings

During the second quarter of 2018, Chart was named in lawsuits (including a class action lawsuit filed in the U.S. District Court for the Northern District of California) filed against Chart and other defendants with respect to the alleged failure of a

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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stainless steel cryobiological storage tank (model MVE 808AF-GB) at the Pacific Fertility Center in San Francisco, California. No monetary damages related to the alleged failure have been specified or communicated to Chart at this point, and we are evaluating the merits of such claims in light of the limited information available to date regarding use, maintenance and operation of the tank which has been out of our custody for the past six years when it was sold to the Pacific Fertility Center through an independent distributor. Accordingly, an accrual related to any damages that may result from the lawsuits has not been recorded because a potential loss is not currently probable or estimable.
We have asserted various defenses against the claims in the lawsuits, including a defense that since manufacture, we were not in any way involved with the installation, ongoing maintenance or monitoring of the tank or related fertility center cryogenic systems at any time since the initial delivery of the tank.

Aluminum Cryobiological Tank Legal Proceeding

Chart has been named in purported class action lawsuits filed in the Ontario Superior Court of Justice against the Company and other defendants with respect to the alleged failure of an aluminum cryobiological storage tank (model FNL XC 47/11-6 W/11) at The Toronto Institute for Reproductive Medicine in Etobicoke, Ontario. We have confirmed that the tank in question was part of the aluminum cryobiological tank recall commenced on April 23, 2018. We have asserted various defenses against the claims in the lawsuits and are in the early stages of litigation. Accordingly, an accrual related to any damages that may result from the lawsuit has not been recorded because a potential loss is not currently probable or estimable.

We are occasionally subject to various legal claims related to performance under contracts, product liability, taxes, employment matters, environmental matters, intellectual property, and other matters incidental to the normal course of our business. Based on our historical experience in litigating these claims, as well as our current assessment of the underlying merits of the claims and applicable insurance, if any, management believes that the final resolution of these matters will not have a material adverse effect on our financial position, liquidity, cash flows, or results of operations. Future developments may, however, result in resolution of these legal claims in a way that could have a material adverse effect.

NOTE 20 — Restructuring Activities

We implemented certain cost reduction or avoidance actions, primarily related to departmental restructuring, including headcount reductions resulting in associated severance costs. As described in Note 4 “Segment and Geographic Information,” we executed a strategic realignment of our segment structure, which resulted in severance charges during 2018.

During 2017, we implemented a number of cost reduction or avoidance actions, including headcount reductions and facility closures and relocations primarily relating to the consolidation of certain of our facilities in China and relocation of the corporate headquarters. The E&C Wuxi, China facility consolidation was completed during 2017, and the China facility consolidation in our D&S East segment was substantially completed during the fourth quarter of 2017. Our corporate headquarters move from Garfield Heights, Ohio to Ball Ground, Georgia, which was officially effective October 26, 2017, was substantially complete at the end of 2017, and our Garfield Heights lease commitment ended on December 31, 2017. All of these actions were completed in the first half of 2018.

The following table is a summary of the severance and other restructuring costs, which included employee-related costs, facility rent and exit costs, relocation, recruiting, travel and other, for the years ended December 31, 2018, 2017 and 2016:

	Year Ended December 31,		
	2018	2017	2016
Severance:			
Cost of sales	$—	$0.4	$3.3
Selling, general, and administrative expenses	3.2	3.2	5.3
Total severance costs	$3.2	$3.6	$8.6

Other restructuring:			
Cost of sales	$0.8	$2.3	$0.2
Selling, general, and administrative expenses	0.4	5.3	0.7
Total other restructuring costs	$1.2	$7.6	$0.9
Total restructuring costs	$4.4	$11.2	$9.5

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
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We currently do not expect any significant severance or restructuring charges in 2019. We are closely monitoring our end markets and order rates and will continue to take appropriate and timely actions as necessary.
The following tables summarize our restructuring activities for the years ended 2018, 2017 and 2016:

	Year Ended December 31, 2018				
	Energy & Chemicals	D&S West	D&S East	Corporate	Consolidated
Balance as of December 31, 2017	$0.2	$1.2	$0.2	$ 1.1	$ 2.7
Restructuring charges	0.7	—	1.4	2.3	4.4
Cash payments and other	(0.9)	(1.2)	(0.8)	(3.3)	(6.2)
Balance as of December 31, 2018	$—	$—	$0.8	$ 0.1	$ 0.9

	Year Ended December 31, 2017				
	Energy & Chemicals	D&S West	D&S East	Corporate	Consolidated
Balance as of December 31, 2016	$0.1	$3.2	$—	$ 3.0	$ 6.3
Restructuring charges	2.4	1.1	1.7	6.0	11.2
Cash payments and other	(2.5)	(3.1)	(1.5)	(7.9)	(15.0)
Acquired restructuring reserve	0.2	—	—	—	0.2
Balance as of December 31, 2017	$0.2	$1.2	$0.2	$ 1.1	$ 2.7

	Year Ended December 31, 2016				
	Energy & Chemicals	D&S West	D&S East	Corporate	Consolidated
Balance as of December 31, 2015	$1.1	$0.4	$0.2	$ 0.9	$ 2.6
Restructuring charges	1.0	3.5	0.8	4.2	9.5
Cash payments and other	(2.0)	(0.7)	(1.0)	(2.1)	(5.8)
Balance as of December 31, 2016	$0.1	$3.2	$—	$ 3.0	$ 6.3

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

NOTE 21 — Quarterly Data (Unaudited)

Selected quarterly data for the years ended December 31, 2018 and 2017 are as follows:

	Year Ended December 31, 2018				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total
Sales	$244.1	$277.9	$272.2	$290.1	$1,084.3
Gross profit	66.9	72.8	82.3	73.9	295.9
Operating income (1) (2) (3)	15.0	19.3	31.5	26.3	92.1
Income from continuing operations	$4.2	$9.9	$21.5	$18.0	$53.6
Income from discontinued operations (3) (4)	1.6	2.4	0.7	29.7	34.4
Net income attributable to Chart Industries, Inc. (5)	$5.8	$12.3	$22.2	$47.7	$88.0
Basic earnings per common share attributable to Chart Industries, Inc. (6) (7)					
Income from continuing operations	$0.14	$0.32	$0.69	$0.58	$1.73
Income from discontinued operations	0.05	0.08	0.03	0.94	1.10
Net income attributable to Chart Industries, Inc.	$0.19	$0.40	$0.72	$1.52	$2.83
Diluted earnings per common share attributable to Chart Industries, Inc. (6) (7)					
Income from continuing operations	$0.13	0.31	$0.65	$0.56	$1.67
Income from discontinued operations	0.05	0.07	0.02	0.91	1.06
Net income attributable to Chart Industries, Inc.	$0.18	$0.38	$0.67	$1.47	$2.73

(1) Includes an expense of $3.8 recorded to the cost of sales related to the estimated costs of the aluminum cryobiological tank recall for the second quarter of 2018 and an additional expense of $0.2 recorded to the cost of sales for the fourth quarter of 2018.

(2) During the year ended December 31, 2018, we recorded net severance costs of $2.3 primarily related to headcount reductions associated with the strategic realignment of our segment structure, which includes $1.8 in payroll severance costs partially offset by a $0.9 credit due to related share-based compensation forfeitures for the third quarter of 2018. Includes net severance costs of $1.4 related to the departure of our former CEO, which includes $3.2 in payroll severance costs partially offset by a $1.8 credit due to related share-based compensation forfeitures for the second quarter of 2018.

(3) Includes transaction-related costs of $2.1 for the year ended December 31, 2018, which were mainly related to the VRV acquisition. Includes integration costs of $0.8 related to the VRV acquisition for the fourth quarter of 2018.

(4) Includes gain on sale of the CAIRE business of $34.3 for the fourth quarter of 2018.

(5) We have completed our analysis to determine the effect of the Tax Cuts and Jobs Act, and as such, we have recorded an additional tax benefit of $1.8.

(6) Basic and diluted earnings per share are computed independently for each of the quarters presented. As such, the sum of quarterly basic and diluted earnings per share may not equal reported annual basic and diluted earnings per share.

(7) Zero incremental shares from share-based awards are included in the computation of diluted net loss per share for periods in which a net loss occurs, because to do so would be anti-dilutive.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS — (Continued)
(Dollars and shares in millions, except per share amounts)

	Year Ended December 31, 2017				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total
Sales [1]	$171.0	$199.8	$202.7	$269.4	$842.9
Gross profit	48.2	52.4	57.9	73.1	231.6
Operating income [1] [2]	1.9	8.5	7.2	20.9	38.5
(Loss) income from continuing operations	$(1.9)	$1.2	$(0.6)	$27.5	$26.2
(Loss) income from discontinued operations	(1.0)	1.5	2.1	(0.8)	1.8
Net (loss) income attributable to Chart Industries, Inc. [3] [4]	$(2.9)	$2.7	$1.5	$26.7	$28.0
Basic (loss) earnings per common share attributable to Chart Industries, Inc. [5] [6]					
(Loss) income from continuing operations	$(0.06)	$0.04	$(0.02)	$0.89	$0.85
(Loss) income from discontinued operations	(0.03)	0.05	0.07	(0.02)	0.06
Net (loss) income attributable to Chart Industries, Inc.	$(0.09)	$0.09	$0.05	$0.87	$0.91
Diluted (loss) earnings per common share attributable to Chart Industries, Inc. [5] [6]					
(Loss) income from continuing operations	$(0.06)	$0.04	$(0.02)	$0.87	$0.84
(Loss) income from discontinued operations	(0.03)	0.05	0.07	(0.02)	0.05
Net (Loss) income attributable to Chart Industries, Inc.	$(0.09)	$0.09	$0.05	$0.85	$0.89

(1) Hudson, included in these results since the acquisition date, September 20, 2017, added net sales and operating income of $58.0 and $6.4 for the year ended December 31, 2017, including $6.1 and $1.2 in the third quarter and $51.9 and $5.2 in the fourth quarter, respectively.

(2) The fourth quarter of 2017 includes $3.7 in additional expense as a result of a litigation award in China.

(3) During the fourth quarter of 2017, we recorded a $4.9 loss on extinguishment of debt associated with the repurchase of $192.9 principal amount of our $250.0 2.00% convertible notes due August 2018 and refinance of our senior secured revolving credit facility.

(4) The fourth quarter of 2017 includes a one-time $22.5 net favorable tax benefit that was recorded during the fourth quarter of 2017, which resulted from the enactment of the Tax Cuts and Jobs Act. This benefit mainly consisted of a one-time, provisional benefit of $26.9 related to the remeasurement of certain of our deferred tax liabilities using the lower U.S. federal corporate tax rate of 21%. This was partially offset by (i) a one-time, provisional charge of $8.7 related to the deemed repatriation transition tax, which is a tax on previously untaxed accumulated earnings and profits of certain of our foreign subsidiaries, and (ii) a one-time tax expense and tax benefit of $4.5 and $8.7, respectively, related to our intent to amend pre-acquisition Hudson U.S. federal tax returns. We have completed our analysis to determine the effect of the Tax Cuts and Jobs Act as discussed above.

(5) Basic and diluted (loss) earnings per share are computed independently for each of the quarters presented. As such, the sum of quarterly basic and diluted (loss) earnings per share may not equal reported annual basic and diluted (loss) earnings per share.

(6) Zero incremental shares from share-based awards are included in the computation of diluted net loss per share for periods in which a net loss occurs, because to do so would be anti-dilutive.

CHART INDUSTRIES, INC. AND SUBSIDIARIES
SCHEDULE II – VALUATION AND QUALIFYING ACCOUNTS
(Dollars in millions)

	Balance at beginning of period	Additions Charged to costs and expenses	Deductions	Translations	Balance at end of period
Year Ended December 31, 2018					
Allowance for doubtful accounts	$ 9.1	$ —	$ (0.8) [1]	$ 0.2	$ 8.5
Allowance for excess and obsolete inventory	7.1	4.8	(3.5) [2]	0.6	9.0
Deferred tax assets valuation allowance	26.8	38.7	—	(0.3)	65.2
Year Ended December 31, 2017					
Allowance for doubtful accounts	$ 9.0	$ 0.5	$ (0.9) [1]	$ 0.5	$ 9.1
Allowance for excess and obsolete inventory	9.1	4.2	(6.3) [2]	0.1	7.1
Deferred tax assets valuation allowance	14.9	10.9	—	1.0	26.8
Year Ended December 31, 2016					
Allowance for doubtful accounts	$ 6.3	$ 3.6	$ (0.4) [1]	$ (0.5)	$ 9.0
Allowance for excess and obsolete inventory	10.0	6.6	(7.0) [2]	(0.5)	9.1
Deferred tax assets valuation allowance	8.6	7.0	(0.1) [3]	(0.6)	14.9

[1] Reversal of amounts previously recorded as bad debt and uncollectible accounts written off.
[2] Inventory items written off against the allowance.
[3] Deductions to the deferred tax assets valuation allowance relate to decreased deferred tax assets and the release of the valuation allowance.

INDEX TO EXHIBITS

Exhibit No.	Description
2.1	Agreement and Plan of Merger, among Chart Industries, Inc., Chart Sully Corporation, RCHPH Holdings, Inc., and R/C Hudson Holdings, L.P., solely in its capacity as the Initial Holder Representative under the Merger Agreement, dated as of June 30, 2017 (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed with the SEC on June 30, 2017 (File No. 001-11442)).**
2.1.1	Amendment No. 1, dated September 19, 2017, to Agreement and Plan of Merger, among Chart Industries, Inc., Chart Sully Corporation, RCHPH Holdings, Inc., and R/C Hudson Holdings, L.P., solely in its capacity as the Initial Holder Representative under the Merger Agreement, dated as of June 30, 2017 (incorporated by reference to Exhibit 2.2 to the Registrant's Current Report on Form 8-K filed with the SEC on September 21, 2017 (File No. 001-11442)).**
2.2	Share Purchase Agreement, by and among Chart Industries, Inc., Alessandro Spada, Elena Spada and Federico Spada, dated as of September 26, 2018 (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed with the SEC on September 27, 2018 (File No. 001-11442)).**
2.2.1	Amended and Restated Share Purchase Agreement, by and among Chart Industries, Inc., Alessandro Spada, Elena Spada, Federico Spada and VRV S.p.a., dated as of November 13, 2018 (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed with the SEC on November 15, 2018 (File No. 001-11442)).**
2.3	Stock Purchase Agreement, by and among Chart Inc., Chart Industries Luxembourg S.à r.l., Chart Asia Investment Company Limited and NGK Spark Plug Co., Ltd., dated as of September 28, 2018 (incorporated by reference to Exhibit 2.1 to the Registrant's Current Report on Form 8-K filed with the SEC on October 1, 2018 (File No. 001-11442)).**
3.1	Amended and Restated Certificate of Incorporation (incorporated by reference to Exhibit 3.1 to Amendment No. 5 to the Registrant's Registration Statement on Form S-1 (File No. 333-133254)).
3.2	Amended and Restated By-Laws, as amended (incorporated by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K, filed with the SEC on December 19, 2008 (File No. 001-11442)).
4.1	Form of Certificate (incorporated by reference to Exhibit 4.1 to Amendment No. 4 to the Registrant's Registration Statement on Form S-1 (File No. 333-133254)).
4.2	Indenture, dated as of November 6, 2017, by and between Chart Industries, Inc. and Wells Fargo Bank, National Association (including the form of the 1.00% Convertible Senior Subordinated Notes due 2024) (incorporated by reference to Exhibit 4.1 to the Registrant's Current Report on Form 8-K filed with the SEC on November 6, 2017 (File No. 001-11442)).
10.1	Amended and Restated Chart Industries, Inc. 2005 Stock Incentive Plan (incorporated by reference to Exhibit 10.3 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2008 (File No. 001-11442)).*

10.1.1	Form of Restricted Stock Unit Agreement (for non-employee directors) under the Amended and Restated Chart Industries, Inc. 2005 Stock Incentive Plan (incorporated by reference to Exhibit 10.22 to Amendment No. 4 to the Registrant's Registration Statement on Form S-1 (File No. 333-133254)).*
10.1.2	Form of Nonqualified Stock Option Agreement (2007 and 2008 grants) under the Amended and Restated Chart Industries, Inc. 2005 Stock Incentive Plan (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K, filed with the SEC on August 7, 2007 (File No. 001-11442)).*
10.1.3	Form of Nonqualified Stock Option Agreement (2009 grants) under the Amended and Restated Chart Industries, Inc. 2005 Stock Incentive Plan (incorporated by reference to Exhibit 10.3.7 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2008 (File No. 001-11442)).*
10.1.4	Forms of Stock Award Agreement and Deferral Election Form (for non-employee directors) (2008 grants) under the Amended and Restated Chart Industries, Inc. 2005 Stock Incentive Plan (incorporated by reference to Exhibit 10.4.6 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2007 (File No. 001-11442)).*
10.1.5	Forms of Stock Award Agreement and Deferral Election Form (for non-employee directors) (2009 grants) under the Amended and Restated Chart Industries, Inc. 2005 Stock Incentive Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2008 (File No. 001-11442)).*

10.2	Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Appendix A to the Registrant's definitive proxy statement filed with the SEC on April 10, 2012 (File No. 001-11442)).*
10.2.1	Amendment No. 1 to the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended September 30, 2012 (File No. 001-11442)).*
10.2.2	Form of Nonqualified Stock Option Agreement (2010 grants) under the Chart Industries, Inc. 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.4.1 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2009 (File No. 001-11442)).*
10.2.3	Forms of Stock Award Agreement and Deferral Election Form (for eligible directors) under the Chart Industries, Inc. 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.4.3 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2009 (File No. 001-11442)).*
10.2.4	Form of Nonqualified Stock Option Agreement (2011 grants) under the Chart Industries, Inc. 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.4 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 (File No. 001-11442)).*
10.2.5	Form of Restricted Stock Agreement (2011 grants) under the Chart Industries, Inc. 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.5 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 (File No. 001-11442)).*
10.2.6	Form of Performance Unit Agreement (2011 grants) under the Chart Industries, Inc. 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.6 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2010 (File No. 001-11442)).*
10.2.7	Form of Nonqualified Stock Option Agreement (2012 grants) under the Chart Industries, Inc. 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.8 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2011 (File No. 001-11442)).*
10.2.8	Form of Leveraged Restricted Share Unit Agreement (2013 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed with the SEC on January 5, 2012 (File No. 001-11442)).*
10.2.9	Form of Nonqualified Stock Option Agreement (2013 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.11 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2012 (File No. 001-11442)).*
10.2.10	Form of Performance Unit Agreement (2013 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.12 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2012 (File No. 001-11442)).*
10.2.11	Form of Nonqualified Stock Option Agreement (2014 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.13 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2013 (File No. 001-11442)).*
10.2.12	Form of Performance Unit Agreement (2014 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.14 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2013 (File No. 001-11442)).*

10.2.13	Form of Leveraged Restricted Share Unit Agreement (2014 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.15 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2013 (File No. 001-11442)).*
10.2.14	Form of Nonqualified Stock Option Agreement (2015 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.16 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2014 (File No. 001-11442)).*
10.2.15	Form of Performance Unit Agreement (2015 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.17 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2014 (File No. 001-11442)).*
10.2.16	Form of Restricted Share Unit Agreement (2015 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.18 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2014 (File No. 001-11442)).*
10.2.17	Form of Nonqualified Stock Option Agreement (2016 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.18 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2015 (File No. 001-11442)).*

10.2.18	Form of Performance Unit Agreement (2016 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.19 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2015 (File No. 001-11442)).*
10.2.19	Form of Performance Unit Agreement (2016 Thomas grant) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.20 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2015 (File No. 001-11442)).*
10.2.20	Form of Restricted Share Unit Agreement (2016 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.21 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2015 (File No. 001-11442)).*
10.2.21	Form of Nonqualified Stock Option Agreement (2017 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.21 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 (File No. 001-11442)).*
10.2.22	Form of Performance Unit Agreement (2017 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.22 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 (File No. 001-11442)).*
10.2.23	Form of Restricted Share Unit Agreement (2017 grants) under the Chart Industries, Inc. Amended and Restated 2009 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.23 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2016 (File No. 001-11442)).*
10.3	Chart Industries, Inc. 2017 Omnibus Equity Plan (incorporated by reference to Appendix B to the Registrant's definitive proxy statement filed with the Securities and Exchange Commission on April 11, 2017 (File No. 001-11442)).*
10.3.1	Form of Nonqualified Stock Option Agreement (2018 grants) under the Chart Industries, Inc. 2017 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.25 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2017 (File No. 001-11442)).*
10.3.2	Form of Performance Unit Agreement (2018 grants) under the Chart Industries, Inc. 2017 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.26 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2017 (File No. 001-11442)).*
10.3.3	Form of Restricted Share Unit Agreement (2018 grants) under the Chart Industries, Inc. 2017 Omnibus Equity Plan (incorporated by reference to Exhibit 10.3.27 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2017 (File No. 001-11442)).*
10.3.4	Form of Stock Award Agreement and Deferral Election Form (for eligible directors) under the Chart Industries, Inc. 2017 Omnibus Equity Plan.* (x)
10.3.5	Form of Nonqualified Stock Option Agreement (2019 grants) under the Chart Industries, Inc. 2017 Omnibus Equity Plan.* (x)
10.3.6	

	Form of Performance Unit Agreement (2019 grants) under the Chart Industries, Inc. 2017 Omnibus Equity Plan.* (x)
10.3.7	Form of Restricted Share Unit Agreement (2019 grants) under the Chart Industries, Inc. 2017 Omnibus Equity Plan.* (x)
10.3.8	Form of Restricted Share Unit Agreement (2018 Evanko Grant) under the Chart Industries, Inc. 2017 Omnibus Equity Plan.* (x)
10.4	Amended and Restated Chart Industries, Inc. Voluntary Deferred Income Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed with the SEC on June 28, 2010 (File No. 001-11442)).*
10.4.1	Amendment No. 1 to the Amended and Restated Chart Industries, Inc. Voluntary Deferred Income Plan (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2016 (File No. 001-11442)).*
10.4.2	Amendment No. 2 to the Amended and Restated Chart Industries, Inc. Voluntary Deferred Income Plan (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K, filed with the SEC on July 14, 2016 (File No. 001-11442)).*

10.5	Chart Industries, Inc. Cash Incentive Plan (incorporated by reference to Appendix A to the Registrant's definitive proxy statement filed with the Securities and Exchange Commission on April 8, 2014 (File No. 001-11442)).*
10.6	Third Amended and Restated Credit Agreement, dated November 3, 2017, among Chart Industries, Inc., Chart Industries Luxembourg S.à r.l., Chart Asia Investment Company Limited, the lenders from time to time party thereto, and JPMorgan Chase Bank, N.A. as Administrative Agent (incorporated by reference to Exhibit 10.13 to the Registrant's Current Report on Form 8-K, filed with the SEC on November 6, 2017 (File No. 001-11442)).
10.6.1	Amendment No. 1, dated October 26, 2018, to Third Amended and Restated Credit Agreement, among Chart Industries, Inc., Chart Industries Luxembourg S.à r.l., Chart Asia Investment Company Limited, the lenders from time to time party thereto, and JPMorgan Chase Bank, N.A. as Administrative Agent (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K, filed with the SEC on October 26, 2018 (File no. 001-11442)).
10.7	Amended and Restated Employment Agreement, dated May 25, 2017, by and between Chart Industries, Inc. and Samuel F. Thomas (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K/A, filed with the SEC on May 26, 2017 (File No. 001-11442)).*
10.8	Amended and Restated Employment Agreement, dated effective June 12, 2018, by and between Chart Industries, Inc. and Jillian C. Evanko (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K/A filed with the SEC on July 10, 2018 (File No. 001-11442).*
10.9	Amended and Restated Employment Agreement, dated May 25, 2017, by and between Chart Industries, Inc. and William C. Johnson (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report on Form 8-K/A, filed with the SEC on May 26, 2017 (File No. 001-11442)).*
10.10	Employment Agreement, dated October 26, 2017, by and between Chart Industries, Inc. and DeWayne R. Youngberg (incorporated by reference to Exhibit 10.12 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2017 (File No. 001-11442)).*
10.10.1	Mutual Agreement of Separation and Release, dated March 27, 2018, between Chart Industries, Inc. and DeWayne R. Youngberg (incorporated by reference to Exhibit 10.1 to the Registrant's Quarterly Report on Form 10-Q for the quarter ended March 31, 2018 (File No. 001-11442)).*
10.11	Employment Agreement, dated October 26, 2017, by and between Chart Industries, Inc. and Gerald F. Vinci (incorporated by reference to Exhibit 10.14 to the Registrant's Annual Report on Form 10-K for the year ended December 31, 2017 (File No. 001-11442)).*
10.12	Form of Indemnification Agreement (incorporated by reference to Exhibit 10.20 to the Registrant's Registration Statement on Form S-1 (File No. 333-133254)).
10.13	Base Call Option Transaction Confirmation, dated October 31, 2017, by and between Chart Industries, Inc. and Morgan Stanley & Co. International plc (incorporated by reference to Exhibit 10.1 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.1	Base Warrants Confirmation, dated October 31, 2017, by and between Chart Industries, Inc. and Morgan Stanley & Co. International plc (incorporated by reference to Exhibit 10.2 to the Registrant's Current Report

	on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.2	Base Call Option Transaction Confirmation, dated October 31, 2017, by and between Chart Industries, Inc. and JPMorgan Chase Bank, National Association, London Branch (incorporated by reference to Exhibit 10.3 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.3	Base Warrants Confirmation, dated October 31, 2017, by and between Chart Industries, Inc. and JPMorgan Chase Bank, National Association, London Branch (incorporated by reference to Exhibit 10.4 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.4	Base Call Option Transaction Confirmation, dated October 31, 2017, by and between Chart Industries, Inc. and Bank of America, N.A. (incorporated by reference to Exhibit 10.5 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.5	Base Warrants Confirmation, dated October 31, 2017, by and between Chart Industries, Inc. and Bank of America, N.A. (incorporated by reference to Exhibit 10.6 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).

10.13.6	Additional Call Option Transaction Confirmation, dated November 1, 2017, by and between Chart Industries, Inc. and Morgan Stanley & Co. International plc (incorporated by reference to Exhibit 10.7 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.7	Additional Warrants Confirmation, dated November 1, 2017, by and between Chart Industries, Inc. and Morgan Stanley & Co. International plc (incorporated by reference to Exhibit 10.8 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.8	Additional Call Option Transaction Confirmation, dated November 1, 2017, by and between Chart Industries, Inc. and JPMorgan Chase Bank, National Association, London Branch (incorporated by reference to Exhibit 10.9 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.9	Additional Warrants Confirmation, dated November 1, 2017, by and between Chart Industries, Inc. and JPMorgan Chase Bank, National Association, London Branch (incorporated by reference to Exhibit 10.10 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.10	Additional Call Option Transaction Confirmation, dated November 1, 2017, by and between Chart Industries, Inc. and Bank of America, N.A. (incorporated by reference to Exhibit 10.11 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
10.13.11	Additional Warrants Confirmation, dated November 1, 2017, by and between Chart Industries, Inc. and Bank of America, N.A. (incorporated by reference to Exhibit 10.12 to the Registrant's Current Report on Form 8-K filed with the Securities and Exchange Commission on November 6, 2017 (File No. 001-11442)).
21.1	List of Subsidiaries. (x)
23.1	Consent of Independent Registered Public Accounting Firm. (x)
31.1	Rule 13a-14(a) Certification of the Company's Chief Financial Officer. (x)
31.2	Rule 13a-14(a) Certification of the Company's Chief Executive Officer. (x)
32.1	Section 1350 Certification of the Company's Chief Financial Officer. (xx)
32.2	Section 1350 Certification of the Company's Chief Executive Officer. (xx)
101.INS	XBRL Instance Document (x)
101.SCH	XBRL Taxonomy Extension Schema Document (x)
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document (x)
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document (x)

101.LAB XBRL Taxonomy Extension Label Linkbase Document (x)

101.PRE XBRL Taxonomy Extension Presentation Linkbase Document (x)

(x) Filed herewith.
(xx) Furnished herewith.
* Management contract or compensatory plan or arrangement.
** Certain exhibits and schedules have been omitted and Chart agrees to furnish supplementally to the Securities and Exchange Commission a copy of any omitted exhibits and schedules upon request.