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

Commission File Number 1-3610

ARCONIC INC.

(Exact name of registrant as specified in its charter)

Delaware	25-0317820
(State of incorporation)	(I.R.S. Employer Identification No.)

390 Park Avenue, New York, New York 10022-4608
(Address of principal executive offices) (Zip code)

Registrant's telephone numbers:

Investor Relations----------------(212) 836-2758
Office of the Secretary-----------(212) 836-2732

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 $1.00 per share	New York Stock Exchange
$3.75 Cumulative Preferred Stock, par value $100.00 per share	NYSE American

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

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

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

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

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

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K 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. []

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

Large accelerated filer [✓] Accelerated filer [] Non-accelerated filer []

Smaller reporting company [] Emerging growth company []

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 Exchange Act). Yes __ No ✓.

The aggregate market value of the outstanding common stock, other than shares held by persons who may be deemed affiliates of the registrant, as of the last business day of the registrant's most recently completed second fiscal quarter was approximately $8 billion. As of February 15, 2019, there were 484,940,842 shares of common stock, par value $1.00 per share, of the registrant outstanding.

Documents incorporated by reference.

Part III of this Form 10-K incorporates by reference certain information from the registrant's definitive Proxy Statement for its 2019 Annual Meeting of Shareholders to be filed pursuant to Regulation 14A (Proxy Statement).

TABLE OF CONTENTS

Note on Incorporation by Reference

In this Form 10-K, selected items of information and data are incorporated by reference to portions of the Proxy Statement. Unless otherwise provided herein, any reference in this report to disclosures in the Proxy Statement shall constitute incorporation by reference of only that specific disclosure into this Form 10-K.

PART I

Item 1. Business.

General

Arconic Inc. is a Delaware corporation with its principal office in New York, New York and the successor to Arconic Pennsylvania (as defined below) which was formed in 1888 and formerly known as Alcoa Inc. In this report, unless the context otherwise requires, "Arconic" or the "Company" means Arconic Inc., a Delaware corporation, and all subsidiaries consolidated for the purposes of its financial statements.

The Company's Internet address is http://www.arconic.com. Arconic makes available free of charge on or through its website its annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934 as soon as reasonably practicable after the Company electronically files such material with, or furnishes it to, the Securities and Exchange Commission (SEC). The information on the Company's Internet site is not a part of, or incorporated by reference in, this annual report on Form 10-K. The SEC maintains an Internet site that contains these reports at http://www.sec.gov.

Forward-Looking Statements

This report contains (and oral communications made by Arconic may contain) statements that relate to future events and expectations and, as such, constitute forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Forward-looking statements include those containing such words as "anticipates," "believes," "could," "estimates," "expects," "forecasts," "goal," "guidance," "intends," "may," "outlook," "plans," "projects," "seeks," "sees," "should," "targets," "will," "would," or other words of similar meaning. All statements that reflect Arconic's expectations, assumptions or projections about the future, other than statements of historical fact, are forward-looking statements, including, without limitation, forecasts relating to the growth of the aerospace, automotive, commercial transportation and other end markets; statements and guidance regarding future financial results or operating performance; statements about Arconic's strategies, outlook, business and financial prospects; and statements regarding potential share gains. Forward-looking statements are not guarantees of future performance and are subject to risks, uncertainties, and changes in circumstances that are difficult to predict. Although Arconic believes that the expectations reflected in any forward-looking statements are based on reasonable assumptions, it can give no assurance that these expectations will be attained and it is possible that actual results may differ materially from those indicated by these forward-looking statements due to a variety of risks and uncertainties.

For a discussion of some of the specific factors that may cause Arconic's actual results to differ materially from those projected in any forward-looking statements, see the following sections of this report: Part I, Item 1A. (Risk Factors), Part II, Item 7. (Management's Discussion and Analysis of Financial Condition and Results of Operations), including the disclosures under Segment Information and Critical Accounting Policies and Estimates, and Note U to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data). Market projections are subject to the risks discussed in this report and other risks in the market. Arconic disclaims any intention or obligation to update publicly any forward-looking statements, whether in response to new information, future events or otherwise, except as required by applicable law.

Overview

Arconic ("Arconic" or the "Company") is a global leader in lightweight metals engineering and manufacturing. Arconic's innovative, multi-material products, which include aluminum, titanium, and nickel, are used worldwide in aerospace, automotive, commercial transportation, building and construction, industrial applications, defense, and packaging.

Arconic is a global company operating in 18 countries. Based upon the country where the point of sale occurred, the United States and Europe generated 65% and 24%, respectively, of Arconic's sales in 2018. In addition, Arconic has operating activities in Brazil, Canada, China, Japan, and Russia, among others. Governmental policies, laws and regulations, and other economic factors, including inflation and fluctuations in foreign currency exchange rates and interest rates, affect the results of operations in these countries.

Arconic's operations consist of three worldwide reportable segments: Engineered Products and Solutions, Global Rolled Products and Transportation and Construction Solutions.

Background

Arconic Inc. Reincorporation

On December 31, 2017 (the "Effective Date"), Arconic Inc., a Pennsylvania corporation ("Arconic Pennsylvania" or, prior to the Reincorporation (as defined below), the "Company"), effected the change of the Company's jurisdiction of incorporation from Pennsylvania to Delaware (the "Reincorporation") by merging (the "Reincorporation Merger") with a direct wholly owned Delaware subsidiary, Arconic (in this section, "Arconic Delaware" or, following the Reincorporation, the "Company"), pursuant to an Agreement and Plan of Merger (the "Reincorporation Merger Agreement"), dated as of October 12, 2017, by and between Arconic Pennsylvania and Arconic Delaware. Arconic Pennsylvania shareholders approved the Reincorporation Merger to effect the Reincorporation at a Special Meeting of Shareholders held on November 30, 2017. As a result of the Reincorporation, (i) Arconic Pennsylvania has ceased to exist, (ii) Arconic Delaware automatically inherited the reporting obligations of Arconic Pennsylvania under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), and (iii) Arconic Delaware is deemed to be the successor issuer to Arconic Pennsylvania.

The common stock, par value $1.00 per share, of Arconic Pennsylvania (the "Arconic Pennsylvania Common Stock") was listed for trading on the New York Stock Exchange and traded under the symbol "ARNC." As of the Effective Date, this symbol, without interruption, represents shares of common stock, par value $1.00 per share, of Arconic Delaware (the "Arconic Delaware Common Stock"). There was no change in the Exchange Act File Number assigned by the SEC as a result of the Reincorporation.

As of the Effective Date, the rights of the Company's stockholders began to be governed by the General Corporation Law of the State of Delaware, the Certificate of Incorporation of Arconic Delaware (the "Delaware Certificate") and the Bylaws of Arconic Delaware (the "Delaware Bylaws").

Other than the change in corporate domicile, the Reincorporation did not result in any change in the business, physical location, management, financial condition or number of authorized shares of the Company, nor did it result in any change in location of its current employees, including management. On the Effective Date, (i) the directors and officers of Arconic Pennsylvania prior to the Reincorporation continued as the directors and officers of Arconic Delaware after the Reincorporation, (ii) each outstanding share of Arconic Pennsylvania Common Stock was automatically converted into one share of Arconic Delaware Common Stock, (iii) each outstanding share of Serial Preferred Stock, par value $100 per share, of Arconic Pennsylvania (the "Arconic Pennsylvania Preferred Stock") was automatically converted into one share of Serial Preferred Stock, par value $100 per share, of Arconic Delaware (the "Arconic Delaware Preferred Stock") and (iv) all of Arconic Pennsylvania's employee benefit and compensation plans immediately prior to the Reincorporation were continued by Arconic Delaware, and each outstanding equity award and notional share unit relating to shares of Arconic Pennsylvania Common Stock was converted into an equity award or notional share unit, as applicable, relating to an equivalent number of shares of Arconic Delaware Common Stock on the same terms and subject to the same conditions. Beginning at the effective time of the Reincorporation, each certificate representing Arconic Pennsylvania Common Stock or Arconic Pennsylvania Preferred Stock was deemed for all corporate purposes to evidence ownership of Arconic Delaware Common Stock or Arconic Delaware Preferred Stock, as applicable. The Company's stockholders may, but are not required to, exchange their stock certificates as a result of the Reincorporation.

The foregoing descriptions of the Arconic Delaware Common Stock, the Arconic Delaware Preferred Stock, the Delaware Certificate and the Delaware Bylaws are qualified in their entirety by the full text of the Delaware Certificate and the Delaware Bylaws, which are filed as Exhibits 3(a) and 3(b), respectively, to this report.

Alcoa Corporation Separation Transaction

On November 1, 2016, Alcoa Inc. completed the separation of its business into two independent, publicly traded companies (the "Separation") – Alcoa Corporation and Arconic Inc. (the new name for Alcoa Inc.). Following the Separation, Alcoa Corporation holds the Alumina and Primary Metals segments, the rolling mill at the Warrick, Indiana operations and the 25.1% stake in the Ma'aden Rolling Company in Saudi Arabia previously held by the Company. The Company retained the Global Rolled Products (other than the rolling mill at the Warrick, Indiana operations and the 25.1% ownership stake in the Ma'aden Rolling Company), Engineered Products and Solutions and Transportation and Construction Solutions segments.

The Separation was effected by a pro rata distribution of 80.1% of the outstanding shares of Alcoa Corporation common stock to the Company's shareholders (the "Distribution"). The Company's shareholders of record as of the close of business on October 20, 2016 (the "Record Date") received one share of Alcoa Corporation common stock for every three shares of the Company's common stock held as of the Record Date. The Company did not issue fractional shares of Alcoa Corporation common stock in the Distribution. Instead, each shareholder otherwise entitled to receive a fractional share of Alcoa Corporation common stock received cash in lieu of fractional shares.

The Company distributed 146,159,428 shares of common stock of Alcoa Corporation in the Distribution and retained 36,311,767 shares, or approximately 19.9%, of the common stock of Alcoa Corporation immediately following the Distribution. As a result of the Distribution, Alcoa Corporation became an independent public company trading under the symbol "AA" on the New York Stock Exchange, and the Company trades under the symbol "ARNC" on the New York Stock Exchange.

During 2017, the Company disposed of its retained interest in Alcoa Corporation. In February 2017, the Company sold 23,353,000 shares of Alcoa Corporation stock at $38.03 per share, which resulted in cash proceeds of $888 million and a gain of $351 million. In April and May 2017, the Company acquired a portion of its outstanding notes held by two investment banks (the "Investment Banks") in exchange for cash and the Company's remaining 12,958,767 shares (valued at $35.91 per share) in

Alcoa Corporation stock (the "Debt-for-Equity Exchange") and recorded a gain of $167 million. The gains of $351 million and $167 million associated with the disposition of the Alcoa Corporation shares were recorded in Other Income, Net in the accompanying Statement of Consolidated Operations in Part II, Item 8 (Financial Statements and Supplementary Data).

On October 31, 2016, in connection with the Separation and the Distribution, Arconic entered into several agreements with Alcoa Corporation or its subsidiaries that govern the relationship of the parties following the Distribution, including the following: Separation and Distribution Agreement, Transition Services Agreement, Tax Matters Agreement, Employee Matters Agreement, certain Patent, Know-How, Trade Secret License and Trademark License Agreements, Toll Processing and Services Agreement, Master Agreement for the Supply of Primary Aluminum, Massena Lease and Operations Agreement, Fusina Lease and Operations Agreement, and Stockholder and Registration Rights Agreement. The Toll Processing and Services Agreement expired by its terms at the end of 2018.

Recent Developments

On January 22, 2019, the Company announced that its Board of Directors (the Board) had determined to no longer pursue a potential sale of Arconic as part of its strategy and portfolio review. Management and the Board have been conducting a rigorous and comprehensive strategy and portfolio review over the past year and as part of that process had considered a sale of the Company, among other matters. However, the Company did not receive a proposal for a full-Company transaction that management and the Board believed would be in the best interest of Arconic's shareholders and other stakeholders. Management and the Board remain confident in Arconic's significant potential and are strongly focused on enhancing value for shareholders, through continued operational improvements and through other potential initiatives which have been previously identified in the strategy and portfolio review. The Company has announced the following key initiatives as part of its ongoing strategy and portfolio review:

- Commenced plans to reduce operating costs by approximately $200 million on an annual run-rate basis, designed to maximize the impact in 2019;
- Announced the planned separation of its portfolio into Engineered Products and Forgings and Global Rolled Products, with a spin-off of one of the businesses;
- Considering the potential sale of businesses that do not best fit into one of the two segments above;
- Intends to execute its previously authorized $500 million share repurchase program in the first half of 2019;
- The Board also authorized an additional $500 million of share repurchases, effective through the end of 2020; and
- Expects to reduce its quarterly common stock dividend from $0.06 to $0.02 per share.

On February 6, 2019, the Company announced that the Board appointed John C. Plant, current Chairman of the Board, as Chairman and Chief Executive Officer of the Company, effective February 6, 2019, to succeed Chip Blankenship, who ceased to serve as Chief Executive Officer of the Company and resigned as a member of the Board, in each case as of that date. In addition, the Company announced that the Board appointed Elmer L. Doty, current member of the Board, as President and Chief Operating Officer, a newly created position, effective February 6, 2019. Mr. Doty will remain a member of the Board. The Company also announced that Arthur D. Collins, Jr., current member of the Board, has been appointed interim Lead Independent Director of the Company, effective February 6, 2019.

On February 19, 2019, the Company entered into an accelerated share repurchase ("ASR") agreement with JPMorgan Chase Bank to repurchase $700 million of its common stock, pursuant to the share repurchase program previously authorized by the Board. Under the ASR agreement, Arconic will receive initial delivery of approximately 32 million shares on February 21, 2019. The final number of shares to be repurchased will be based on the volume-weighted average price of Arconic's common stock during the term of the transaction, less a discount. The ASR agreement is expected to be completed during the first half of 2019.

The Company will evaluate its organizational structure in conjunction with the planned separation of its portfolio and changes to its reportable segments are expected in the first half of 2019.

Description of the Business

Information describing Arconic's businesses can be found on the indicated pages of this report:

Major Product Revenues

Products that contributed 10% or more to consolidated revenues for the years ended December 31, 2018, 2017 and 2016, were:

	For the Year Ended December 31,		
	2018	2017	2016
Innovative flat-rolled products	40%	39%	39%
Engines	21%	21%	21%
Engineered structures	13%	13%	14%
Fastening systems	11%	11%	12%

Arconic has no customer that accounts for 10% or more of its consolidated revenues. However, certain of the Company's businesses are dependent upon a few significant customers. The loss of any such significant customer could have a material adverse effect on such businesses.

Engineered Products and Solutions

Arconic's Engineered Products and Solutions segment ("EP&S") develops and manufactures high performance products mainly for the aerospace (commercial and defense), commercial transportation, and power generation end markets. Such products include fastening systems (titanium, steel, and nickel superalloys); seamless rolled rings (nickel superalloys, steel and titanium); investment castings (nickel superalloys, titanium, and aluminum), including airfoils and structural components; forged airframe and jet engine components (nickel superalloys, titanium, aluminum), including bulkheads, disks and shafts; extruded airframe components (aluminum); and various other forged and extruded metallic components for the oil and gas, industrial products, automotive, and land and sea defense end markets.

In January 2018, EP&S announced a change in the organizational structure of the segment, from four business units to three business units, with a focus on aligning its internal structure to core markets and customers and reducing costs. The three business units are Arconic Engines; Arconic Fastening Systems; and Arconic Engineered Structures.

Arconic Engines (AEN). AEN produces investment cast airfoils, seamless rolled rings and closed-die (including isothermal) forged turbine disks for aero engine and industrial gas turbines, as well as other structural aero engine components. AEN also provides additive manufacturing technologies, superalloy ingots, open-die forging, machining, performance coatings, and hot isostatic pressing for high performance parts.

Arconic Fastening Systems (AFS). AFS produces aerospace fastening systems, as well as commercial transportation fasteners. The business's high-tech, multi-material fastening systems are found nose to tail on aircraft and aero engines. The business's products are also critical components of industrial gas turbines, automobiles, commercial transportation vehicles, and construction and industrial equipment.

Arconic Engineered Structures (AES). AES produces titanium and aluminum ingots and mill products for aerospace and defense applications and is vertically integrated to produce structural investment castings, forgings and extrusions, for airframe, wing, aero-engine, and landing gear components, as well as lightweight drive shafts for the commercial transportation industries. AES also provides multi-material airframe subassemblies and solutions related to advanced technologies and materials, such as 3D printing and titanium aluminides.

For additional discussion of the EP&S segment's business, see "Results of Operations—Segment Information" in Part II, Item 7. (Management's Discussion and Analysis of Financial Condition and Results of Operations) and Note C to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data).

In July 2018, Arconic announced a two-year Joint Development Agreement with Lockheed Martin to develop customized lightweight material systems and advanced manufacturing processes, such as metal 3D printing, to advance current and next-generation aerospace and defense solutions - including new structures and systems.

In December 2018, as part of the Company's ongoing strategy and portfolio review, Arconic completed the sale of its Eger, Hungary forgings business that manufactured high volume steel forgings for drivetrain components in the European heavy-duty truck and automotive market to Angstrom Automotive Group LLC.

Engineered Products and Solutions Principal Facilities[1]

Country	Facility	Products
Australia	Oakleigh	Fasteners
Canada	Georgetown, Ontario[2]	Aerospace Castings
	Laval, Québec	Aerospace Castings and Machining
China	Suzhou[2]	Fasteners and Rings
France	Dives-sur-Mer	Aerospace and Industrial Gas Turbine Castings
	Evron	Aerospace and Specialty Castings
	Gennevilliers	Aerospace and Industrial Gas Turbine Castings
	Montbrison	Fasteners
	St. Cosme-en-Vairais[2]	Fasteners
	Toulouse	Fasteners
	Us-par-Vigny	Fasteners
Germany	Bestwig	Aerospace Castings
	Erwitte	Aerospace Castings
	Hannover[2]	Extrusions
	Hildesheim-Bavenstedt[2]	Fasteners
	Kelkheim[2]	Fasteners
Hungary	Nemesvámos	Fasteners
	Székesfehérvár	Aerospace and Industrial Gas Turbine Castings and Forgings
Japan	Nomi	Aerospace and Industrial Gas Turbine Castings
Mexico	Ciudad Acuña[2]	Aerospace Castings/Fasteners and Rings
Morocco	Casablanca[2]	Fasteners
South Korea	Kyoungnam	Extrusions
United Kingdom	Darley Dale	Forgings
	Ecclesfield	Ingot Castings
	Exeter[2]	Aerospace and Industrial Gas Turbine Castings and Alloy
	Glossop	Ingot Castings
	Ickles	Ingot Castings
	Leicester[2]	Fasteners
	Low Moor	Extrusions
	Meadowhall	Forgings
	Provincial Park	Forgings
	Redditch[2]	Fasteners
	River Don	Forgings
	Telford	Fasteners
	Welwyn Garden City	Aerospace Formed Parts

Country	Facility	Products
United States	Chandler, AZ	Extrusions
	Tucson, AZ[2]	Fasteners
	Carson, CA[2]	Fasteners
	City of Industry, CA[2]	Fasteners
	Fontana, CA	Rings
	Fullerton, CA[2]	Fasteners
	Rancho Cucamonga, CA	Rings
	Sylmar, CA	Fasteners
	Torrance, CA	Fasteners
	Branford, CT	Aerospace Coatings
	Winsted, CT	Aerospace Machining
	Savannah, GA	Forgings
	Lafayette, IN	Extrusions
	La Porte, IN	Aerospace and Industrial Gas Turbine Castings
	Baltimore, MD[2]	Extrusions
	Whitehall, MI	Aerospace and Industrial Gas Turbine Castings and Coatings, Titanium Alloy and Specialty Products
	Washington, MO	Aerospace Formed Parts, Titanium Mill Products
	Big Lake, MN	Aerospace Machining
	New Brighton, MN	Aerospace Machining
	Dover, NJ	Aerospace and Industrial Gas Turbine Castings and Alloy
	Verdi, NV	Rings
	Kingston, NY[2]	Fasteners
	Massena, NY	Extrusions
	Rochester, NY	Rings
	Canton, OH[2]	Ferro-Titanium Alloys and Titanium Mill Products
	Cleveland, OH	Investment Casting Equipment, Aerospace Components, Castings, Forgings and Oil & Gas Drilling Products
	Niles, OH	Titanium Mill Products
	Morristown, TN[2]	Aerospace and Industrial Gas Turbine Ceramic Products
	Austin, TX[2]	Additively Manufactured Parts
	Houston, TX[2]	Extrusions
	Spring, TX	Deep Water Drilling Machining
	Waco, TX[2]	Fasteners
	Wichita Falls, TX	Aerospace and Industrial Gas Turbine Castings
	Hampton, VA[2]	Aerospace and Industrial Gas Turbine Castings
	Martinsville, VA	Titanium Mill Products

1 Principal facilities are listed, and do not include 14 locations that serve as sales and administrative offices, distribution centers or warehouses.

2 Leased property or partially leased property.

Global Rolled Products

Arconic's Global Rolled Products segment ("GRP") has a single group organization structure and produces a range of aluminum sheet and plate products for the following markets:

Aerospace and Automotive - GRP provides a wide range of products, including many highly-differentiated sheet and plate products, for the worldwide aerospace and regional automotive markets.

Brazing, Commercial Transportation and Industrial - GRP provides specialty aluminum sheet and plate products for automotive, commercial transportation and industrial applications including proprietary heat exchanger products like multilayer brazing sheet.

Packaging - GRP serves the packaging market in Russia, Asia and Latin America through regional facilities.

For additional discussion of the Global Rolled Products segment's business, see "Results of Operations—Segment Information" in Part II, Item 7. (Management's Discussion and Analysis of Financial Condition and Results of Operations) and Note C to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data).

In July 2018, the Company announced it had signed a new long-term contract with Boeing to supply aluminum sheet and plate for all models produced by Boeing Commercial Airplanes. The multiyear contract, which extends and adds to the Companies' 2014 contract, is the largest to date and captures growth in the build rate increases of the Boeing 737 program.

On October 31, 2018, the Company sold its Texarkana, Texas rolling mill and cast house to Ta Chen International, Inc. for $302 million in cash, subject to post-closing adjustments, plus additional contingent consideration of up to $50 million. The contingent consideration relates to the achievement of various milestones within 36 months of the transaction closing date associated with operationalizing the rolling mill equipment. The Texarkana rolling mill facility had previously been idle since late 2009. In early 2016, the Company restarted the Texarkana cast house to meet demand for aluminum slab. As part of the agreement, the Company will continue to produce aluminum slab at the facility for a period of 18 months through a lease back of the cast house building and equipment, after which time, Ta Chen will perform toll processing of metal for the Company for a period of six months. The Company will supply Ta Chen with cold-rolled aluminum coil during this 24-month period.

In February 2019, the Company announced an investment of approximately $100 million to expand its hot mill capability and add downstream equipment capabilities to manufacture industrial and automotive aluminum products in its Tennessee Operations facility near Knoxville, Tennessee. The project, which is expected to create 70 new jobs, is already underway and is expected to be complete by the fourth quarter of 2020.

Global Rolled Products Principal Facilities

Country	Location	Products
Brazil	Itapissuma	Specialty Foil
China	Kunshan	Sheet and Plate
	Qinhuangdao[1]	Sheet and Plate
Hungary	Székesfehérvár	Sheet and Plate/Slabs and Billets
Russia	Samara	Sheet and Plate/Extrusions and Forgings
United Kingdom	Birmingham	Plate
United States	Davenport, IA	Sheet and Plate
	Danville, IL[2]	Sheet and Plate
	Hutchinson, KS[2]	Sheet and Plate
	Lancaster, PA	Sheet and Plate
	Alcoa, TN	Sheet
	Texarkana, TX[1, 3]	Slabs
	San Antonio, TX[4]	Micromill™

1 Leased property or partially leased property.

2 Properties are satellite locations of the Davenport, Iowa facility.

3 The aluminum slab that is cast at Texarkana is turned into aluminum sheets at Arconic's expanded automotive facility in Davenport, Iowa and its rolling mill in Lancaster, Pennsylvania. See discussion above concerning the sale of this facility.

4 Micromill™ production facility produces sheet for automotive and industrial applications using Arconic innovative production process.

Transportation and Construction Solutions

Arconic's Transportation and Construction Solutions segment ("TCS") produces products that are used mostly in the commercial transportation and nonresidential building and construction end markets. Such products include integrated aluminum structural systems, architectural extrusions and forged aluminum commercial vehicle wheels.

The Transportation and Construction Solutions segment is comprised of two business units: Arconic Wheel and Transportation Products; and Building and Construction Systems.

Arconic Wheel and Transportation Products (AWTP). AWTP provides forged aluminum wheels and related products for heavy-duty trucks and the commercial transportation markets.

Building and Construction Systems (BCS). BCS provides building and construction architectural framing products and aluminum curtain wall and front entry systems.

For additional discussion of the Transportation and Construction Solutions segment's business, see "Results of Operations—Segment Information" in Part II, Item 7. (Management's Discussion and Analysis of Financial Condition and Results of Operations) and Note C to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data).

In April 2018, the Company completed the sale of its Latin America Extrusions business to a subsidiary of Hydro Extruded Solutions AS. The sale is part of Arconic's continued drive to streamline its business portfolio, reduce complexity and further focus on its higher-margin products and profitable growth.

On July 31, 2018, the Company announced that it had initiated a sale process of its BCS business, as part of the Company's ongoing strategy and portfolio review that commenced in January 2018.

Transportation and Construction Solutions Principal Facilities[1]

Country	Facility	Products
Canada	Lethbridge, Alberta	Architectural Products
China	Suzhou[2]	Forgings
France	Merxheim[2]	Architectural Products
Hungary	Székesfehérvár	Forgings
Japan	Jôetsu City[2]	Forgings
Mexico	Monterrey	Forgings
United Kingdom	Runcorn	Architectural Products
United States	Springdale, AR	Architectural Products
	Visalia, CA	Architectural Products
	Eastman, GA	Architectural Products
	Barberton, OH	Forgings
	Cleveland, OH	Forgings
	Bloomsburg, PA	Architectural Products
	Cranberry, PA	Architectural Products

1 Principal facilities are listed, and do not include 8 locations that serve as sales and administrative offices, distribution centers or warehouses. In addition to the facilities listed above, TCS has 20 service centers. These centers perform light manufacturing, such as assembly and fabrication of certain products.

2 Leased property or partially leased property.

Sources and Availability of Raw Materials

Important raw materials purchased in 2018 for each of the Company's reportable segments are listed below.

Engineered Products and Solutions	**Global Rolled Products**
Alloying materials	Alloying materials
Cobalt	Aluminum scrap
Electricity	Coatings
Natural gas	Electricity
Nickel alloys	Lube oil
Primary aluminum (ingot, billet, P1020, high purity)	Natural gas
Stainless steel	Packaging materials
Steel	Primary aluminum (ingot, slab, billet, P1020, high purity)
Titanium alloys	Steam
Titanium sponge	

Transportation and Construction Solutions
Aluminum coil
Aluminum scrap
Electricity
Natural gas
Paint/Coating
Primary aluminum (billet)
Resin

Generally, other materials are purchased from third-party suppliers under competitively priced supply contracts or bidding arrangements. The Company believes that the raw materials necessary to its business are and will continue to be available.

Patents, Trade Secrets and Trademarks

The Company believes that its domestic and international patent, trade secret and trademark assets provide it with a significant competitive advantage. The Company's rights under its patents, as well as the products made and sold under them, are important to the Company as a whole and, to varying degrees, important to each business segment. The patents owned by Arconic generally concern metal alloys, particular products, manufacturing equipment or techniques. Arconic's business as a whole is not, however, materially dependent on any single patent, trade secret or trademark. As a result of product development and technological advancement, the Company continues to pursue patent protection in jurisdictions throughout the world. As of the end of 2018, the Company's worldwide patent portfolio consists of approximately 1,863 granted patents and 824 pending patent applications.

The Company also has a significant number of trade secrets, mostly regarding manufacturing processes and material compositions that give many of its businesses important advantages in their markets. The Company continues to strive to improve those processes and generate new material compositions that provide additional benefits.

With respect to domestic and international registered trademarks, the Company has many that have significant recognition within the markets that are served. Examples include the name "Arconic" and the Arconic symbol for aluminum, nickel, and titanium products, Howmet® metal castings, Huck® fasteners, Kawneer® building panels and Dura-Bright® wheels with easy-clean surface treatments. A significant trademark filing campaign for the name "Arconic" was completed in 2016, in support of the corporate launch of Arconic Inc. As of the end of 2018, the Company's worldwide trademark portfolio consists of approximately 1,967 registered trademarks and 465 pending trademark applications. The Company's rights under its trademarks are important to the Company as a whole and, to varying degrees, important to each business segment.

Competitive Conditions

Engineered Products and Solutions (EP&S)

EP&S's business units - AFS, AEN and AES -are subject to substantial and intense competition in the markets they serve. Although Arconic believes its advanced technology, manufacturing processes and experience provide advantages to Arconic's customers, such as high quality and superior mechanical properties that meet the Company's customers' most stringent requirements, many of the products Arconic makes can be produced by competitors using similar types of manufacturing processes as well as alternative forms of manufacturing. Despite intense competition, Arconic continues as a market leader in most of its principal markets. Several factors, including Arconic’s legacy of technical innovation, state-of-the-art capabilities, engaged employees and long-standing customer relationships, enable the Company to maintain its competitive position.

Principal competitors in the EP&S segment include Berkshire Hathaway Inc., through its acquisition of Precision Castparts Corporation and subsidiaries, for titanium and titanium-based alloys, precision forgings, seamless rolled rings, investment castings and aerospace fasteners; VSMPO (Russia) for titanium and titanium-based alloys and precision forgings; the High-Performance Materials & Components segment of Allegheny Technologies, Inc. (ATI) for titanium and titanium-based alloys, precision forgings, and investment castings; Lisi Aerospace (France) for aerospace fasteners; and Aubert & Duval (part of Eramet Group in France) for precision forgings.

Other competitors include:

- Kaiser Aluminum - for extruded products
- Universal Alloy Corp., part of Montana Tech Components - for extruded products
- Doncasters Group Ltd. (UK) - for investment castings
- Consolidated Precision Products Corp., part of Warburg Pincus - for investment castings
- Weber Metals, part of Otto Fuchs - for precision forgings
- Forgital - for seamless rings
- Frisa (Mexico) - for seamless rings

Several of Arconic’s largest customers have captive superalloy furnaces for producing airfoil investment castings for their own use. Many other companies around the world also produce superalloy investment castings, and some of these companies currently compete with Arconic in the aerospace and other markets, while others are capable of competing with the Company should they choose to do so.

International competition in the investment castings**,** fasteners, rings and forgings markets may also increase in the future as a result of strategic alliances among engine original equipment manufacturers (OEMs), aero-structure prime contractors, and overseas companies, especially in developing markets, particularly where “offset” or “local content” requirements create purchase obligations with respect to products manufactured in or directed to a particular country.

Global Rolled Products (GRP)

GRP is one of the leaders in many of the aluminum flat rolled products markets in which it participates, including aerospace, automotive, commercial transportation, industrial markets (including brazing sheet) and packaging. However, much like other Arconic businesses, GRP is subject to substantial and intense competition in all of its markets.

While GRP participates in markets where Arconic believes the Company has a significant competitive advantage due to customer intimacy, advanced manufacturing capability, unique technology and/or differentiated products, in certain cases, the Company’s competitors are capable of making products similar to Arconic’s. The Company continuously works to maintain and enhance its competitive advantage through innovation: new alloys such as aerospace alloys, differentiated products such as the Company’s 5-layer brazing products and break-through processes such as Arconic Micromill® technology.

Some of GRP’s markets are worldwide and some are more regionally focused. Participation in these segments by GRP’s competitors varies. For example, Novelis is the largest flat rolled products producer competing in automotive, but it does not participate in the aerospace market. On the other hand, Constellium participates in all major market segments including aerospace, brazing, industrial, commercial transportation and packaging. Granges participates only in the brazing sheet market. Other GRP competitors include Aleris, AMAG, Hydro, Kaiser, Kobe, Nanshan, and UACJ. The competitive landscape is changing - in this past year, Novelis announced the acquisition of aluminum rolled products producer Aleris and Braidy Industries announced its intention to build a new aluminum mill near Ashland, Kentucky for automotive production.

Additionally, there are a number of new competitors emerging, particularly in China and other developing economies. Arconic expects that this competitive pressure will continue and increase in the future as customers seek to globalize their supply bases in order to reduce costs. The Company continually monitors and plans for these new emerging players.

Summary of Major Competitors for GRP:

- Constellium (The Netherlands)
- Novelis
- Kaiser Aluminum
- AMAG (Austria)
- UACJ (Japan)

- Aleris
- Hydro (Norway)
- Nanshan (China)
- Granges (Sweden)
- Kobe (Japan)

Transportation and Construction Solutions (TCS)

In the forged aluminum wheels business, AWTP competes in commercial transportation, under the product brand name Alcoa® Wheels, for the major regions that it serves (Americas, Europe, Japan, China, and Australia). AWTP competes against steel wheels, as well as aluminum. Its larger competitors are Accuride Corporation, Nippon Steel & Sumitomo Metal Corporation, Zhejiang Dicastal Hongxin Technology Co. Ltd, Wheels India Limited and Speedline (member of the Ronal Group). AWTP has continued to see aluminum wheel suppliers (both forged and cast aluminum wheels) from China, Taiwan, India and South Korea attempting to penetrate the commercial transportation market.

BCS is a manufacturer of aluminum architectural systems and products in North America and Europe. In North America, BCS primarily competes in the nonresidential building segment. In Europe, it competes in both the residential and the nonresidential building segments. BCS competes with regional and local players in the architectural systems and more global companies in the products markets. BCS's competitive advantage is the cornerstone to its strong brand, innovative products, customer intimacy and technical services. Over the past decade, the regional competitors, primarily in North America, have narrowed the product portfolio and technical services advantages. However, BCS has maintained its competitive advantage through innovative products like highly energy-efficient high-thermal products and differentiated services. BCS sales are derived mainly from the retail, office, education and healthcare building segments.

BCS is organized into two business segments: architectural systems and architectural products. The primary product categories in architectural systems are storefront, framing and entrances (SEF), curtain walls, and windows. In the SEF and curtain wall businesses, BCS competes with competitors like Apogee, YKK, Oldcastle, Schüco, Hydro/SAPA and Reynaers in their aluminum framing systems business. The architectural products business is more global and is primarily served by subsidiaries of larger companies like Alpolic (Mitsubishi Corporation), Alucobond (Schweiter Technologies) and Novelis (Aditya Birla Group). The primary product categories are aluminum composite material and coil coated sheet. The competitive landscape in the architectural systems market has been relatively stable since the mid-2000s, with the major competitors in North America and Europe still operating in their markets, despite some industry consolidation in North America during the late 2000s.

Summary of Major Competitors:

AWTP:

- Accuride Corporation
- Nippon Steel & Sumitomo Metal Corporation (Japan)
- Zhejiang Dicastal Hongxin Technology Co. Ltd (China)
- Wheels India Limited (India)
- Speedline (member of the Ronal Group in Switzerland)

BCS:

- Apogee, Oldcastle and YKK
- Alpolic, Alucobond and Alucoil
- Schüco (Germany), Hydro/SAPA (Norway), Reynaers (Belgium) and Corialis (Belgium)
- Alucobond, Alucoil, Euramax and Novelis

Research and Development

Arconic, at its light metals research center, engages in research and development (R&D) programs that include process and product development, and basic and applied research.

Throughout 2018, the Company continued working on new developments in all business segments and leveraging new technologies. The Company has continued investing in additive manufacturing, with a focus on producing metal powder materials tailored for a range of additive process technologies, and furthering its development of advanced 3D printing design and manufacturing techniques-such as Arconic's Ampliforge™ process-to improve production speeds, reduce costs, and achieve material properties not possible through other additive flowpaths. The Company's powder production facility was completed at the Arconic Technology Center (ATC) in 2016. This facility will continue its focus on material development in aluminum, nickel and titanium alloys.

The Company is also producing and qualifying additively manufactured aerospace, automotive and defense components via laser powder bed printing technology. It also is developing more formable titanium plate based wrought products for customers.

Arconic's Micromill® technology, which enables aluminum sheet to be produced in a matter of minutes rather than weeks and with enhanced structural properties, continues to grow. Specifically, the Arconic Micromill® technology located in San Antonio continues to transition to commercial production. In addition, the Company has invested in further developing Micromill™ technology, including installation of a pilot line at the ATC.

The Company continues to develop differentiated pretreatment technology, for example, by continuing to improve on its A951 technology, which enables aluminum to be joined with steel (e.g., in automotive applications). In addition, the Company continues to advance its joining methods/fasteners (like RSR™) and highly formable and high strength automotive sheet products for automotive original equipment manufacturer applications in both cosmetic hang on parts and structural body-in-white applications. A pilot coating line was installed at ATC in 2018.

The Company continued its differentiation in the commercial transportation market with Dura-Bright® EVO, UltraOne™ and European UltraOne™ wheel products.

The Company also continues to develop and deploy proprietary processing technologies in the manufacture of aerospace components, as well as a continued commitment and commercialization of a portfolio of proprietary aerospace fasteners. One such example is Ergo-Tech® blind fasteners which enable automated assembly operations.

Environmental Matters

Information relating to environmental matters is included in Note U to the Consolidated Financial Statements under the caption "Environmental Matters". Approved capital expenditures for new or expanded facilities for environmental control are $28 million for 2019 and estimated expenditures for such purposes are $8 million for 2020.

Employees

Total worldwide employment at the end of 2018 was approximately 43,000 employees in 29 countries. About 18,600 of these employees are represented by labor unions. The Company believes that relations with its employees and any applicable union representatives generally are good.

In the United States, approximately 7,900 employees are represented by various labor unions. The largest collective bargaining agreement is the master collective bargaining agreement between Arconic and the United Steelworkers (USW). The USW master agreement covers approximately 3,400 employees at four U.S. locations; the current labor agreement expires on May 15, 2019. There are 17 other collective bargaining agreements in the United States with varying expiration dates.

On a regional basis, collective bargaining agreements with varying expiration dates cover approximately 8,900 employees in Europe and Russia, 8,100 employees in North America, 600 employees in South America, and 1,000 employees in Asia.

Executive Officers of the Registrant

The names, ages, positions and areas of responsibility of the executive officers of the Company as of February 21, 2019 are listed below.

Elmer L. Doty, 64, Director, President and Chief Operating Officer. Mr. Doty was appointed President and Chief Operating Officer of Arconic effective February 6, 2019, and has served on the Arconic Board of Directors since May 2017. From March 2016 until February 2019, Mr. Doty was an Operating Executive at The Carlyle Group LP, multinational private equity, alternative asset management and financial services corporation, where he held a similar position from March 2012 to December 2012. From December 2012 to February 2016, Mr. Doty was President and Chief Executive Officer of Accudyne Industries LLC, a provider of precision-engineered flow control systems and industrial compressors. Mr. Doty also was the President and Chief Executive Officer of Vought Aircraft Industries, Inc. from 2006 until its acquisition in 2010 by Triumph Group, a leader in manufacturing and overhauling aerospace structures, systems and components. Prior to Vought, Mr. Doty was Executive Vice President and General Manager of the Land Systems Division of United Defense Industries, Inc. (now BAE Systems). Earlier in his career, Mr. Doty held executive positions at General Electric Company and FMC Corporation.

Ken Giacobbe, 53, Executive Vice President and Chief Financial Officer. Mr. Giacobbe was elected Executive Vice President and Chief Financial Officer of Arconic effective November 1, 2016. Mr. Giacobbe joined Arconic in 2004 as Vice President of Finance for Global Extruded Products, part of Alcoa Forgings and Extrusions. He then served as Vice President of Finance for the Company's Building and Construction Systems business from 2008 until 2011. In 2011, he assumed the role of Group Controller for the Engineered Products and Solutions segment. From January 2013 until October 2016, Mr. Giacobbe served as Chief Financial Officer of the Engineered Products and Solutions segment. Before joining Arconic, Mr. Giacobbe held senior finance roles at Avaya and Lucent Technologies.

Timothy D. Myers, 53, Executive Vice President and Group President, Global Rolled Products and Transportation and Construction Solutions. Mr. Myers was appointed Executive Vice President and Group President, Global Rolled Products and Transportation and Construction Solutions in October 2017. Prior to being appointed to his current role, he was Executive Vice President and Group President, Transportation and Construction Solutions from May 2016 to October 2017. Prior to that assignment, he was President of Alcoa Wheel and Transportation Products, from June 2009 to May 2016. Mr. Myers was Vice President and General Manager, Commercial Vehicle Wheels for the Alcoa Wheel Products business from January 2006 to June 2009. Mr. Myers joined Arconic in 1991 as an automotive applications engineer in the Commercial Rolled Products Division, and held a series of engineering, marketing, sales and management positions with the Company since that time.

Paul Myron, 52, Vice President and Controller. Mr. Myron was elected Vice President and Controller of Arconic effective November 1, 2016. Mr. Myron joined Arconic as a systems analyst in Pittsburgh and in 1992 relocated to the Company's Davenport, Iowa facility as a product accountant. He served in numerous financial management positions from 1995 until 2000 when he was named Commercial Manager and Controller for the Atlantic division of the Alcoa World Alumina and Chemicals business. In 2002, Mr. Myron was appointed Vice President of Finance, Alcoa Primary Metals and later became Vice President of Finance, Alcoa World Alumina and Chemicals. In 2005 Mr. Myron was named Director of Financial Planning and Analysis, accountable for Arconic's financial planning, analysis, and reporting worldwide. In February 2012, he became Director of Finance Initiatives for the Engineered Products and Solutions segment, overseeing specific financial initiatives and projects within the group. From July 2012 until his most recent appointment, Mr. Myron served as Vice President, Finance and Business Excellence for the Arconic Power and Propulsion business.

John C. Plant, 65, Chairman and Chief Executive Officer. Mr. Plant was appointed Chief Executive Officer of Arconic effective February 6, 2019. He has served as Arconic's Chairman since October 2017 and as a member of the Board since February 2016. Mr. Plant previously served as Chairman of the Board, President and Chief Executive Officer of TRW Automotive from 2011 to 2015, and as its President and Chief Executive Officer from 2003 to 2011. TRW Automotive was acquired by ZF Friedrichshafen AG in May 2015. Mr. Plant was a co-member of the Chief Executive Office of TRW Inc. from 2001 to 2003 and an Executive Vice President of TRW from the company's 1999 acquisition of Lucas Varity to 2003. Prior to TRW, Mr. Plant was President of Lucas Varity Automotive and managing director of the Electrical and Electronics division from 1991 through 1997.

Katherine H. Ramundo, 51, Executive Vice President, Chief Legal Officer and Secretary. Ms. Ramundo was elected to her current position effective November 1, 2016. Prior to joining Arconic, from January 2013 through August 2015, she was Executive Vice President, General Counsel and Secretary of ANN INC., the parent company of ANN TAYLOR and LOFT brands, based in New York. Prior to ANN INC., she served as Vice President, Deputy General Counsel and Assistant Secretary at Colgate-Palmolive, where she held various legal roles from November 1997 to January 2013. She began her career as a litigator in New York, practicing at major law firms, including Cravath, Swaine & Moore and Sidley & Austin.

The Company's executive officers are elected or appointed to serve until the next annual meeting of the Board of Directors (held in conjunction with the annual meeting of shareholders) except in the case of earlier death, retirement, resignation or removal.

Item 1A. Risk Factors.

Arconic's business, financial condition and results of operations may be impacted by a number of factors. In addition to the factors discussed elsewhere in this report, the following risks and uncertainties could materially harm its business, financial condition or results of operations, including causing Arconic's actual results to differ materially from those projected in any forward-looking statements. The following list of significant risk factors is not all-inclusive or necessarily in order of importance. Additional risks and uncertainties not presently known to Arconic or that Arconic currently deems immaterial also may materially adversely affect the Company in future periods.

The markets for Arconic's products are highly cyclical and are influenced by a number of factors, including global economic conditions.

Arconic is subject to cyclical fluctuations in global economic conditions and lightweight metals end-use markets. Arconic sells many products to industries that are cyclical, such as the aerospace, automotive, and commercial transportation and construction industries, and the demand for its products is sensitive to, and quickly impacted by, demand for the finished goods manufactured by its customers in these industries, which may change as a result of changes in regional or worldwide economies, currency exchange rates, energy prices or other factors beyond its control.

In particular, Arconic derives a significant portion of its revenue from products sold to the aerospace industry, which can be highly cyclical and reflective of changes in the general economy. The commercial aerospace industry is historically driven by the demand from commercial airlines for new aircraft. The U.S. and international commercial aviation industries may face challenges arising from competitive pressures and fuel costs. Demand for commercial aircraft is influenced by airline industry profitability, trends in airline passenger traffic, the state of U.S., regional and world economies, the ability of aircraft purchasers to obtain required financing and numerous other factors including the effects of terrorism, health and safety concerns, environmental constraints imposed upon aircraft operators, the retirement of older aircraft, and technological improvements to new engines. The military aerospace cycle is highly dependent on U.S. and foreign government funding; however, it is also driven by the effects of terrorism, a changing global political environment, U.S. foreign policy, the retirement of older aircraft, and technological improvements to new engines.

Further, the demand for Arconic's automotive and ground transportation products is driven by the number of vehicles produced by automotive manufacturers and Arconic content per vehicle. The automotive industry is sensitive to general economic conditions, including credit markets and interest rates, and consumer spending and preferences regarding vehicle ownership and usage, vehicle size, configuration and features. Automotive sales and production can also be affected by other factors including the age of the vehicle fleet and related scrappage rates, labor relations issues, fuel prices, regulatory requirements, government initiatives, trade agreements and levels of competition.

While Arconic believes that the long-term prospects for its products are positive, the Company is unable to predict the future course of industry variables, the strength of the U.S., regional or global economies, or the effects of government intervention. Negative economic conditions, such as a major economic downturn, a prolonged recovery period, or disruptions in the financial markets, could have a material adverse effect on Arconic's business, financial condition or results of operations.

Arconic faces significant competition, which may have an adverse effect on profitability.

As discussed in Part I, Item 1. (Business-Competitive Conditions) of this report, the markets for Arconic's products are highly competitive. Arconic's competitors include a variety of both U.S. and non-U.S. companies in all major markets. New product offerings, new technologies in the marketplace or new facilities may compete with or replace Arconic products. The willingness of customers to accept substitutes for the products sold by Arconic, the ability of large customers to exert leverage in the marketplace to affect the pricing for Arconic's products, and technological advancements or other developments by or affecting Arconic's competitors or customers could adversely affect Arconic's business, financial condition or results of operations.

In addition, Arconic may face increased competition due to industry consolidation. As companies attempt to strengthen or hold their market positions in an evolving industry, companies could be acquired or may be unable to continue operations. Companies that are strategic alliance partners in some areas of Arconic's business may acquire or form alliances with Arconic's competitors, thereby reducing their business with Arconic. Industry consolidation may result in stronger competitors who are better able to compete as sole-source vendors for customers. If there is consolidation among Arconic's customer base, those customers may be able to command increased leverage in negotiating prices and other terms of sale, which could adversely affect Arconic's profitability. Moreover, if, as a result of increased leverage, customer pressures require Arconic to reduce its pricing such that its gross margins are diminished, the Company could decide not to sell certain products under such less favorable terms, which would decrease Arconic's revenue. Consolidation among the Company's customer base may also lead to reduced demand for Arconic's solutions, replacement of Arconic products by the combined entity with those of Arconic's competitors and cancellations of orders, each of which could have a material adverse effect on Arconic's business, operating results and financial condition.

Arconic may be unable to develop innovative new products or implement technology initiatives successfully.

Arconic's competitive position and future performance depends, in part, on the Company's ability to:

- identify and evolve with emerging technological and broader industry trends in Arconic's target end-markets;
- identify and successfully execute on a strategy to remain an essential and sustainable element of its customer's supply chain;
- fund, develop, manufacture and bring innovative new products and services to market quickly and cost-effectively;
- monitor disruptive technologies and understand customers' and competitors' abilities to deploy those disruptive technologies; and
- achieve sufficient return on investment for new products based on capital expenditures and research and development spending.

Arconic is working on new developments for a number of strategic projects in all business segments, including additive manufacturing, alloy development, engineered finishes and product design, high speed continuous casting and rolling technology, and other advanced manufacturing technologies. For more information on Arconic's research and development programs, see "Research and Development" in Part I, Item 1. (Business-Research and Development) of this report.

While Arconic intends to continue committing substantial financial resources and effort to the development of innovative new products and services, it may not be able to successfully differentiate its products or services from those of its competitors or match the level of research and development spending of its competitors, including those developing technology to displace Arconic's current products. In addition, Arconic may not be able to adapt to evolving markets and technologies or achieve and maintain technological advantages. There can be no assurance that any of Arconic's new products or services, development programs or technologies will be commercially adopted or beneficial to Arconic.

Arconic could be adversely affected by changes in the business or financial condition or the loss of a significant customer or customers.

A significant downturn or deterioration in the business or financial condition or loss of a key customer or customers supplied by Arconic could affect Arconic's financial results in a particular period. Arconic's customers may experience delays in the launch of new products, labor strikes, diminished liquidity or credit unavailability, weak demand for their products, or other difficulties in their businesses. Arconic's customers may also change their business strategies or modify their business relationships with Arconic, including to reduce the amount of Arconic's products they purchase or to switch to alternative suppliers. If Arconic is unsuccessful in replacing business lost from such customers, profitability may be adversely affected.

Arconic could encounter manufacturing difficulties or other issues that impact product performance, quality or safety, which could affect Arconic's reputation, business and financial statements.

The manufacture of many of Arconic's products is a highly exacting and complex process. Problems may arise during manufacturing for a variety of reasons, including equipment malfunction, failure to follow specific protocols, specifications and procedures, including those related to quality or safety, problems with raw materials, supply chain interruptions, natural disasters, labor unrest and environmental factors. Such problems could have an adverse impact on the Company's ability to fulfill orders or on product quality or performance. Product manufacturing or performance issues could result in recalls, customer penalties, contract cancellation and product liability exposure, including if any of our products are non-compliant or are used in an unintended and/or unapproved manner that results in injuries or other damages. Because of approval and license requirements applicable to manufacturers and/or their suppliers, alternatives to mitigate manufacturing disruptions may not be readily available to the Company or its customers. Accordingly, manufacturing problems, product defects or other risks associated with our products, including their use or application, could result in significant costs to and liability for Arconic that could have a material adverse effect on its business, financial condition or results of operations, including the payment of potentially substantial monetary damages, fines or penalties, as well as negative publicity and damage to the Company's reputation, which could adversely impact product demand and customer relationships.

Arconic's business depends, in part, on its ability to meet increased program demand successfully and to mitigate the impact of program cancellations, reductions and delays.

Arconic is currently under contract to supply components for a number of new and existing commercial, general aviation, military aircraft and aircraft engine programs and is the sole supplier of aluminum sheet for a number of aluminum-intensive automotive vehicle programs. Many of these programs are scheduled for production increases over the next several years. If Arconic fails to meet production levels or encounters difficulty or unexpected costs in meeting such levels, it could have a material adverse effect on the Company's business, financial condition or results of operations. Similarly, program cancellations, reductions or delays could also have a material adverse effect on Arconic's business.

Arconic could be adversely affected by reductions in defense spending.

Arconic's products are used in a variety of military applications, including military aircraft and armored vehicles. Although many of the programs in which Arconic participates extend several years, they are subject to annual funding through congressional appropriations. Changes in military strategy and priorities, or reductions in defense spending, may affect current and future funding of these programs and could reduce the demand for Arconic's products, which could adversely affect Arconic's business, financial condition or results of operations.

Arconic's global operations and status as a public company expose the Company to risks that could adversely affect Arconic's business, financial condition, results of operations, cash flows or the market price of its securities.

Arconic has operations or activities in numerous countries and regions outside the United States, including Europe, Brazil, Canada, China, Japan, and Russia. As a result, the Company's global operations are affected by economic, political and other conditions in the foreign countries in which Arconic does business as well as U.S. laws regulating international trade, including:

- economic and commercial instability risks, including those caused by sovereign and private debt default, corruption, and changes in local government laws, regulations and policies, such as those related to tariffs, sanctions and trade barriers, taxation, exchange controls, employment regulations and repatriation of earnings;

- geopolitical risks such as political instability, civil unrest, expropriation, nationalization of properties by a government, imposition of sanctions, and renegotiation or nullification of existing agreements;
- war or terrorist activities;
- kidnapping of personnel;
- major public health issues such as an outbreak of a pandemic or epidemic (such as Sudden Acute Respiratory Syndrome, Avian Influenza, H7N9 virus, or the Ebola virus), which could cause disruptions in Arconic's operations or workforce;
- difficulties enforcing intellectual property and contractual rights in certain jurisdictions;
- changes in trade and tax laws that may result in our customers being subjected to increased taxes, duties and tariffs and reduce their willingness to use our services in countries in which we are currently manufacturing their products;
- rising labor costs;
- labor unrest, including strikes;
- compliance with antitrust and competition regulations;
- compliance with foreign labor laws, which generally provide for increased notice, severance and consultation requirements compared to U.S. laws;
- aggressive, selective or lax enforcement of laws and regulations by national governmental authorities;
- compliance with the Foreign Corrupt Practices Act ("FCPA") and other anti-bribery and corruption laws;
- compliance with U.S. laws concerning trade, including the International Traffic in Arms Regulations ("ITAR"), the Export Administration Regulations ("EAR"), and the sanctions, regulations and embargoes administered by the U.S. Department of Treasury's Office of Foreign Asset Controls ("OFAC");
- imposition of currency controls;
- adverse tax audit rulings; and
- unexpected events, including fires or explosions at facilities, and natural disasters.

Although the effect of any of the foregoing factors is difficult to predict, any one or more of them could adversely affect Arconic's business, financial condition, or results of operations. While Arconic believes it has adopted appropriate risk management, compliance programs and insurance arrangements to address and reduce the risks associated with these factors, such measures may provide inadequate protection against costs or liabilities that may arise from such events.

As a public company, Arconic is subject to, among other things, the reporting requirements of the Securities Exchange Act of 1934, as amended, the Sarbanes-Oxley Act, the Dodd-Frank Wall Street Reform and Consumer Protection Act and the regulations of the New York Stock Exchange. Arconic's failure to comply with applicable law could subject it to penalties under federal securities laws, expose it to lawsuits and restrict its ability to access financing. Under the Sarbanes-Oxley Act, Arconic must maintain effective disclosure controls and procedures and internal control over financial reporting. There can be no assurance that Arconic's internal control over financial reporting will be effective in the future or that a material weakness will not be discovered with respect to a prior period for which the Company had previously believed that internal controls were effective. Any failure to maintain effective disclosure controls and procedures or internal control over financial reporting could result in adverse regulatory consequences and/or a loss of investor confidence, which could limit the Company's ability to access the global capital markets and could have a material adverse effect on the Company's business, financial condition or the market price of Arconic securities.

A material disruption of Arconic's operations, particularly at one or more of the Company's manufacturing facilities, could adversely affect Arconic's business.

If Arconic's operations, particularly one of the Company's manufacturing facilities, were to be disrupted as a result of significant equipment failures, natural disasters, power outages, fires, explosions, terrorism, theft, sabotage, adverse weather conditions, public health crises, labor disputes or other reasons, the Company may be unable to effectively meet its obligations to or demand from its customers, which could adversely affect Arconic's financial performance.

Interruptions in production could increase the Company's costs and reduce its sales. Any interruption in production capability could require the Company to make substantial capital expenditures or purchase alternative material at higher costs to fill customer orders, which could negatively affect Arconic's profitability and financial condition. Arconic maintains property damage insurance that the Company believes to be adequate to provide for reconstruction of facilities and equipment, as well as business interruption insurance to mitigate losses resulting from significant production interruption or shutdown caused by an insured loss. However, any recovery under Arconic's insurance policies may not offset the lost profits or increased costs that may be experienced during the disruption of operations, which could adversely affect Arconic's business, results of operations, financial condition and cash flow.

Arconic may face challenges to its intellectual property rights which could adversely affect the Company's reputation, business and competitive position.

Arconic owns important intellectual property, including patents, trademarks, copyrights and trade secrets. The Company's intellectual property plays an important role in maintaining Arconic's competitive position in a number of the markets that the Company serves. Arconic's competitors may develop technologies that are similar or superior to Arconic's proprietary technologies or design around the patents Arconic owns or licenses. The pursuit of remedies for any misappropriation of Arconic intellectual property is expensive and the ultimate remedies may be deemed insufficient. Further, as the Company expands its operations in jurisdictions where the enforcement of intellectual property rights is less robust, the risk of misappropriation of Arconic intellectual property increases, despite efforts the Company undertakes to protect it. Developments or assertions by or against Arconic relating to intellectual property rights, and any inability to protect or enforce Arconic's rights sufficiently, could adversely affect Arconic's business and competitive position.

Arconic may be unable to realize the expected benefits from acquisitions, divestitures, joint ventures and strategic alliances.

Arconic has made, and may continue to plan and execute, acquisitions and divestitures and take other actions to grow its business or streamline its portfolio. Although management believes that its strategic actions are beneficial to Arconic, there is no assurance that anticipated benefits will be realized. Acquisitions present significant challenges and risks, including the effective integration of the business into the Company, unanticipated costs and liabilities, and the ability to realize anticipated benefits, such as growth in market share, revenue or margins, at the levels or in the timeframe expected. The Company may be unable to manage acquisitions successfully. Additionally, adverse factors may prevent Arconic from realizing the benefits of its growth projects, including unfavorable global economic conditions, currency fluctuations, or unexpected delays in target timelines.

With respect to portfolio optimization actions such as divestitures, curtailments and closures, Arconic may face barriers to exit from unprofitable businesses or operations, including high exit costs or objections from customers, suppliers, unions, local or national governments, or other stakeholders. In addition, Arconic may retain unforeseen liabilities for divested entities if a buyer fails to honor all commitments. Arconic's business operations are capital intensive, and curtailment or closure of operations or facilities may include significant charges, including employee separation costs, asset impairment charges and other measures.

In addition, Arconic has participated in, and may continue to participate in, joint ventures, strategic alliances and other similar arrangements from time to time. Although the Company has, in connection with past and existing joint ventures, sought to protect its interests, joint ventures and strategic alliances inherently involve special risks. Whether or not Arconic holds majority interests or maintains operational control in such arrangements, its partners may:

- have economic or business interests or goals that are inconsistent with or opposed to those of the Company;
- exercise veto rights to block actions that Arconic believes to be in its or the joint venture's or strategic alliance's best interests;
- take action contrary to Arconic's policies or objectives with respect to investments; or
- as a result of financial or other difficulties, be unable or unwilling to fulfill their obligations under the joint venture, strategic alliance or other agreements, such as contributing capital to expansion or maintenance projects.

There can be no assurance that acquisitions, growth investments, divestitures, closures, joint ventures, strategic alliances or similar arrangements will be undertaken or completed in their entirety as planned or that they will be beneficial to Arconic, whether due to the above-described risks, unfavorable global economic conditions, increases in construction costs, currency fluctuations, political risks, or other factors.

Arconic may be unable to realize future targets or goals established for its business segments, or complete projects, at the levels, projected costs or by the dates targeted.

From time to time, Arconic may announce future targets or goals for its business, which are based on the Company's then current expectations, estimates, forecasts and projections about the operating environment, economies and markets in which Arconic operates. Future targets and goals reflect the Company's beliefs and assumptions and its perception of historical trends, then current conditions and expected future developments, as well as other factors management believes are appropriate in the circumstances. As such, targets and goals are inherently subject to significant business, economic, competitive and other uncertainties and contingencies regarding future events, including the risks discussed in this report. The actual outcome may be materially different. There can be no assurance that any targets or goals established by the Company will be accomplished at the levels or by the dates targeted, if at all. Failure to achieve the targets or goals by the Company may have a material adverse effect on its business, financial condition, results of operations or the market price of its securities.

In addition, the implementation of Arconic's business strategy periodically involves the entry into and the execution of complex projects, which place significant demands on the Company's management and personnel, and may depend on numerous factors beyond the Company's control. There can be no assurance that such projects will be completed within budgeted costs, on a timely basis, or at all, whether due to the risks described in this report, or other factors. The failure to complete a material project as planned, or a significant delay in a material project, whatever the cause, could have an adverse effect on Arconic's business, financial condition, or results of operations.

Arconic's plans to restructure the Company, including separating into two companies and the possible sales of businesses, will involve significant time and expense, which could disrupt or adversely affect Arconic's business, may not achieve some or all of the anticipated benefits, are subject to various risks and uncertainties and may not be completed in accordance with the expected plans or anticipated timelines, or at all.

On February 8, 2019, Arconic announced plans to separate into Engineered Products & Forgings and Global Rolled Products, with a spin-off of one of the businesses, and to consider the possible sales of certain businesses.

Arconic expects that the process of completing the proposed separation and possible sales of businesses will be time-consuming and involve significant costs and expenses, which may be significantly higher than what it currently anticipates and may not yield a benefit if the separation and/or sales are not completed. Executing these transactions will also require significant time and attention from Arconic's senior management and employees, which could disrupt the Company's ongoing business and adversely affect financial results and results of operations. Arconic may also experience increased difficulties in attracting, retaining and motivating employees or maintaining or initiating relationships with lead suppliers, customers and other parties with which Arconic currently does business, or may do business in the future, during the pendency of the separation and/or possible sales of businesses and following their completion, which could have a material and adverse effect on Arconic's businesses, financial condition, results of operations and prospects, or the businesses, financial condition, results of operations and prospects of the independent companies resulting from the separation.

Arconic may not realize some or all of the anticipated strategic, financial, operational or other benefits from the separation and/or possible sales of businesses. For example, as independent companies, the Engineered Products & Forgings and Global Rolled Products businesses will be smaller, less diversified companies with a narrower business focus and may be more vulnerable to changing market conditions, such as changes in industry conditions, which could result in increased volatility in their cash flows, working capital and financing requirements and could materially and adversely affect the respective business, financial condition and results of operations. Moreover, following the separation, there can be no assurance that either company will be able to obtain an investment grade rating from nationally recognized credit rating agencies, which could, among other things, increase the non-investment grade rated company's cost of capital. Further, there can be no assurance that the combined value of the common stock of the two companies will be equal to or greater than what the value of Arconic's common stock would have been had the proposed separation not occurred. In addition, if Arconic pursues the possible sales of businesses, it may face barriers to exit or objections from various stakeholders, and/or may retain liabilities for divested entities. There can be no assurance that any such sales will be undertaken or completed or that they will be beneficial to Arconic, whether due to the above-described risks, unfavorable global economic conditions, currency fluctuations, political risks, or other factors.

Additionally, the separation is subject to approval by Arconic's Board of Directors and market, regulatory and certain other conditions. Unanticipated developments, including, among others, failure of the separation to qualify for the expected tax treatment, the possibility that any third-party consents required in connection with the separation will not be received, material adverse changes in business or industry conditions, changes in global economic and financial market conditions generally, and the ability to complete the possible sales of businesses, could delay or prevent the completion of the proposed separation, or cause the proposed separation to occur on terms or conditions that are different or less favorable than expected.

Information technology system failures, cyber attacks and security breaches may threaten the integrity of Arconic's intellectual property and other sensitive information, disrupt its business operations, and result in reputational harm and other negative consequences that could have a material adverse effect on its financial condition and results of operations.

Arconic relies on its information technology systems to manage and operate its business, process transactions, and summarize its operating results. Arconic's information technology systems are subject to damage or interruption from power outages, computer and telecommunications failures, computer viruses, and catastrophic events, such as fires, floods, earthquakes, tornadoes, hurricanes, acts of war or terrorism, and usage errors by employees. If Arconic's information technology systems are damaged or cease to function properly, the Company may have to make a significant investment to fix or replace them, and Arconic may suffer loss of critical data and interruptions or delays in its operations. Any material disruption in the Company's information technology systems, or delays or difficulties in implementing or integrating new systems or enhancing current systems, could have an adverse effect on Arconic's business, financial condition or results of operations.

Arconic also faces global cybersecurity threats, which may range from uncoordinated individual attempts to sophisticated and targeted measures, known as advanced persistent threats, directed at the Company. Cyber attacks and security breaches may include, but are not limited to, attempts to access information, computer viruses, denial of service and other electronic security breaches.

The Company believes that it faces a heightened threat of cyber attacks due to the industries it serves, the locations of its operations and its technological innovations. The Company has experienced cybersecurity attacks in the past, including breaches of its information technology systems in which information was taken, and may experience them in the future, potentially with more frequency or sophistication. Based on information known to date, past attacks have not had a material impact on Arconic's financial condition or results of operations. However, due to the evolving nature of cybersecurity threats, the scope and impact of any future incident cannot be predicted.

Arconic employs a number of measures to protect and defend against cyber attacks, including technical security controls, data encryption, firewalls, intrusion prevention systems, anti-virus software and frequent backups. Additionally, the Company conducts regular periodic training of its employees regarding the protection of sensitive information which includes training intended to prevent the success of "phishing" attacks. While the Company continually works to safeguard its systems and mitigate potential risks, there is no assurance that such actions will be sufficient to prevent cyber attacks or security breaches that manipulate or improperly use its systems or networks, compromise confidential or otherwise protected information, destroy or corrupt data, or otherwise disrupt its operations. The occurrence of such events could negatively impact Arconic's reputation and its competitive position and could result in litigation with third parties, regulatory action, loss of business, potential liability and increased remediation costs, any of which could have a material adverse effect on its financial condition and results of operations. In addition, such attacks or breaches could require significant management attention and resources, and result in the diminution of the value of the Company's investment in research and development.

Arconic's enterprise risk management program and disclosure controls and procedures address cybersecurity and include elements intended to ensure that there is an analysis of potential disclosure obligations arising from cyber attacks and security breaches. Arconic also maintains compliance programs to address the potential applicability of restrictions against trading while in possession of material, nonpublic information generally and in connection with a cyber attack or security breach. However, a breakdown in existing controls and procedures around the Company's cybersecurity environment may prevent Arconic from detecting, reporting or responding to cyber incidents in a timely manner and could have a material adverse effect on the Company's financial condition or the market price of its securities.

A decline in Arconic's financial performance or outlook could negatively impact the Company's access to the global capital markets, reduce the Company's liquidity and increase its borrowing costs.

Arconic has significant capital requirements and depends, in part, upon the issuance of debt to fund its operations and contractual commitments and pursue strategic acquisitions. A decline in the Company's financial performance or outlook due to internal or external factors could affect the Company's access to, and the availability or cost of, financing on acceptable terms and conditions. There can be no assurance that Arconic will have access to the global capital market on terms the Company finds acceptable. Limitations on Arconic's ability to access the global capital markets, a reduction in the Company's liquidity or an increase in borrowing costs could materially and adversely affect Arconic's ability to maintain or grow its business, which in turn may adversely affect its financial condition and results of operations.

A downgrade of Arconic's credit ratings could limit Arconic's ability to obtain future financing, increase its borrowing costs, increase the pricing of its credit facilities, adversely affect the market price of its securities, trigger letter of credit or other collateral postings, or otherwise impair its business, financial condition, and results of operations.

Arconic's credit ratings are important to the Company's cost of capital. The major rating agencies routinely evaluate Arconic's credit profile and assign debt ratings to the Company. This evaluation is based on a number of factors, which include financial strength, business and financial risk, as well as transparency with rating agencies and timeliness of financial reporting. On May 1, 2017, Standard and Poor's Ratings Services (S&P) affirmed Arconic's long-term debt at BBB-, an investment grade rating, with a stable outlook, and its short-term debt at A-3. On February 7, 2019, S&P changed the outlook from stable to negative credit watch. On October 8, 2018, Moody's Investor Service (Moody's) affirmed Arconic's long-term debt rating at Ba2, a non-investment grade, with a stable outlook, and its short-term debt rating at Speculative Grade Liquidity-2. On September 27, 2018, Fitch affirmed Arconic's long-term debt rating at BB+, a non-investment grade, and short-term debt at B. Additionally, Fitch changed the outlook from stable to positive.

There can be no assurance that one or more of these or other rating agencies will not take negative actions with respect to Arconic's ratings. Increased debt levels, macroeconomic conditions, a deterioration in the Company's debt protection metrics, a contraction in the Company's liquidity, or other factors could potentially trigger such actions. A rating agency may lower, suspend or withdraw entirely a rating or place it on negative outlook or watch if, in that rating agency's judgment, circumstances so warrant.

A downgrade of Arconic's credit ratings by one or more rating agencies could adversely impact the market price of Arconic's securities; adversely affect existing financing (for example, a downgrade by S&P or Moody's would subject Arconic to higher costs under Arconic's Five-Year Revolving Credit Agreement and certain of its other revolving credit facilities); limit access to the capital (including commercial paper) or credit markets or otherwise adversely affect the availability of other new financing on favorable terms, if at all; result in more restrictive covenants in agreements governing the terms of any future indebtedness that the Company incurs; increase the cost of borrowing or fees on undrawn credit facilities; result in vendors or counterparties seeking collateral or letters of credit from Arconic; or otherwise impair Arconic's business, financial condition, liquidity and results of operations.

Arconic's business and growth prospects may be negatively impacted by limits in its capital expenditures.

Arconic requires substantial capital to invest in growth opportunities and to maintain and prolong the life and capacity of its existing facilities. Insufficient cash generation or capital project overruns may negatively impact Arconic's ability to fund as planned its sustaining and return-seeking capital projects. Over the long term, Arconic's ability to take advantage of improved market conditions or growth opportunities in its businesses may be constrained by earlier capital expenditure restrictions, which could adversely affect the long-term value of its business and the Company's position in relation to its competitors.

An adverse decline in the liability discount rate, lower-than-expected investment return on pension assets and other factors could affect Arconic's results of operations or amount of pension funding contributions in future periods.

Arconic's results of operations may be negatively affected by the amount of expense Arconic records for its pension and other postretirement benefit plans, reductions in the fair value of plan assets and other factors. Arconic calculates income or expense for its plans using actuarial valuations in accordance with accounting principles generally accepted in the United States of America (GAAP).

These valuations reflect assumptions about financial market and other economic conditions, which may change based on changes in key economic indicators. The most significant year-end assumptions used by Arconic to estimate pension or other postretirement benefit income or expense for the following year are the discount rate applied to plan liabilities and the expected long-term rate of return on plan assets. In addition, Arconic is required to make an annual measurement of plan assets and liabilities, which may result in a significant charge to shareholders' equity. For a discussion regarding how Arconic's financial statements can be affected by pension and other postretirement benefits accounting policies, see "Critical Accounting Policies and Estimates-Pension and Other Postretirement Benefits" in Part II, Item 7. (Management's Discussion and Analysis of Financial Condition and Results of Operations) and Note G to the Consolidated Financial Statements-Pension and Other Postretirement Benefits in Part II, Item 8. (Financial Statements and Supplementary Data). Although GAAP expense and pension funding contributions are impacted by different regulations and requirements, the key economic factors that affect GAAP expense would also likely affect the amount of cash or securities Arconic would contribute to the pension plans.

Potential pension contributions include both mandatory amounts required under federal law and discretionary contributions to improve the plans' funded status. The Moving Ahead for Progress in the 21st Century Act ("MAP-21"), enacted in 2012, provided temporary relief for employers like Arconic who sponsor defined benefit pension plans related to funding contributions under the Employee Retirement Income Security Act of 1974 by allowing the use of a 25-year average discount rate within an upper and lower range for purposes of determining minimum funding obligations. In 2014, the Highway and Transportation Funding Act (HATFA) was signed into law. HATFA extended the relief provided by MAP-21 and modified the interest rates that had been set by MAP-21. In 2015, the Bipartisan Budget Act of 2015 (BBA 2015) was signed into law. BBA 2015 extends the relief period provided by HAFTA. Arconic believes that the relief provided by BBA 2015 will moderately reduce the cash flow sensitivity of the Company's U.S. pension plans' funded status to potential declines in discount rates over the next several years. However, higher than expected pension contributions due to a decline in the plans' funded status as a result of declines in the discount rate or lower-than-expected investment returns on plan assets could have a material negative effect on the Company's cash flows. Adverse capital market conditions could result in reductions in the fair value of plan assets and increase the Company's liabilities related to such plans, which could adversely affect Arconic's liquidity and results of operations.

Unanticipated changes in Arconic's tax provisions or exposure to additional tax liabilities could affect Arconic's future profitability.

Arconic is subject to income taxes in both the United States and various non-U.S. jurisdictions. Its domestic and international tax liabilities are dependent upon the distribution of income among these different jurisdictions. Changes in applicable domestic or foreign tax laws and regulations, or their interpretation and application, including the possibility of retroactive effect, could affect the Company's tax expense and profitability. Arconic's tax expense includes estimates of additional tax that may be incurred for tax exposures and reflects various estimates and assumptions. The assumptions include assessments of future earnings of the Company that could impact the valuation of its deferred tax assets. The Company's future results of operations could be adversely affected by changes in the effective tax rate as a result of a change in the mix of earnings in countries with differing statutory tax rates, changes in the overall profitability of the Company, changes in tax legislation and rates, changes in generally accepted accounting principles, changes in the valuation of deferred tax assets and liabilities, the results of tax audits and examinations of previously filed tax returns or related litigation and continuing assessments of its tax exposures.

Corporate tax law changes continue to be analyzed in the United States and in many other jurisdictions. In particular, on December 22, 2017, the Tax Cuts and Jobs Act (the "2017 Act") was signed into law, significantly reforming the United States Internal Revenue Code of 1986, as amended. During 2018, the Internal Revenue Service began a number of guidance projects which serve to both interpret and implement the 2017 Act. Those guidance projects, which include both Proposed and Final Treasury Regulations, will continue into 2019. The Company continues to review the components of the 2017 Act, as well as the ongoing interpretive guidance, and evaluate its consequences. As such, the ultimate impact of the 2017 Act may differ from reported amounts due to, among other things, changes in interpretations and assumptions the Company has made to date; and actions the Company may take as a result of the 2017 Act and related guidance. These changes to the U.S. corporate tax system could have a substantial impact, positive or negative, on Arconic's future effective tax rate, cash tax expenditures, and deferred tax assets and liabilities.

Arconic's business could be adversely affected by increases in the cost of aluminum.

Arconic derives a significant portion of its revenue from aluminum-based products. The price of primary aluminum has historically been subject to significant cyclical price fluctuations and the timing of changes in the market price of aluminum is largely unpredictable. Although the Company's pricing of products is generally intended to pass the risk of metal price fluctuations on to the Company's customers or is otherwise hedged, there are situations where Arconic is unable to pass on the entire cost of increases to its customers and there is a potential time lag on certain products between increases in costs for aluminum and the point when the Company can implement a corresponding increase in price to its customers and/or there are other timing factors that may result in Arconic's exposure to certain price fluctuations which could have a material adverse effect on Arconic's business, financial condition or results of operations.

Arconic is exposed to fluctuations in foreign currency exchange rates and interest rates, as well as inflation, economic factors, and currency controls in the countries in which it operates.

Economic factors, including inflation and fluctuations in foreign currency exchange rates and interest rates, competitive factors in the countries in which Arconic operates, and continued volatility or deterioration in the global economic and financial environment could affect Arconic's revenues, expenses and results of operations. Changes in the valuation of the U.S. dollar against other currencies, including the Euro, British pound, Chinese yuan (renminbi) and Russian ruble, may affect Arconic's profitability as some important inputs are purchased in other currencies, while the Company's products are generally sold in U.S. dollars.

In addition, a portion of Arconic's indebtedness, including certain borrowings under the Company's Five-Year Credit Facility, bears interest at rates equal to the London Interbank Offering Rate (LIBOR) plus an applicable margin based on the credit ratings of Arconic's outstanding senior unsecured long-term debt. Accordingly, the Company is subject to risk from changes in interest rates on the variable component of the rate. Further, LIBOR is the subject of recent national, international and other regulatory guidance and proposals for reform. These reforms and other pressures may cause LIBOR to disappear entirely or to perform differently than in the past. The consequences of these developments cannot be entirely predicted, but could include changes in the cost of Arconic's variable rate indebtedness.

Arconic also faces risks arising from the imposition of cash repatriation restrictions and exchange controls. Cash repatriation restrictions and exchange controls may limit the Company's ability to convert foreign currencies into U.S. dollars or to remit dividends and other payments by Arconic's foreign subsidiaries or businesses located in or conducted within a country imposing restrictions or controls. While Arconic currently has no need, and does not intend, to repatriate or convert cash held in countries that have significant restrictions or controls in place, should the Company need to do so to fund its operations, it may be unable to repatriate or convert such cash, or be unable to do so without incurring substantial costs. Arconic currently has substantial operations in countries that have cash repatriation restrictions or exchange controls in place, including China, and, if the Company were to need to repatriate or convert such cash, these controls and restrictions may have an adverse effect on Arconic's operating results and financial condition.

Arconic may not realize expected benefits from its productivity and cost-reduction initiatives.

Arconic has undertaken, and may continue to undertake, productivity and cost-reduction initiatives to improve performance and conserve cash, including deployment of company-wide business process models, such as Arconic's degrees of implementation process in which ideas are executed in a disciplined manner to generate savings, and operating cost reductions, including, among others, those announced on February 8, 2019, in connection with the Company's ongoing strategic and portfolio review. There is no assurance that these initiatives will be successful or beneficial to Arconic or that estimated cost savings from such activities will be realized. If Arconic fails to achieve net cost savings at anticipated levels, its business, financial condition or results of operations could be adversely affected.

Arconic's customers may reduce their demand for aluminum products in favor of alternative materials.

Certain applications of Arconic's aluminum-based products compete with products made from other materials, such as steel, titanium and composites. The willingness of customers to pursue materials other than aluminum depends upon the desire to achieve specific attributes. For example, the commercial aerospace industry has used and continues to evaluate the further use of alternative materials to aluminum, such as titanium and composites, in order to reduce the weight and increase the fuel efficiency of aircraft. Additionally, the automotive industry, while motivated to reduce vehicle weight through the use of aluminum, may revert to steel or other materials for certain applications. Further, the decision to use aluminum may be impacted by aluminum prices. The willingness of customers to accept other materials in lieu of aluminum could adversely affect the demand for certain of Arconic's products, and thus adversely affect Arconic's business, financial condition or results of operations.

Arconic's profitability could be adversely affected by volatility in the availability or cost of raw materials.

Arconic's results of operations may be affected by changes in the availability or cost of raw materials (including, but not limited to, aluminum, cobalt, nickel, titanium sponge and vanadium), as well as freight costs associated with transportation of raw materials. The availability and costs of certain raw materials necessary for the production of Arconic's products may be influenced by private or government entities including mergers and acquisitions, changes in world politics or regulatory requirements, labor relations between the producers and their work forces, unstable governments in exporting nations, export quotas, sanctions, new or increased import duties, countervailing or anti-dumping duties, market forces of supply and demand, and inflation. In addition, from time to time, commodity prices may fall rapidly. When this happens, suppliers may withdraw capacity from the market until prices improve, which may cause periodic supply interruptions. Arconic may be unable to offset fully the effects of raw material shortages or higher costs through customer price increases, productivity improvements or cost reduction programs. Shortages or price fluctuations in raw materials could have a material adverse effect on Arconic's operating results.

Union disputes and other employee relations issues could adversely affect Arconic's business, financial condition or results of operations.

A significant portion of Arconic's employees are represented by labor unions in a number of countries under various collective bargaining agreements with varying durations and expiration dates. For more information, see "Employees" in Part I, Item 1. (Business) of this report. While Arconic previously has been successful in renegotiating its collective bargaining agreements with various unions, Arconic may not be able to satisfactorily renegotiate all collective bargaining agreements in the United States and other countries when they expire. In addition, existing collective bargaining agreements may not prevent a strike or work stoppage at Arconic's facilities in the future. Arconic may also be subject to general country strikes or work stoppages unrelated to its business or collective bargaining agreements. Any such work stoppages (or potential work stoppages) could have a material adverse effect on Arconic's business, financial condition or results of operations.

A failure to attract, retain or provide adequate succession plans for key personnel could adversely affect Arconic's operations and competitiveness.

Arconic's existing operations and development projects require highly skilled executives and staff with relevant industry and technical experience. The inability of the Company to attract and retain such people may adversely impact Arconic's ability to meet project demands adequately and fill roles in existing operations. Skills shortages in engineering, manufacturing, technology, construction and maintenance contractors and other labor market inadequacies may also impact activities. These shortages may adversely impact the cost and schedule of development projects and the cost and efficiency of existing operations.

In addition, the continuity of key personnel and the preservation of institutional knowledge are vital to the success of the Company's growth and business strategy. The loss of key members of management and other personnel could significantly harm Arconic's business, and any unplanned turnover, or failure to develop adequate succession plans for key positions, could deplete the Company's institutional knowledge base, delay or impede the execution of the Company's business plans and erode Arconic's competitiveness.

Arconic may be exposed to significant legal proceedings, investigations or changes in U.S. federal, state or foreign law, regulation or policy.

Arconic's results of operations or liquidity in a particular period could be affected by new or increasingly stringent laws, regulatory requirements or interpretations, or outcomes of significant legal proceedings or investigations adverse to Arconic. The Company may experience a change in effective tax rates or become subject to unexpected or rising costs associated with business operations or provision of health or welfare benefits to employees due to changes in laws, regulations or policies. The Company may be a party to litigation in a foreign jurisdiction where geopolitical risks might influence the ultimate outcome of such litigation. The Company is also subject to a variety of legal and regulatory compliance risks associated with its business and products. These risks include, among other things, potential claims relating to product liability, product testing, health and safety, environmental matters, required record keeping and record retention, intellectual property rights, government contracts and taxes, as well as compliance with U.S. and foreign laws and regulations governing import and export, anti-bribery, antitrust and competition, sales and trading practices, human rights and modern slavery, sourcing of raw materials, third-party relationships, supply chain operations and the manufacture and sale of products. Arconic could be subject to fines, penalties, damages (in certain cases, treble damages), or suspension or debarment from government contracts.

For example, in the event that an Arconic product fails to perform as expected, regardless of fault, or is used in an unexpected manner, and such failure or use results in, or is alleged to result in, bodily injury and/or property damage or other losses, Arconic may be subject to product liability lawsuits and other claims or may be required or requested by its customers to participate in a recall or other corrective action involving such product. In addition, if an Arconic product is perceived to be defective or unsafe, sales of the Company's products could be diminished, and the Company could be subject to further liability claims. Even if Arconic successfully defends against these types of claims, the Company could still be required to spend a substantial amount of money in connection with legal proceedings or investigations with respect to such claims; the Company's management could be required to devote significant time, attention and operational resources responding to and defending against these claims; and Arconic's reputation could suffer, any of which could have a material adverse effect on its financial condition and results of operations.

While Arconic believes it has adopted appropriate risk management and compliance programs to address and reduce these risks, including insurance arrangements with respect to these risks, such measures may provide inadequate protection against liabilities that may arise. The global and diverse nature of Arconic's operations means that these risks will continue to exist, and additional legal proceedings and contingencies may arise from time to time. In addition, various factors or developments can lead the Company to change current estimates of liabilities or make such estimates for matters previously unsusceptible to reasonable estimates, such as a significant judicial ruling or judgment, a significant settlement, significant regulatory developments or changes in applicable law. A future adverse ruling or settlement or unfavorable changes in laws, regulations or policies, or other contingencies that the Company cannot predict with certainty could have a material adverse effect on the Company's financial condition, results of operations or cash flows in a particular period. For additional information regarding the legal proceedings involving the Company, see the discussion in Part I, Item 3. (Legal Proceedings) of this report and in Note U to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data).

Arconic is subject to a broad range of health, safety and environmental laws and regulations in the jurisdictions in which it operates and may be exposed to substantial costs and liabilities associated with such laws and regulations.

Arconic's operations worldwide are subject to numerous complex and increasingly stringent health, safety and environmental laws and regulations. The costs of complying with such laws and regulations, including participation in assessments and cleanups of sites, as well as internal voluntary programs, are significant and will continue to be so for the foreseeable future. Environmental laws may impose cleanup liability on owners and occupiers of contaminated property, including past or divested properties, regardless of whether the owners and occupiers caused the contamination or whether the activity that caused the contamination was lawful at the time it was conducted. Environmental matters for which Arconic may be liable may arise in the future at its present sites, where no problem is currently known, at previously owned sites, sites previously operated by the Company, sites owned by its predecessors or sites that it may acquire in the future. Compliance with health, safety and environmental laws and regulations, including remediation obligations, may prove to be more challenging and costly than the Company anticipates. For example, new data and information, including information about the ways in which the Company's products are used, may lead the Company, regulatory authorities, government agencies or other entities or organizations to publish guidelines or recommendations, or impose restrictions, related to the manufacturing or use of the Company's products. This could lead to reduced sales or market acceptance of the Company's products. Arconic's results of operations or liquidity in a particular period could be affected by certain health, safety or environmental matters, including remediation costs and damages related to certain sites as well as other health and safety risks relating to its operations and products. Additionally, evolving regulatory standards and expectations can result in increased litigation and/or increased costs, all of which can have a material and adverse effect on the Company's financial condition, results of operations and cash flows.

Arconic is subject to privacy and data security/protection laws in the jurisdictions in which it operates and may be exposed to substantial costs and liabilities associated with such laws and regulations.

The regulatory environment surrounding information security and privacy is increasingly demanding, with frequent imposition of new and changing requirements. For example, the European Union's General Data Protection Regulation ("GDPR"), which became effective in May 2018, imposed significant new requirements on how companies process and transfer personal data, as well as significant fines for non-compliance. Compliance with changes in privacy and information security laws and standards may result in significant expense due to increased investment in technology and the development of new operational processes, which could have a material adverse effect on Arconic's financial condition and results of operations. In addition, the payment of potentially significant fines or penalties in the event of a breach of the GDRP or other privacy and information security laws, as well as the negative publicity associated with such a breach, could damage the Company's reputation and adversely impact product demand and customer relationships.

Arconic may be subject to securities litigation, which could cause the Company to incur substantial costs and divert management's attention and resources.

Arconic currently is, and may in the future become, subject to claims and litigation alleging violations of the securities laws. Arconic is generally obliged, to the extent permitted by law, to indemnify its current and former directors and officers who are named as defendants in these types of lawsuits. Regardless of the outcome, securities litigation may require substantial attention from management and could result in significant legal expenses, settlement costs or damage awards that could have a material impact on the Company's financial position, results of operations and cash flows.

Failure to comply with domestic or international employment and related laws could result in penalties or costs that could have a material adverse effect on Arconic's business results.

Arconic is subject to a variety of domestic and foreign employment laws, such as the Fair Labor Standards Act (which governs such matters as minimum wages, overtime and other working conditions), state and local wage laws, the Employee Retirement Income Security Act ("ERISA"), and regulations related to safety, discrimination, organizing, whistle-blowing, classification of employees, privacy and severance payments, citizenship requirements, and healthcare insurance mandates. Allegations that Arconic has violated such laws or regulations could damage the Company's reputation and lead to fines from or settlements with federal, state or foreign regulatory authorities or damages payable to employees, which could have a material adverse impact on Arconic's operations and financial condition.

Arconic may be affected by global climate change or by legal, regulatory, or market responses to such change.

Increased concern over climate change has led to new and proposed legislative and regulatory initiatives, such as cap-and-trade systems, additional limits on emissions of greenhouse gases or Corporate Average Fuel Economy (CAFE) standards in the United States. New or revised laws and regulations in this area could directly and indirectly affect Arconic's customers and suppliers (through an increase in the cost of production or their ability to produce satisfactory products) or business (through an impact on Arconic's inventory availability, cost of sales, operations or demand for Arconic products), which could result in an adverse effect on our financial condition, results of operations and cash flows. Compliance with any new or more stringent laws or regulations, or stricter interpretations of existing laws, could require additional expenditures by the Company or its customers or suppliers. Also, Arconic relies on natural gas, electricity, fuel oil and transport fuel to operate its facilities. Any increased costs of these energy sources because of new laws could be passed along to the Company and its customers and suppliers, which could also have a negative impact on Arconic's profitability.

Anti-takeover provisions could prevent or delay a change in control of Arconic, including a takeover attempt by a third party and limit the power of Arconic's shareholders.

Arconic's Certificate of Incorporation and Bylaws contain, and Delaware law contains, provisions that are intended to deter coercive takeover practices and inadequate takeover bids by making such practices or bids unacceptably expensive to the bidder and to encourage prospective acquirers to negotiate with Arconic's Board of Directors rather than to attempt a hostile takeover. For example, Arconic is subject to Section 203 of the Delaware General Corporation Law, which imposes certain restrictions on mergers and other business combinations between the Company and any holder of 15% or more of the Company's outstanding common stock, which could make it more difficult for another party to acquire Arconic. Additionally, the Company's Certificate of Incorporation authorizes Arconic's Board of Directors to issue preferred stock or adopt other anti-takeover measures without shareholder approval. These provisions may apply even if an offer may be considered beneficial by some shareholders and could delay or prevent an acquisition that Arconic's Board of Directors determines is not in the best interests of Arconic's shareholders. These provisions may also limit the price that investors might be willing to pay in the future for shares of Arconic common stock or prevent or discourage attempts to remove and replace incumbent directors.

Dividends on Arconic common stock could be reduced or eliminated in the event of material future deterioration in business conditions or in other circumstances.

Arconic has historically paid dividends on its common stock; however, it has no obligation to do so. The existence, timing, declaration, amount and payment of future dividends to Arconic's shareholders falls within the discretion of Arconic's Board of Directors, and the Company's dividend policy may change at any time without advance notice to Arconic's shareholders. For example, on February 8, 2019, in connection with the Company's ongoing strategic and portfolio review, Arconic announced that it expected to reduce its quarterly common stock dividend from $0.06 to $0.02 per share. The Arconic Board of Directors' decisions regarding the payment of dividends will depend on many factors, such as Arconic's financial condition, earnings, capital requirements, debt service obligations, covenants associated with certain of the Company's debt service obligations, industry practice, legal requirements, regulatory constraints and other factors that Arconic's Board of Directors deems relevant. Arconic's Board of Directors may determine to further reduce or eliminate Arconic's common stock dividend in the event of material future deteriorations in business conditions or in other circumstances.

Changes in the United Kingdom's economic and other relationships with the European Union could adversely affect Arconic.

In March 2017, the United Kingdom formally triggered the process to withdraw from the European Union (also referred to as "Brexit") following the results of a national referendum that took place in June 2016. The ultimate effects of Brexit on Arconic are difficult to predict, but because the Company currently operates and conducts business in the United Kingdom and in Europe, Brexit could cause disruptions and create uncertainty to Arconic's businesses, including affecting the business of and/or our relationships with Arconic's customers and suppliers, as well as altering the relationship among tariffs and currencies, including the value of the British pound and the Euro relative to the U.S. dollar. Such disruptions and uncertainties could adversely affect Arconic's financial condition, operating results and cash flows. In addition, Brexit could result in legal uncertainty and potentially divergent national laws and regulations as new legal relationships between the United Kingdom and the European Union are established. The ultimate effects of Brexit on Arconic will also depend on the terms of any agreements the United Kingdom and the European Union make to retain access to each other's respective markets either during a transitional period or more permanently.

Arconic may not achieve some or all of the expected benefits of the Separation from Alcoa Corporation, and failure to realize such benefits in a timely manner may materially adversely affect Arconic's business.

Arconic may be unable to achieve the full strategic and financial benefits expected to result from the Separation, or such benefits may be delayed or not occur at all. The Separation is expected to provide the following benefits, among others: (i) enabling the management of each company to pursue more effectively its own distinct operating priorities and strategies, to focus on strengthening its core business and its unique needs, and to pursue distinct and targeted opportunities for long-term growth and profitability; (ii) permitting each company to allocate its financial resources to meet the unique needs of its own business, allowing each company to intensify its focus on its distinct strategic priorities and to pursue more effectively its own distinct capital structures and capital allocation strategies; (iii) allowing each company to articulate more effectively a clear investment thesis to attract a long-term investor base suited to its business and providing investors with two distinct and targeted investment opportunities; (iv) creating an independent equity currency tracking each company's underlying business, affording Arconic and Alcoa Corporation direct access to the capital markets and facilitating each company's ability to consummate future acquisitions or other restructuring transactions utilizing its common stock; (v) allowing each company more consistent application of incentive structures and targets, due to the common nature of the underlying businesses; and (vi) separating and simplifying the structures required to manage two distinct and differing underlying businesses.

Arconic may not achieve these and other anticipated benefits for a variety of reasons, including, among others: (i) Arconic may be more susceptible to market fluctuations and other adverse events than if Alcoa Corporation were still a part of the Company because Arconic's business is less diversified than it was prior to the completion of the Separation; and (ii) as a smaller, independent company, Arconic may be unable to obtain certain goods, services and technologies at prices or on terms as favorable as those it obtained prior to completion of the Separation. If Arconic fails to achieve some or all of the benefits expected to result from the Separation, or if such benefits are delayed, it could have a material adverse effect on Arconic's competitive position, business, financial condition, results of operations and cash flows.

Alcoa Corporation may fail to perform under various transaction agreements that were executed as part of the Separation.

In connection with the Separation, Arconic and Alcoa Corporation entered into a Separation and Distribution Agreement and also entered into various other agreements, of which the following were still in effect during 2018: a Tax Matters Agreement, an Employee Matters Agreement, intellectual property license agreements, a metal supply agreement, real estate and office leases and a spare parts loan agreement. The Separation and Distribution Agreement, the Tax Matters Agreement and the Employee Matters Agreement, together with the documents and agreements by which the internal reorganization of the

Company prior to the Separation was effected, determined the allocation of assets and liabilities between the companies following the Separation for those respective areas and included any necessary indemnifications related to liabilities and obligations. Arconic will rely on Alcoa Corporation to satisfy its performance and payment obligations under these agreements. If Alcoa Corporation is unable or unwilling to satisfy its obligations under these agreements, including its indemnification obligations, we could incur operational difficulties and/or losses.

In connection with the Separation from Alcoa Corporation, Alcoa Corporation has agreed to indemnify Arconic for certain liabilities and Arconic has agreed to indemnify Alcoa Corporation for certain liabilities. If Arconic is required to pay under these indemnities to Alcoa Corporation, Arconic's financial results could be negatively impacted. The Alcoa Corporation indemnity may be insufficient to hold Arconic harmless from the full amount of liabilities for which Alcoa Corporation will be allocated responsibility, and Alcoa Corporation may be unable to satisfy its indemnification obligations in the future.

Pursuant to the Separation and Distribution Agreement and certain other agreements with Alcoa Corporation, Alcoa Corporation has agreed to indemnify Arconic for certain liabilities, and Arconic has agreed to indemnify Alcoa Corporation for certain liabilities, in each case for uncapped amounts. Indemnities that Arconic may be required to provide Alcoa Corporation are not subject to any cap, may be significant and could negatively impact Arconic's business. Third parties could also seek to hold Arconic responsible for any of the liabilities that Alcoa Corporation has agreed to retain. Any amounts Arconic is required to pay pursuant to these indemnification obligations and other liabilities could require Arconic to divert cash that would otherwise have been used in furtherance of the Company's operating business. Further, the indemnity from Alcoa Corporation may be insufficient to protect Arconic against the full amount of such liabilities, and Alcoa Corporation may be unable to satisfy its indemnification obligations fully. Moreover, even if Arconic ultimately succeeds in recovering from Alcoa Corporation any amounts for which Arconic is held liable, Arconic may be temporarily required to bear such losses. Each of these risks could negatively affect Arconic's business, results of operations and financial condition.

The Separation could result in substantial tax liability.

It was a condition to the Distribution that (i) the private letter ruling from the Internal Revenue Service (the "IRS") regarding certain U.S. federal income tax matters relating to the Separation and the Distribution received by Arconic remain valid and be satisfactory to Arconic's Board of Directors and (ii) Arconic receive an opinion of its outside counsel, satisfactory to the Board of Directors, regarding the qualification of the Distribution, together with certain related transactions, as a transaction that is generally tax-free, for U.S. federal income tax purposes, under Sections 355 and 368(a)(1)(D) of the Internal Revenue Code of 1986, as amended (the "Code"). Both of these conditions were satisfied prior to the Distribution. However, the IRS private letter ruling and the opinion of counsel were based upon and relied on, among other things, various facts and assumptions, as well as certain representations, statements and undertakings of Arconic and Alcoa Corporation, including those relating to the past and future conduct of Arconic and Alcoa Corporation. If any of these representations, statements or undertakings is, or becomes, inaccurate or incomplete, or if Arconic or Alcoa Corporation breaches any of its representations or covenants contained in any of the Separation- related agreements and documents or in any documents relating to the IRS private letter ruling and/or the opinion of counsel, the IRS private letter ruling and/or the opinion of counsel may be invalid and the conclusions reached therein could be jeopardized.

Notwithstanding Arconic's receipt of the IRS private letter ruling and the opinion of counsel, the IRS could determine that the Distribution and/or certain related transactions should be treated as taxable transactions for U.S. federal income tax purposes if it determines that any of the representations, assumptions or undertakings upon which the IRS private letter ruling or the opinion of counsel was based are false or have been violated. In addition, the IRS private letter ruling does not address all of the issues that are relevant to determining whether the Distribution, together with certain related transactions, qualifies as a transaction that is generally tax-free for U.S. federal income tax purposes, and the opinion of counsel represents the judgment of such counsel and is not binding on the IRS or any court and the IRS or a court may disagree with the conclusions in the opinion of counsel. Accordingly, notwithstanding receipt by Arconic of the IRS private letter ruling and the opinion of counsel, there can be no assurance that the IRS will not assert that the Distribution and/or certain related transactions do not qualify for tax-free treatment for U.S. federal income tax purposes or that a court would not sustain such a challenge. In the event the IRS were to prevail with such challenge, Arconic, Alcoa Corporation and Arconic shareholders could be subject to significant U.S. federal income tax liability.

If the Distribution, together with certain related transactions, fails to qualify as a transaction that is generally tax-free, for U.S. federal income tax purposes, under Sections 355 and 368(a)(1)(D) of the Code, in general, for U.S. federal income tax purposes, Arconic would recognize taxable gain as if it had sold the Alcoa Corporation common stock in a taxable sale for its fair market value and Arconic shareholders who received Alcoa Corporation shares in the distribution would be subject to tax as if they had received a taxable distribution equal to the fair market value of such shares.

Under current U.S. federal income tax law, even if the Distribution, together with certain related transactions, otherwise qualifies for tax-free treatment under Sections 355 and 368(a)(1)(D) of the Code, the Distribution may nevertheless be rendered taxable to Arconic and its shareholders as a result of certain post-Distribution transactions, including certain acquisitions of shares or assets of Arconic or Alcoa Corporation. The possibility of rendering the Distribution taxable as a result of such transactions may limit Arconic's ability to pursue certain equity issuances, strategic transactions or other transactions that would otherwise maximize the value of Arconic's business. Under the Tax Matters Agreement that Arconic entered into with Alcoa Corporation, Alcoa Corporation may be required to indemnify Arconic against any additional taxes and related amounts resulting from (i) an acquisition of all or a portion of the equity securities or assets of Alcoa Corporation, whether by merger or otherwise (and regardless of whether Alcoa Corporation participated in or otherwise facilitated the acquisition), (ii) issuing equity securities beyond certain thresholds, (iii) repurchasing shares of Alcoa Corporation stock other than in certain open-market transactions, (iv) ceasing actively to conduct certain of its businesses, (v) other actions or failures to act by Alcoa Corporation or (vi) any of Alcoa Corporation's representations, covenants or undertakings contained in any of the Separation-related agreements and documents or in any documents relating to the IRS private letter ruling and/or the opinion of counsel being incorrect or violated. However, the indemnity from Alcoa Corporation may be insufficient to protect Arconic against the full amount of such additional taxes or related liabilities, and Alcoa Corporation may be unable to satisfy its indemnification obligations fully. Moreover, even if Arconic ultimately succeeds in recovering from Alcoa Corporation any amounts for which Arconic is held liable, Arconic may be temporarily required to bear such losses. In addition, Arconic and Arconic's subsidiaries may incur certain tax costs in connection with the Separation, including tax costs resulting from separations in non-U.S. jurisdictions, which may be material. Each of these risks could negatively affect Arconic's business, results of operations and financial condition.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Arconic’s principal office is located at 390 Park Avenue, New York, New York 10022-4608. Arconic’s corporate center is located at 201 Isabella Street, Pittsburgh, Pennsylvania 15212-5858. The Arconic Technology Center for research and development is located at 100 Technical Drive, New Kensington, Pennsylvania 15069-0001.

Arconic leases some of its facilities; however, it is the opinion of management that the leases do not materially affect the continued use of the properties or the properties’ values.

Arconic believes that its facilities are suitable and adequate for its operations. Although no title examination of properties owned by Arconic has been made for the purpose of this report, the Company knows of no material defects in title to any such properties. See Notes A and N to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Arconic has active plants and holdings under the following segments and in the following geographic areas:

ENGINEERED PRODUCTS AND SOLUTIONS

See the table and related text in the **Engineered Products and Solutions Facilities** section on page 6 of this report.

GLOBAL ROLLED PRODUCTS

See the table and related text in the **Global Rolled Products Facilities** section on page 8 of this report.

TRANSPORTATION AND CONSTRUCTION SOLUTIONS

See the table and related text in the **Transportation and Construction Solutions** section on page 9 of this report.

Item 3. Legal Proceedings.

In the ordinary course of its business, Arconic is involved in a number of lawsuits and claims, both actual and potential.

Environmental Matters

Arconic is involved in proceedings under the Comprehensive Environmental Response, Compensation and Liability Act, also known as Superfund (CERCLA) or analogous state provisions regarding the usage, disposal, storage or treatment of hazardous substances at a number of sites in the U.S. The Company has committed to participate, or is engaged in negotiations with federal or state authorities relative to its alleged liability for participation, in clean-up efforts at several such sites. The most significant of these matters, the remediation of the Grasse River in Massena, NY, is discussed in the Environmental Matters section of Note U to the Consolidated Financial Statements under the caption “Environmental Matters”.

Reynobond PE

As previously reported, on June 13, 2017, the Grenfell Tower in London, UK caught fire resulting in fatalities, injuries and damage. A French subsidiary of Arconic, Arconic Architectural Products SAS (AAP SAS), supplied a product, Reynobond PE, to its customer, a cladding system fabricator, which used the product as one component of the overall cladding system on Grenfell Tower. The fabricator supplied its portion of the cladding system to the façade installer, who then completed and installed the system under the direction of the general contractor. Neither Arconic nor AAP SAS was involved in the design or installation of the system used at the Grenfell Tower, nor did it have a role in any other aspect of the building’s refurbishment or original design. Regulatory investigations into the overall Grenfell Tower matter are being conducted, including a criminal investigation by the London Metro Police, a Public Inquiry by the British government and a consumer protection inquiry by a French public authority. AAP SAS has sought and received core participant status in the Public Inquiry. The Company will no longer sell the PE product for architectural use on buildings.

Howard v. Arconic Inc. et al. As previously reported, a purported class action complaint related to the Grenfell Tower fire was filed on August 11, 2017 in the United States District Court for the Western District of Pennsylvania against Arconic Inc. and Klaus Kleinfeld. A related purported class action complaint was filed in the United States District Court for the Western District of Pennsylvania on August 25, 2017, under the caption *Sullivan v. Arconic Inc. et al.*, against Arconic Inc., two former Arconic executives, several current and former Arconic directors, and banks that acted as underwriters for Arconic’s September 18, 2014 preferred stock offering (the “Preferred Offering”). The plaintiff in *Sullivan* had previously filed a purported class action against the same defendants on July 18, 2017 in the Southern District of New York and, on August 25, 2017, voluntarily dismissed that action without prejudice. On February 7, 2018, on motion from certain putative class members, the court consolidated *Howard* and *Sullivan*, closed *Sullivan*, and appointed lead plaintiffs in the consolidated case. On April 9, 2018, the lead plaintiffs in the consolidated purported class action filed a consolidated amended complaint. The consolidated amended complaint alleges that the registration statement for the Preferred Offering contained false and misleading statements and omitted to state material information, including by allegedly failing to disclose material uncertainties and trends resulting from sales of Reynobond PE for unsafe uses and by allegedly expressing a belief that appropriate risk management and compliance programs had been adopted while concealing the risks posed by Reynobond PE sales. The consolidated amended complaint also alleges that between November 4, 2013 and June 23, 2017 Arconic and Kleinfeld made false and misleading statements and failed to disclose material information about the Company’s commitment to safety, business and financial prospects, and the risks of the Reynobond PE product, including in Arconic’s Form 10-Ks for the fiscal years ended December 31, 2013, 2014, 2015 and 2016, its Form 10-Qs and quarterly financial press releases from the fourth quarter of 2013 through the first quarter of 2017, its 2013, 2014, 2015 and 2016 Annual Reports, and its 2016 Annual Highlights Report. The consolidated amended complaint seeks, among other things, unspecified compensatory damages and an award of attorney and expert fees and expenses. On June 8, 2018, all defendants moved to dismiss the consolidated amended complaint for failure to state a claim. Briefing on that motion is now closed and the parties await a ruling.

Raul v. Albaugh, et al. As previously reported, on June 22, 2018, a derivative complaint was filed nominally on behalf of Arconic by a purported Arconic shareholder against all current members of Arconic’s Board of Directors, Klaus Kleinfeld and Ken Giacobbe, naming Arconic as a nominal defendant, in the United States District Court for the District of Delaware. The complaint raises similar allegations as the consolidated amended complaint in *Howard*, as well as allegations that the defendants improperly authorized the sale of Reynobond PE for unsafe uses, and asserts claims under Section 14(a) of the Securities Exchange Act of 1934 and Delaware state law. On July 13, 2018, the parties filed a stipulation agreeing to stay this case until the final resolution of the *Howard* case, the Grenfell Tower public inquiry in London, and the investigation by the London Metropolitan Police Service and on June 23, 2018, the Court approved the stay.

While the Company believes that these cases are without merit and intends to challenge them vigorously, there can be no assurances regarding the ultimate resolution of these matters. Given the preliminary nature of these matters and the uncertainty of litigation, the Company cannot reasonably estimate at this time the likelihood of an unfavorable outcome or the possible loss or range of losses in the event of an unfavorable outcome. The Board of Directors has also received letters, purportedly sent on behalf of shareholders, reciting allegations similar to those made in the federal court lawsuits and demanding that the Board authorize the Company to initiate litigation against members of management, the Board and others. The Board of Directors has appointed a Special Litigation Committee of the Board to review and make recommendations to the Board regarding the appropriate course of action with respect to these shareholder demand letters. The Special Litigation Committee and the Board are continuing to consider the appropriate responses to the shareholder demand letters in view of developments in proceedings concerning the Grenfell Tower fire.

Other Matters

As previously reported, Arconic Inc. and its subsidiaries and former subsidiaries are defendants in lawsuits filed on behalf of persons alleging injury as a result of occupational or other exposure to asbestos. Arconic, its subsidiaries and former subsidiaries have numerous insurance policies over many years that provide coverage for asbestos related claims. Arconic has significant insurance coverage and believes that Arconic's reserves are adequate for its known asbestos exposure related liabilities. The costs of defense and settlement have not been and are not expected to be material to the results of operations, cash flows, and financial position of the Company.

Tax

Pursuant to the Tax Matters Agreement, dated as of October 31, 2016, entered into between the Company and Alcoa Corporation in connection with the Separation, the Company shares responsibility with Alcoa Corporation for, and Alcoa Corporation has agreed to partially indemnify the Company with respect to, the following matter.

As previously reported, in July 2013, following a Spanish corporate income tax audit covering the 2006 through 2009 tax years, an assessment was received mainly disallowing certain interest deductions claimed by a Spanish consolidated tax group owned by the Company. In August 2013, the Company filed an appeal of this assessment in Spain's Central Tax Administrative Court, which was denied in January 2015. Arconic filed another appeal in Spain's National Court in March 2015 which was denied in July 2018. The National Court's decision requires the assessment for the 2006 through 2009 tax years to be reissued to take into account the outcome of the 2003 to 2005 audit which was closed in 2017. The Company estimates the revised assessment to be $174 million (€152 million), including interest.

The Company has petitioned to the Supreme Court of Spain to review the National Court's decision. If the petition is accepted, the Supreme Court will review the assessment on its merits and render a final decision. In the event the Company is unsuccessful in appealing the assessment to the Supreme Court of Spain, a portion of the assessment may be offset with existing net operating losses and tax credits available to the Spanish consolidated tax group, which would be shared between the Company and Alcoa Corporation as provided for in the Tax Matters Agreement. As a result of the National Court decision, an income tax reserve, including interest, of $60 million (€52 million) was established in 2018. Concurrent with the establishment of the reserve, an indemnification receivable of $29 million (€25 million), representing Alcoa Corporation's 49% share of the liability, was also recorded in 2018.

Additionally, while the tax years 2010 through 2013 are closed to audit, it is possible that the Company may receive assessments for tax years subsequent to 2013. Any potential assessment for an individual tax year is not expected to be material to the Company's consolidated operations. At this time, the Company is unable to reasonably predict an ultimate outcome for this matter.

Matters Previously Reported – Alcoa Corporation

We have included the matters discussed below in which the Company remains party to proceedings relating to Alcoa Corporation in accordance with SEC regulations. The Separation and Distribution Agreement, dated October 31, 2016, entered into between the Company and Alcoa Corporation in connection with the Separation, provides for cross-indemnities between the Company and Alcoa Corporation for claims subject to indemnification. The Company does not expect any of such matters to result in a net claim against it.

St. Croix Proceedings

Red Dust Docket Cases, (St. Croix) f/k/a Abednego, Laurie L.A., et al. v. St. Croix Alumina, L.L.C., et al. As previously reported, on January 14, 2010, Arconic was served with a multi-plaintiff action complaint involving several thousand individual persons claiming to be residents of St. Croix who are alleged to have suffered personal injury or property damage from Hurricane Georges or winds blowing material from the St. Croix Alumina, L.L.C. ("SCA") facility on the island of St. Croix (U.S. Virgin Islands) since the time of the hurricane. This complaint, Abednego, et al. v. Alcoa, et al. was filed in the Superior Court of the Virgin Islands, St. Croix Division. Following an unsuccessful attempt by Arconic and SCA to remove the case to federal court, the case has been lodged in the Superior Court. The complaint names as defendants the same entities that were sued in a February 1999 action arising out of the impact of Hurricane Georges on the island and added as a defendant the current owner of the alumina facility property.

Also as previously reported, on March 1, 2012, Arconic was served with a separate multi-plaintiff action complaint involving approximately 200 individual persons alleging claims essentially identical to those set forth in the Abednego v. Alcoa complaint. This complaint, Abraham, et al. v. Alcoa, et al., was filed on behalf of plaintiffs previously dismissed in the federal court proceeding involving the original litigation over Hurricane Georges impacts. The matter was originally filed in the Superior Court of the Virgin Islands, St. Croix Division, on March 30, 2011.

Arconic and other defendants in the Abraham and Abednego cases filed or renewed motions to dismiss each case in March 2012 and August 2012 following service of the Abraham complaint on Arconic and remand of the Abednego complaint to Superior Court, respectively. By order dated August 10, 2015, the Superior Court dismissed plaintiffs' complaints without prejudice to re-file the complaints individually, rather than as a multi-plaintiff filing. The order also preserves the defendants' grounds for dismissal if new, individual complaints are filed. On July 7, 2017, the Court issued an order and associated memoranda on plaintiff's multiple motions for extension of time to file the individual Complaints. Following the court's July 7, 2017 order, a total of 429 complaints were filed and accepted by the court by the deadline of July 30, 2017 (and consolidated into the *Red Dust Claims* docket (Master Case No.: SX-15-CV-620)). These complaints include claims of about 1,260 individual plaintiffs. On December 11, 2017, the court issued a new scheduling order and further set a scheduling conference for January 18, 2018. At that conference, the court set the next status conference for late July 2018.

The July 2018 status conference was canceled. On November 5, 2018, notice of an order of reassignment was entered, transferring the claims to the newly created Complex Litigation Division of the Superior Court of the Virgin Islands, Division of St. Croix. Following the transfer, the Court scheduled a status conference to discuss the most efficient manner in which to proceed with discovery. The conference took place on January 24, 2019. The Court has not issued a discovery schedule. On January 28, 2019, the plaintiffs filed a motion asking for a determination that expert testimony will not be required on the issue of causation, which defendants opposed. The Court has not ruled on that motion.

Other Contingencies

In addition to the matters discussed above, various other lawsuits, claims, and proceedings have been or may be instituted or asserted against Arconic, including those pertaining to environmental, product liability, safety and health, employment, tax and antitrust matters. While the amounts claimed in these other matters may be substantial, the ultimate liability cannot currently be determined because of the considerable uncertainties that exist. Therefore, it is possible that the Company's liquidity or results of operations in a period could be materially affected by one or more of these other matters. However, based on facts currently available, management believes that the disposition of these other matters that are pending or asserted will not have a material adverse effect, individually or in the aggregate, on the results of operations, financial position, or cash flows of the Company.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

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

The Company's common stock is listed on the New York Stock Exchange. Prior to the Separation of Alcoa Corporation from the Company, the Company's common stock traded under the symbol "AA." In connection with the separation, on November 1, 2016, the Company changed its stock symbol and its common stock began trading under the symbol "ARNC."

On October 5, 2016, the Company's common shareholders approved a 1-for-3 reverse stock split of the Company's outstanding and authorized shares of common stock (the "Reverse Stock Split"). As a result of the Reverse Stock Split, every three shares of issued and outstanding common stock were combined into one issued and outstanding share of common stock, without any change in the par value per share. The Reverse Stock Split reduced the number of shares of common stock outstanding from approximately 1.3 billion shares to approximately 0.4 billion shares, and proportionately decreased the number of authorized shares of common stock from 1.8 billion to 0.6 billion shares. The Company's common stock began trading on a Reverse Stock Split-adjusted basis on October 6, 2016.

On November 1, 2016, the Company completed the Separation of its business into two independent, publicly traded companies: the Company and Alcoa Corporation. The Separation was effected by means of a pro rata distribution by the Company of 80.1% of the outstanding shares of Alcoa Corporation common stock to the Company's shareholders. The Company's shareholders of record as of the close of business on October 20, 2016 (the "Record Date") received one share of Alcoa Corporation common stock for every three shares of the Company's common stock held as of the Record Date. The Company retained 19.9% of the outstanding common stock of Alcoa Corporation immediately following the Separation. See disposition of retained shares in Note V to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

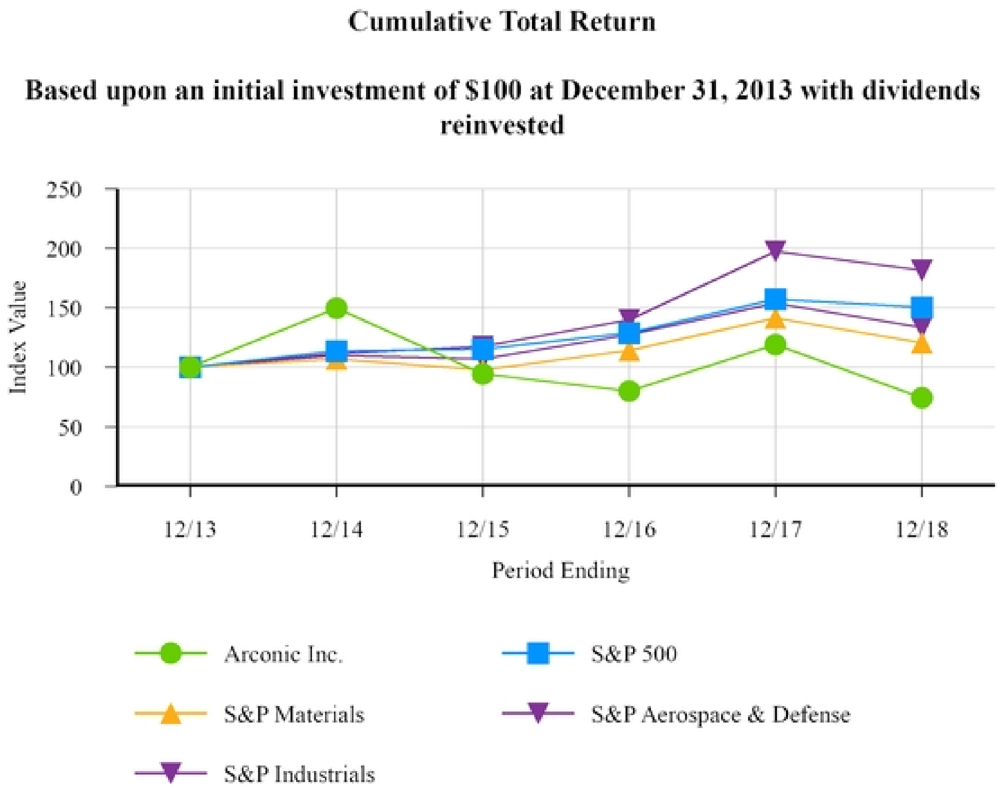
The number of holders of record of common stock was approximately 11,668 as of February 15, 2019.

Table of Contents

Stock Performance Graph

The following graph compares the most recent five-year performance of the Company’s common stock with (1) the Standard & Poor’s (S&P) 500® Index, (2) the S&P 500® Materials Index, a group of 25 companies categorized by Standard & Poor’s as active in the “materials” market sector, (3) the S&P Aerospace & Defense Select Industry Index, a group of 33 companies categorized by Standard & Poor’s as active in the “aerospace & defense” industry and (4) the S&P 500® Industrials Index, a group of 69 companies categorized by Standard & Poor’s as active in the “industrials” market sector. The graph assumes, in each case, an initial investment of $100 on December 31, 2013, and the reinvestment of dividends. Historical prices prior to the separation of Alcoa Corporation from the Company on November 1, 2016, have been adjusted to reflect the value of the Separation transaction. The graph, table and related information shall not be deemed to be “filed” with the SEC, nor shall such information be incorporated by reference into future filings under the Securities Act of 1933 or Securities Exchange Act of 1934, each as amended, except to the extent that the Company specifically incorporates it by reference into such filing.

Please note that the Company intends to replace the S&P 500® Materials Index with the S&P Aerospace & Defense Select Industry Index and the S&P 500® Industrials Index in subsequent stock performance graphs. We believe that the companies and industries represented in the S&P Aerospace & Defense Select Industry Index and the S&P 500® Industrials Index better reflect the markets in which the Company currently participates. All three indices are represented in the graph below.



As of December 31,	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Arconic Inc.	$ 100	$ 149.83	$ 94.62	$ 80.22	$ 119.02	$ 74.47
S&P 500® Index	100	113.69	115.26	129.05	157.22	150.33
S&P 500® Materials Index	100	106.91	97.95	114.30	141.55	120.74
S&P Aerospace & Defense Select Industry Index	100	111.43	117.49	139.70	197.50	181.56
S&P 500® Industrials Index	100	109.83	107.04	127.23	153.99	133.53

Item 6. Selected Financial Data.

The separation of Alcoa Inc. into two standalone, publicly-traded companies, Arconic Inc. (the new name for Alcoa Inc.) and Alcoa Corporation, became effective on November 1, 2016 (the "Separation Transaction"). The financial results of Alcoa Corporation for all periods prior to the Separation Transaction have been retrospectively reflected in the Statement of Consolidated Operations as discontinued operations and, as such, have been excluded from continuing operations and segment results for 2016 and all prior periods presented prior to the Separation Transaction. The cash flows related to Alcoa Corporation have not been segregated and are included in the Statement of Consolidated Cash Flows for 2016 and all prior periods presented.

(dollars in millions, except per-share amounts)

For the year ended December 31,	2018	2017	2016	2015	2014
Sales	$ 14,014	$ 12,960	$ 12,394	$ 12,413	$ 12,542
Amounts attributable to Arconic:					
Income (loss) from continuing operations[1]	$ 642	$ (74)	$ (1,062)	$ (157)	$ (61)
Income (loss) from discontinued operations[2]	—	—	121	(165)	329
Net income (loss)	$ 642	$ (74)	$ (941)	$ (322)	$ 268
Earnings (loss) per share attributable to Arconic common shareholders:[3]					
Basic:					
Income (loss) from continuing operations	$ 1.33	$ (0.28)	$ (2.58)	$ (0.54)	$ (0.21)
Income (loss) from discontinued operations	—	—	0.27	(0.39)	0.85
Net income (loss)	$ 1.33	$ (0.28)	$ (2.31)	$ (0.93)	$ 0.64
Diluted:					
Income (loss) from continuing operations	$ 1.30	$ (0.28)	$ (2.58)	$ (0.54)	$ (0.21)
Income (loss) from discontinued operations	—	—	0.27	(0.39)	0.84
Net income (loss)	$ 1.30	$ (0.28)	$ (2.31)	$ (0.93)	$ 0.63
Cash dividends declared per common share[1]	$ 0.24	$ 0.24	$ 0.36	$ 0.36	$ 0.36
Total assets	18,693	18,718	20,038	36,477	37,298
Total debt	6,330	6,844	8,084	8,827	8,445
Cash provided from (used for) operations[4]	217	(39)	95	764	1,674
Capital expenditures:					
Capital expenditures—continuing operations	768	596	827	789	775
Capital expenditures—discontinued operations	—	—	298	391	444
Total capital expenditures	$ 768	$ 596	$ 1,125	$ 1,180	$ 1,219

(1) Calculated from the accompanying Statement of Consolidated Operations as Income (loss) from continuing operations after income taxes less Net income from continuing operations attributable to noncontrolling interests.

(2) Calculated from the accompanying Statement of Consolidated Operations as Income from discontinued operations after income taxes less Net income from discontinued operations attributable to noncontrolling interests.

(3) Per share data has been retroactively restated to reflect the 1-for-3 reverse stock split which became effective on October 6, 2016 (see Note I to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K).

(4) Cash provided from (used for) operations has not been restated for discontinued operations presentation for 2016 and all prior periods presented (see Basis of Presentation section of Note A to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K). Cash provided from (used for) operations in 2014 has not been recast for the impact of the new accounting pronouncements that were adopted in the first quarter of 2018 (see Recently Adopted Accounting Guidance section of Note A to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K).

The data presented in the Selected Financial Data table should be read in conjunction with the information provided in Management's Discussion and Analysis of Financial Condition and Results of Operations in Part II, Item 7. and the Consolidated Financial Statements and Notes in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

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

(dollars in millions, except per-share amounts; shipments in thousands of metric tons [kmt])

Overview

Our Business

Arconic ("Arconic" or the "Company") is a global leader in lightweight metals engineering and manufacturing. Arconic's innovative, multi-material products, which include aluminum, titanium, and nickel, are used worldwide in aerospace, automotive, commercial transportation, building and construction, industrial applications, defense, and packaging.

Arconic is a global company operating in 18 countries. Based upon the country where the point of sale occurred, the United States and Europe generated 65% and 24%, respectively, of Arconic's sales in 2018. In addition, Arconic has operating activities in Brazil, Canada, China, Japan, and Russia, among others. Governmental policies, laws and regulations, and other economic factors, including inflation and fluctuations in foreign currency exchange rates and interest rates, affect the results of operations in these countries.

Management Review of 2018 and Outlook for the Future

In 2018, Arconic's revenues increased 8% over 2017 as a result of higher volumes across all segments including strong volume growth in aerospace engines and defense, automotive, commercial transportation, industrial, and building and construction end markets; higher aluminum pricing and favorable product mix primarily impacting the Global Rolled Products segment; and favorable foreign currency movements; partially offset by a decline in volumes in the industrial gas turbine end market; lower sales of $90 from the divestiture of the Latin America extrusions business (divested in April 2018), $54 from the divestiture of the rolling mill in Fusina, Italy (divested in March 2017), and $46 from the ramp down of Arconic's North American packaging operations (completed in December 2018); and costs of $38 in 2018 related to settlements of certain customer claims primarily related to product introductions. In the segments, Segment operating profit decreased 6% from 2017 as volume growth was more than offset by performance shortfalls in the disks operations, manufacturing inefficiencies in the Engineered Structures business, unfavorable product mix, and higher aluminum prices.

Net income was $642 in 2018 compared to a Net loss of $74 in 2017. There were several significant items that impacted the fourth quarter of 2018. The Company recognized proceeds of approximately $300 in cash and recorded a gain of $119 ($154 pre-tax) on the sale of the Texarkana rolling mill. The Company recorded a loss of $39 ($43 pre-tax) on the sale of the Eger, Hungary forgings business. The Company also recorded a charge of $72 ($92 pre-tax) for pension plan settlement charges associated with significant lump sum payments made to participants. Additionally, the Company recorded several discrete tax items, including benefits related to the reversal of a foreign deferred tax liability of $74 as well as the release of valuation allowances and revaluation of deferred taxes.

Management continued its focus on liquidity and cash flows as well as improving its operating performance through cost reductions, streamlined organizational structures, margin enhancement, and profitable revenue generation. Management has continued its intensified focus on capital efficiency. This focus and the related results enabled Arconic to end 2018 with a solid financial position.

The following financial information reflects certain key measures of Arconic's 2018 results:

- Sales of $14,014, up 8% from 2017, with growth from all segments as key end markets remained healthy, and Net income of $642, or $1.30 per diluted share;
- Total segment operating profit of $1,581, a decrease of $97, or 6%, from 2017[1];
- Cash provided from operations of $217, cash used for financing activities of $649, and cash provided from investing activities of $565, reflecting improvements in working capital;
- Cash on hand at the end of the year of $2,277; and
- Total debt of $6,330, a decrease in total debt of $514 from 2017.

(1) *For the reconciliation of Total segment operating profit to Consolidated income before income taxes and related information, see page 43.*

On January 22, 2019, the Company announced that its Board of Directors (the Board) had determined to no longer pursue a potential sale of Arconic as part of its strategy and portfolio review. Management and the Board have been conducting a rigorous and comprehensive strategy and portfolio review over the past year and as part of that process had considered a sale of the Company, among other matters. However, the Company did not receive a proposal for a full-Company transaction that management and the Board believed would be in the best interest of Arconic's shareholders and other stakeholders. Management and the Board remain confident in Arconic's significant potential and are strongly focused on enhancing value for shareholders, through continued operational improvements and through other potential initiatives which have been previously identified in the strategy and portfolio review. The Company has announced the following key initiatives as part of its ongoing strategy and portfolio review:

- Commenced plans to reduce operating costs by approximately $200 on an annual run-rate basis, designed to maximize the impact in 2019;
- Announced the planned separation of its portfolio into Engineered Products and Forgings and Global Rolled Products, with a spin-off of one of the businesses;
- Considering the potential sale of businesses that do not best fit into one of the two segments above;
- Intends to execute its previously authorized $500 share repurchase program in the first half of 2019;
- The Board also authorized an additional $500 of share repurchases, effective through the end of 2020; and
- Expects to reduce its quarterly common stock dividend from $0.06 to $0.02 per share.

On February 6, 2019, the Company announced that the Board appointed John C. Plant, current Chairman of the Board, as Chairman and Chief Executive Officer of the Company, effective February 6, 2019, to succeed Chip Blankenship, who ceased to serve as Chief Executive Officer of the Company and resigned as a member of the Board, in each case as of that date. In addition, the Company announced that the Board appointed Elmer L. Doty, current member of the Board, as President and Chief Operating Officer, a newly created position, effective February 6, 2019. Mr. Doty will remain a member of the Board. The Company also announced that Arthur D. Collins, Jr., current member of the Board, has been appointed interim Lead Independent Director of the Company, effective February 6, 2019.

On February 19, 2019, the Company entered into an accelerated share repurchase (“ASR”) agreement with JPMorgan Chase Bank to repurchase $700 of its common stock, pursuant to the share repurchase program previously authorized by the Board. Under the ASR agreement, Arconic will receive initial delivery of approximately 32 million shares on February 21, 2019. The final number of shares to be repurchased will be based on the volume-weighted average price of Arconic’s common stock during the term of the transaction, less a discount. The ASR agreement is expected to be completed during the first half of 2019.

The Company will evaluate its organizational structure in conjunction with the planned separation of its portfolio and changes to its reportable segments are expected in the first half of 2019.

In 2019, management projects that sales will be up approximately 2% to 4% supported by increases in most of the Company’s key end markets, as robust growth and the Company’s unique position in those markets is expected to continue. These increases will be partly offset by the expected decline in aluminum prices in 2019 compared with 2018. Earnings per share is expected to grow as management continues to focus on operational performance and driving further cost reductions. The Company expects favorable impacts from volume, net cost savings, aerospace pricing, and lower aluminum pricing, which will be pressured by the continuation of new product introductions in aerospace as well as higher transportation costs and aluminum scrap spreads. Cash flows are expected to keep pace for the full year in 2019 compared with 2018, resulting from improved operating performance and the focus on capital efficiency that is expected to drive lower capital expenditures. Cash flows in the first quarter of 2019 are expected to reflect the typical use of cash based on anticipated timing of working capital increases and interest payments.

2016 Separation Transaction. On November 1, 2016, the Company completed the separation of its business into two standalone, publicly-traded companies, Arconic Inc. and Alcoa Corporation. Following the Separation Transaction, Arconic comprises the Global Rolled Products (other than the rolling mill in Warrick, Indiana, and the 25.1% equity ownership stake in the Ma’aden Rolling Company), the Engineered Products and Solutions, and the Transportation and Construction Solutions segments. Alcoa Corporation comprises the Alumina and Primary Metals segments, the rolling mill in Warrick, Indiana, and the 25.1% equity ownership stake in the Ma’aden Rolling Company in Saudi Arabia.

The Separation Transaction was effected by the distribution of 80.1% of the outstanding shares of Alcoa Corporation common stock to the Company’s shareholders (the “Distribution”). The Company’s shareholders of record as of the close of business on October 20, 2016 (the “Record Date”) received one share of Alcoa Corporation common stock for every three shares of the Company’s common stock held as of the Record Date. The Company distributed 146,159,428 shares of common stock of Alcoa Corporation in the Distribution and retained 36,311,767 shares, or approximately 19.9% (see disposition of retained shares under Results of Operations below), of the common stock of Alcoa Corporation immediately following the Distribution. As a result of the Distribution, Alcoa Corporation is now an independent public company trading under the symbol “AA” on the New York Stock Exchange, and the Company trades under the symbol “ARNC” on the New York Stock Exchange.

On October 31, 2016, Arconic entered into several agreements with Alcoa Corporation that govern the relationship of the parties following the completion of the Separation Transaction. These agreements include the following: Separation and Distribution Agreement, Transition Services Agreement, Tax Matters Agreement, Employee Matters Agreement, Alcoa Corporation to Arconic Inc. Patent, Know-How, and Trade Secret License Agreement, Arconic Inc. to Alcoa Corporation Patent, Know-How, and Trade Secret License Agreement, Alcoa Corporation to Arconic Inc. Trademark License Agreement, Toll Processing and Services Agreement, Master Agreement for the Supply of Primary Aluminum, Massena Lease and

Operations Agreement, Fusina Lease and Operations Agreement, and Stockholder and Registration Rights Agreement. The Toll Processing and Services Agreement expired by its terms at the end of 2018.

Results of Operations

Earnings Summary

Sales. Sales for 2018 were $14,014 compared with $12,960 in 2017, an increase of $1,054, or 8%. The increase was the result of strong volume growth across all segments, primarily in the aerospace engines and defense, automotive, commercial transportation, industrial, and building and construction end markets; higher aluminum prices and favorable product mix primarily in the Global Rolled Products segment; and favorable foreign currency movements; partially offset by a decline in volumes in the industrial gas turbine end market; lower sales of $190 from the divestitures of the Latin America extrusions business (divested in April 2018), the rolling mill in Fusina, Italy (divested in March 2017), and the ramp down of Arconic's North American packaging operations (completed in December 2018); and costs of $38 in 2018 related to settlements of certain customer claims primarily related to product introductions.

Sales for 2017 were $12,960 compared with $12,394 in 2016, an increase of $566, or 5%. The increase was the result of strong volume growth in all segments and higher aluminum pricing, partially offset by the planned ramp down and Toll Processing Agreement relating to the Company's North America packaging business in Tennessee in the Global Rolled Products segment, as well as unfavorable product pricing in both the Engineered Products and Solutions and Global Rolled Products segments. Pursuant to the Toll Processing Agreement that Arconic entered into with Alcoa Corporation on October 31, 2016 in connection with the Separation Transaction, Arconic provides can body stock to Alcoa Corporation using aluminum supplied by Alcoa Corporation, resulting in the absence of metal sales in 2017 compared to 2016.

Cost of Goods Sold (COGS). COGS as a percentage of Sales was 81.3% in 2018 compared with 78.9% in 2017. The increase was the result of higher aluminum prices; unfavorable aerospace product mix; higher transportation costs; manufacturing inefficiencies in the Engineered Structures business; performance shortfalls in the disks operations; costs related to settlements of certain customer claims noted above; and the impact of a $23 charge related to a physical inventory adjustment at one plant in the Engineered Products and Solutions segment that was recorded in the second quarter of 2018. While a portion of this charge for the physical inventory adjustment related to prior years, the majority related to the first half of 2018. The out-of-period amounts were not material to any interim or annual periods.

COGS as a percentage of Sales was 78.9% in 2017 compared with 78.2% in 2016. The increase was primarily attributable to cost increases, including net higher aluminum prices of $84 and ramp-up costs related to new commercial aerospace engines, and a lower margin product mix, partially offset by net cost savings.

Selling, General Administrative, and Other Expenses (SG&A). SG&A expenses were $604, or 4.3% of Sales, in 2018 compared with $715, or 5.5% of Sales, in 2017. The decrease in SG&A was the result of proxy, advisory and governance-related costs of $58, costs related to the separation of Alcoa Inc. of $18, and costs associated with the Company's Delaware reincorporation of $3 in 2017, none of which recurred in 2018. Additionally, lower expenses driven by lower annual incentive compensation accruals and overhead cost reductions were somewhat offset by an increase in legal and other advisory costs related to Grenfell Tower of $4 as well as strategy and portfolio review costs of $7 in 2018.

SG&A expenses were $715, or 5.5% of Sales, in 2017 compared with $924, or 7.5% of Sales, in 2016. The decrease in SG&A was the result of expenses related to the Separation Transaction of $193 in 2016 compared to $18 in 2017, as well as ongoing overhead cost reduction efforts, partially offset by proxy, advisory and governance-related costs of $58, external legal and other advisory costs related to Grenfell Tower of $14, and costs associated with the Company's Delaware reincorporation of $3 in 2017.

Research and Development Expenses (R&D). R&D expenses were $103 in 2018 compared with $109 in 2017 and $130 in 2016. The decrease in both periods was the result of lower spending.

Provision for Depreciation and Amortization (D&A). The provision for D&A was $576 in 2018 compared with $551 in 2017 and $535 in 2016. The increase in both periods was primarily due to capital projects placed into service.

Impairment of Goodwill. In 2017, the Company recognized an impairment of goodwill of $719 related to the annual impairment review of the Arconic Forgings and Extrusions business (see Goodwill under Critical Accounting Policies and Estimates below).

Restructuring and Other Charges. Restructuring and other charges were $9 in 2018 compared with $165 in 2017. The decrease of $156 was primarily due to the gain on the sale of the Texarkana rolling mill of $154, lower layoff costs, and a postretirement curtailment benefit of $28, partially offset by pension plan settlement charges of $96 associated with significant lump sum payments made to participants, a loss on the sale of the Eger, Hungary forgings business of $43, and pension curtailment charges of $23. In 2017, the Company recorded a loss on the sale of the Fusina, Italy rolling mill of $60 and a charge for the impairment of assets associated with the sale of the Latin America extrusions business of $41. See Note T to the to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Restructuring and other charges were $165 in 2017 compared with $155 in 2016. The increase of $10 was primarily due to a loss of $60 on the sale of the Fusina, Italy rolling mill and a charge of $41 for the impairment of assets associated with the sale of the Latin America extrusions business (divested in 2018) in 2017, partially offset by $57 for costs related to the exit of certain legacy Firth Rixson operations in the U.K. and $37 for exit costs related to the decision in 2016 to permanently shut down a can sheet facility. See Note T to the to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Interest Expense. Interest expense was $378 in 2018 compared with $496 in 2017. The decrease of $118, or 24%, was the result of higher costs incurred in 2017 related to the early redemption of the Company's outstanding debt than were incurred during 2018, as well as lower debt outstanding.

Interest expense was $496 in 2017 compared with $499 in 2016. The decrease of $3, or 1%, was primarily due to lower interest expense resulting from lower outstanding debt, mostly offset by $73 primarily in higher premiums paid in 2017 related to the early redemption of $1,250 in debt. In the second quarter of 2017, Arconic redeemed all of the Company's 6.50% Bonds due 2018 and 6.75% Notes due 2018, and a portion of the Company's 5.72% Notes due 2019 in advance of the respective maturity dates.

Other Expense (Income), Net. Other expense, net was $79 in 2018 compared with Other income, net of $486 in 2017. The decrease in other income, net of $565 was the result of gains recorded during 2017 related to the sale of a portion of Arconic's investment in Alcoa Corporation common stock of $351, the Debt-for-Equity Exchange (in April and May 2017, the Company acquired a portion of its outstanding notes held by two investment banks (the "Investment Banks") in exchange for cash and the Company's remaining 12,958,767 shares (valued at $35.91 per share) in Alcoa Corporation stock and recorded a gain of $167), income of $81 associated with an adjustment to the contingent earn-out liability related to the Firth Rixson acquisition (see Note T to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K), and income of $25 due to the reversal of a liability associated with a separation-related guarantee, none of which recurred in 2018, and unfavorable foreign currency movements, somewhat offset by lower non-service related net periodic benefit cost and the benefit of $29 from establishing a tax indemnification receivable reflecting Alcoa Corporation's 49% share of a Spanish tax reserve (see Note U to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K).

Other income, net was $486 in 2017 compared with Other expense, net of $41 in 2016. The increase in other income, net of $527 was primarily due to the gain on the sale of a portion of Arconic's investment in Alcoa Corporation common stock of $351 (in February 2017, the Company sold 23,353,000 shares of Alcoa Corporation stock at $38.03 per share, which resulted in cash proceeds of $888 and a gain of $351) and the gain of $167 on the Debt-for-Equity Exchange, income of $25 associated with a higher reversal of a contingent earn-out liability related to the Firth Rixson acquisition (see Note T to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K), and income of $25 due to the reversal of a liability associated with a separation-related guarantee. The Company was required to provide a guarantee for an Alcoa Corporation electricity contract in the event of an Alcoa Corporation payment default. In the fourth quarter of 2017, Alcoa Corporation announced that it had terminated the electricity contract at its Rockdale Operations and, as a result, Arconic reversed its associated guarantee liability.

Income Taxes. Arconic's effective tax rate was 26.0% in 2018 compared with the U.S. federal statutory rate of 21%. The effective tax rate differs from the U.S. federal statutory rate primarily as a result of a $60 charge to establish a tax reserve in Spain, a $59 net charge resulting from the Company's finalized analysis of the U.S. Tax Cuts and Jobs Acts of 2017 ("the 2017 Act"), a $13 charge for U.S. state taxes, foreign income taxed in higher rate jurisdictions, and foreign losses with no tax benefit, partially offset by a $74 benefit related to the reversal of a foreign recapture obligation, a $38 benefit to reverse a foreign tax reserve that is effectively settled, and a $10 benefit for the release of U.S. valuation allowances.

Arconic's effective tax rate was 115.7% in 2017 compared with the U.S. federal statutory rate of 35%. The effective tax rate differs from the U.S. federal statutory rate primarily as a result of a $719 impairment of goodwill, a $41 impairment of assets in the Latin America extrusions business, and a $60 charge related to the sale of a rolling mill in Italy that are nondeductible for income tax purposes, a $272 tax charge as a provisional impact of the 2017 Act, and a $23 tax charge for an increase in an uncertain tax position in Germany, partially offset by a $73 tax benefit related to the sale and Debt-for-Equity Exchange of the Alcoa Corporation stock, a $69 tax benefit for the release of U.S. state valuation allowances net of the federal tax benefit, a $27 favorable tax impact associated with a non-taxable earn-out liability adjustment in connection with the Firth Rixson acquisition, and by foreign income taxed in lower rate jurisdictions.

Arconic's effective tax rate was 356.5% in 2016 compared with the U.S. federal statutory rate of 35%. The effective tax rate differs from the U.S. federal statutory rate primarily due to a $1,267 discrete income tax charge for valuation allowances related to the Separation Transaction (see Note H to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K), a $95 tax charge associated with the redemption of company-owned life insurance policies whose tax basis was less than the redemption amount resulting in a taxable gain, a $51 net charge for the remeasurement of certain deferred tax assets and liabilities due to tax rate and tax law changes, and a $34 unfavorable tax impact related to certain separation costs which are nondeductible for income tax purposes, somewhat offset by a $39 discrete income tax benefit for the release of valuation allowances in Canada and Russia, a $38 tax benefit related to currency impacts of a distribution of previously taxed income, and a $26 favorable tax impact associated with non-taxable settlement proceeds and earn-out liability adjustments in connection with the Firth Rixson acquisition.

Management anticipates that the effective tax rate in 2019 will be between 26.5% and 28.5%. However, business portfolio actions, changes in the current economic environment, tax legislation or rate changes, currency fluctuations, ability to realize deferred tax assets, movements in stock price impacting tax benefits or deficiencies on stock-based payment awards, and the results of operations in certain taxing jurisdictions may cause this estimated rate to fluctuate.

Income (Loss) From Continuing Operations After Income Taxes. Income from continuing operations after income taxes was $642 for 2018, or $1.30 per diluted share, compared to a loss from continuing operations after income taxes of $74 for 2017, or $0.28 per share. The increase in results of $716 was due in part to the following items that occurred in 2017 but did not recur in 2018: a charge for goodwill impairment of $719 ($719 pre-tax); gains related to the sale of a portion of Arconic’s investment in Alcoa Corporation common stock and the Debt-for-Equity Exchange of $405 ($518 pre-tax); and favorable adjustments of $97 ($106 pre-tax) to contingent earn-out and guarantee liabilities as noted below. Additional favorable impacts in 2018 included: volume growth across all segments; lower SG&A expenses due to proxy and separation costs incurred in 2017 and not recurring in 2018, as well as lower incentive compensation accruals; lower Restructuring and other charges driven primarily by the gain on sale of the Texarkana rolling mill, offset by pension settlement charges and the loss on sale of the Eger, Hungary forgings business; lower Interest expense due to lower debt levels; lower pension expenses; and lower Income taxes. These favorable impacts were partially offset by unfavorable aerospace product mix, higher aluminum prices, manufacturing inefficiencies in the Engineered Structures business, performance shortfalls in the disks operations, settlements of certain customer claims, and an unfavorable physical inventory adjustment at one plant.

Loss from continuing operations after income taxes was $74 for 2017, or $0.28 per diluted share, compared with $1,062 for 2016, or $2.58 per share. The increase in results of $988 was primarily attributable to charges for tax valuation allowances and costs related to the Separation Transaction in 2016; a gain of $238 ($351 pre-tax) on the sale of a portion of Arconic’s investment in Alcoa Corporation common stock and a gain of $167 ($167 pre-tax) on the Debt-for-Equity Exchange in 2017; income of $25 ($25 pre-tax) associated with a higher reversal of a contingent earn-out liability related to the Firth Rixson acquisition and income of $16 ($25 pre-tax) due to the reversal of a liability associated with a separation-related guarantee; net cost savings; and higher sales volumes across all segments; partially offset by a charge for goodwill impairment of $719 ($719 pre-tax); a charge related to the 2017 Act of $272; $47 ($73 pre-tax) of higher premiums paid for the early redemption of debt in 2017; higher LIFO inventory expense associated with higher aluminum prices; charges for asset impairments of the Fusina, Italy rolling mill of $60 ($60 pre-tax) and Latin America extrusions business of $41 ($41 pre-tax) based on the sale of these businesses; unfavorable product pricing, primarily in aerospace; and lower-margin product mix.

Segment Information

Arconic’s operations consist of three worldwide reportable segments: Engineered Products and Solutions, Global Rolled Products and Transportation and Construction Solutions (see below). In the first quarter of 2018, the Company changed its primary measure of segment performance from Adjusted earnings before interest, tax, depreciation, and amortization (“Adjusted EBITDA”) to Segment operating profit, which more closely aligns segment performance with Operating income as presented in the Statement of Consolidated Operations. Segment performance under Arconic’s management reporting system is evaluated based on a number of factors; however, the primary measure of performance is Segment operating profit. Arconic’s definition of Segment operating profit is Operating income excluding Special items. Special items include Restructuring and other charges and Impairment of goodwill. Segment operating profit also includes certain items that, under the previous segment performance measure, were recorded in Corporate, such as the impact of LIFO inventory accounting, metal price lag, intersegment profit eliminations, and derivative activities. Segment operating profit may not be comparable to similarly titled measures of other companies. Differences between segment totals and consolidated Arconic are in Corporate. Prior period financial information has been recast to conform to current year presentation.

Segment operating profit for all reportable segments totaled $1,581 in 2018, $1,678 in 2017, and $1,622 in 2016. The following information provides Sales and Segment operating profit for each reportable segment, as well as certain shipment data for Global Rolled Products, for each of the three years in the period ended December 31, 2018. See Note C to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Engineered Products and Solutions

	2018	2017	2016
Third-party sales	$ 6,316	$ 5,943	$ 5,728
Segment operating profit	$ 891	$ 964	$ 955

The Engineered Products and Solutions segment produces products that are used primarily in the aerospace (commercial and defense), industrial, commercial transportation, and power generation end markets. Such products include fastening systems (titanium, steel, and nickel superalloys); seamless rolled rings (mostly nickel superalloys); investment castings (nickel superalloys, titanium, and aluminum), including airfoils and forged jet engine components (e.g., jet engine disks), and extruded, machined and formed aircraft parts (titanium and aluminum), all of which are sold directly to customers and through distributors. More than 75% of the third-party sales in this segment are from the aerospace end market. A small part of this segment also produces various forged, extruded, and machined metal products (titanium, aluminum and steel) for the oil and gas, automotive, and land and sea defense end markets. Seasonal decreases in sales are generally experienced in the third quarter of the year due to the European summer slowdown across all end markets. Generally, the sales and costs and expenses of this segment are transacted in the local currency of the respective operations, which are mostly the U.S. dollar, British pound and the euro.

On December 31, 2018, as part of the Company’s ongoing strategy and portfolio review, Arconic completed the sale of its Eger, Hungary forgings business that manufactured high volume steel forgings for drivetrain components in the European heavy-duty truck and automotive market. This business generated third-party sales of $32, $38, and $29 in 2018, 2017, and 2016, respectively, and had 180 employees at the time of the divestiture. See Restructuring and other charges under Results of Operations above.

In April 2016, Arconic completed the sale of the Remmele Medical business (that was part of the RTI International Metals Inc. (RTI) acquisition) that manufactured precision-machined metal products for customers in the minimally invasive surgical device and implantable device markets. Remmele Medical generated third-party sales of $23 from January 1, 2016 through the divestiture date, and, at the time of the divestiture, had approximately 330 employees.

Third-party sales for the Engineered Products and Solutions segment increased $373, or 6%, in 2018 compared with 2017, primarily attributable to higher volumes in the aerospace engines and defense end markets and favorable foreign currency movements, partially offset by a decline in volumes in the industrial gas turbine market and lower aerospace pricing principally in the fasteners business.

Third-party sales for this segment increased $215, or 4%, in 2017 compared with 2016, primarily attributable to volume growth in both aerospace engines and airframes, partially offset by lower product pricing, primarily in the aerospace end market, and the absence of sales of $23 related to the Remmele Medical business, which was sold in April 2016.

Segment operating profit for the Engineered Products and Solutions segment decreased $73, or 8%, in 2018 compared with 2017, primarily attributable to performance shortfalls in the disks operations; manufacturing inefficiencies in the Engineered Structures business, including the now resolved forging press outage at the Cleveland facility that impacted the fourth quarter of 2018 with higher costs of $10; unfavorable aerospace engine mix and new product introductions; a physical inventory adjustment of $23; and lower aerospace pricing principally in the fasteners business; partly offset by the strength in aerospace engine and defense volumes.

Segment operating profit for this segment increased $9, or 1%, in 2017 compared with 2016, primarily on higher volumes and net cost savings, partially offset by product pricing pressures, ramp up costs associated with increasing production volumes of new aerospace engine parts, and a lower margin product mix.

In 2019, demand in the commercial aerospace end market is expected to remain strong, driven by the ramp-up of new aerospace engine platforms. Demand in the defense end market is expected to grow due to the continuing ramp-up of certain aerospace programs, while declines in the industrial gas turbine market are expected to continue, albeit at lower levels than in 2018. Net cost savings and favorable pricing are expected.

Global Rolled Products[1]

	2018	2017	2016
Third-party sales	$ 5,604	$ 5,000	$ 4,865
Intersegment sales	160	148	118
Total sales	$ 5,764	$ 5,148	$ 4,983
Segment operating profit	$ 386	$ 424	$ 421
Third-party aluminum shipments (kmt)	1,249	1,197	1,339

(1) Excludes the Warrick, IN rolling operations and the equity interest in the rolling mill at the joint venture in Saudi Arabia, both of which were previously part of the Global Rolled Products segment but became part of Alcoa Corporation effective November 1, 2016.

The Global Rolled Products segment produces aluminum sheet and plate for a variety of end markets. Sheet and plate is sold directly to customers and through distributors related to the aerospace, automotive, commercial transportation, packaging, building and construction, and industrial products (mainly used in the production of machinery and equipment and consumer durables) end markets. A small portion of this segment also produces aseptic foil for the packaging end market. While the customer base for flat-rolled products is large, a significant amount of sales of sheet and plate is to a relatively small number of customers. Generally, the sales and costs and expenses of this segment are transacted in the local currency of the respective operations, which are mostly the U.S. dollar, Chinese yuan, the euro, the Russian ruble, the Brazilian real, and the British pound.

On April 6, 2018, the U.S. Treasury Department's Office of Foreign Asset Control ("OFAC") announced new sanctions against Russian "oligarchs" and extended those sanctions to companies that are majority-owned or substantively controlled by those oligarchs. These sanctions block U.S. persons - both individuals and companies - from engaging in transactions with listed oligarchs and their companies. These sanctions originally extended to UC Rusal PLC ("Rusal"), which supplies primary aluminum to Arconic in Europe, the United States, and to the Company's Samara plant in Russia. The Company operated under a series of temporary licenses issued by OFAC until January 27, 2019 when OFAC removed Rusal from the list of sanctioned parties. The Company complies with and expects to continue to comply with all other aspects of these sanctions and we do not anticipate any interruption in Samara's ability to operate normally.

In March 2017, Arconic completed the sale of its Fusina, Italy rolling mill. The rolling mill generated third-party sales of $54 and $165 for 2017 and 2016, respectively. At the time of the divestiture, the rolling mill had approximately 312 employees. See Restructuring and other charges under Results of Operations above.

On November 1, 2016, Arconic entered into a Toll Processing Agreement with Alcoa Corporation for the tolling of metal for the Warrick, IN rolling mill which became a part of Alcoa Corporation upon the completion of the Separation Transaction. As part of this arrangement, Arconic provided a toll processing service to Alcoa Corporation to produce can sheet products at its facility in Tennessee through the end date of the contract, December 31, 2018. Alcoa Corporation supplied all required raw materials to Arconic and Arconic processed the raw materials into finished can sheet coils ready for shipment to the end customer. Tolling revenue for 2018, 2017, and the two months ended December 31, 2016 was $144, $190 and $37, respectively.

Third-party sales for the Global Rolled Products segment increased $604, or 12%, in 2018 compared with 2017, primarily attributable to higher aluminum prices; higher volumes in the automotive, commercial transportation, and industrial end markets; and favorable product mix; partially offset by the absence of sales of $54 from the rolling mill in Fusina, Italy (divested in March 2017) and the planned ramp down of Arconic's North American packaging operations (completed in December 2018).

Third-party sales for this segment increased $135, or 3%, in 2017 compared with 2016, primarily attributable to volume growth in the automotive end market and higher aluminum pricing, partially offset by the impact of $362 associated with the ramp-down and Toll Processing Agreement with Alcoa Corporation at the Company's North America packaging business in Tennessee, the absence of sales of $111 from the rolling mill in Fusina, Italy, aerospace customer inventory destocking and reduced build rates, and pricing pressures in the global packaging market.

Segment operating profit for the Global Rolled Products segment decreased $38, or 9%, in 2018 compared with 2017, primarily driven by unfavorable aerospace wide-body production mix, higher aluminum prices, and higher transportation costs and scrap spreads, partially offset by higher automotive, commercial transportation and industrial volumes. The higher aluminum prices negatively impacted segment operating profit margin by $30, or 100 basis points, in 2018 compared with 2017.

Segment operating profit for this segment increased $3, or 1%, in 2017 compared with 2016, primarily driven by net cost savings and increased automotive volumes, partially offset by lower aerospace volume from customer destocking and reduced build rates, continued pricing pressure on global packaging products and higher aluminum prices. The higher aluminum prices negatively impacted segment operating profit margin by $37, or 150 basis points, in 2017 compared with 2016.

In 2019, demand in the North America commercial transportation, brazing, and industrial end markets is expected to grow as a result of the International Trade Commission initiated common alloy trade case. Demand in the automotive end market is expected to continue to grow due to the growing demand for innovative products and aluminum-intensive vehicles. Demand from the commercial airframe end market is expected to be flat as the ramp-up of new programs is offset by lower build rates for aluminum intensive wide-body programs. Net productivity improvements are anticipated to continue.

Transportation and Construction Solutions

	2018	2017	2016
Third-party sales	$ 2,126	$ 2,011	$ 1,802
Segment operating profit	$ 304	$ 290	$ 246

The Transportation and Construction Solutions segment produces products that are used mostly in the commercial transportation and nonresidential building and construction end markets. Such products include integrated aluminum structural systems, architectural extrusions, and forged aluminum commercial vehicle wheels, which are sold both directly to customers and through distributors. A small part of this segment also produces aluminum products for the industrial products end market. Generally, the sales and costs and expenses of this segment are transacted in the local currency of the respective operations, which are primarily the U.S. dollar, the euro, and the Brazilian real.

On July 31, 2018, the Company announced that it had initiated a sale process of its Building and Construction Systems (BCS) business, as part of the Company’s ongoing strategy and portfolio review that commenced in January 2018. BCS generated third-party sales of approximately $1,140, $1,070, and $1,010 for 2018, 2017, and 2016, respectively. The sale process continues to progress. The Company’s decision regarding whether to sell the business will not be finalized until final binding offers are evaluated. Until the Company makes that final decision, the BCS business will remain classified as held and in-use in the Consolidated Financial Statements.

On April 2, 2018, Arconic completed the sale of its Latin America extrusions business as part of its continued drive to streamline its business portfolio, reduce complexity and further focus on its higher-margin products and profitable growth. This business generated sales of $25, $115, and $103 in 2018, 2017, and 2016 respectively, and had 612 employees at the time of the divestiture. See Restructuring and Other Charges under Results of Operations above.

Third-party sales for the Transportation and Construction Solutions segment increased $115, or 6%, in 2018 compared with 2017, primarily driven by higher volumes in the commercial transportation and building and construction end markets, favorable foreign currency movements and higher aluminum prices, partially offset by the absence of sales of $90 resulting from the divestiture of the Latin America extrusions business in April 2018.

Third-party sales for this segment increased $209, or 12%, in 2017 compared with 2016, primarily driven by increased volumes in the commercial transportation and building and construction end markets, higher aluminum pricing, and favorable foreign currency movements, partially offset by lower product pricing.

Segment operating profit for the Transportation and Construction Solutions segment increased $14, or 5%, in 2018 compared with 2017, principally driven by higher volumes in the commercial transportation and building and construction end markets and net cost savings, which more than offset higher aluminum prices. The higher aluminum prices negatively impacted segment operating margin by $57, or 270 basis points, in 2018 compared with 2017.

Segment operating profit for this segment increased $44, or 18%, in 2017 compared with 2016, principally driven by net cost savings and higher volumes, partially offset by lower product pricing in the heavy-duty truck market, unfavorable product mix, and higher aluminum prices. The higher aluminum prices negatively impacted segment operating margin by $8, or 90 basis points, in 2017 compared with 2016.

In 2019, we expect continued growth in the North American and European commercial transportation and building and construction markets and continued demand for innovative products. Net productivity improvements are anticipated to continue.

Reconciliation of Total segment operating profit to Consolidated income from continuing operations before income taxes

	2018	2017	2016
Total segment operating profit	$ 1,581	$ 1,678	$ 1,622
Unallocated amounts:			
Impairment of goodwill	—	(719)	—
Restructuring and other charges	(9)	(165)	(155)
Corporate expense	(247)	(314)	(513)
Consolidated operating income	$ 1,325	$ 480	$ 954
Interest expense	(378)	(496)	(499)
Other (expense) income, net	(79)	486	(41)
Consolidated income from continuing operations before income taxes	$ 868	$ 470	$ 414

See Restructuring and Other Charges, Impairment of Goodwill, Interest Expense, and Other Expense (Income), Net discussions above under Results of Operations for reference.

Corporate expense decreased in 2018 compared with 2017 primarily due to proxy, advisory and governance-related costs of $58 and costs related to the separation of Alcoa Inc. of $18 in 2017, neither of which recurred in 2018. Also, lower expenses driven by lower annual incentive compensation accruals and overhead cost reductions were partially offset by costs incurred in the second quarter of 2018 related to the settlements of certain customer claims primarily related to product introductions of $38, an increase in legal and other advisory costs related to Grenfell Tower of $4, and strategy and portfolio review costs of $7 in 2018.

Corporate expense decreased in 2017 compared with 2016 primarily attributable to costs incurred in 2016 related to the Separation Transaction, partially offset by proxy, advisory and governance-related costs and legal and other advisory costs related to Grenfell Tower incurred in 2017.

Environmental Matters

See the Environmental Matters section of Note U to the Consolidated Financial Statements in Part II, Item 8 of this Form 10-K.

Liquidity and Capital Resources

Arconic maintains a disciplined approach to cash management and strengthening of its balance sheet. Management continued to focus on actions to improve Arconic’s cost structure and liquidity, providing the Company with the ability to operate effectively. Such actions included procurement efficiencies and overhead rationalization to reduce costs, working capital initiatives, and maintaining a sustainable level of capital expenditures.

Cash provided from operations and financing activities is expected to be adequate to cover Arconic’s operational and business needs over the next 12 months. For an analysis of long-term liquidity, see Contractual Obligations and Off-Balance Sheet Arrangements below.

At December 31, 2018, cash and cash equivalents of Arconic were $2,277, of which $541 was held by Arconic's non-U.S. subsidiaries. If the cash held by non-U.S. subsidiaries were to be repatriated to the U.S., the company does not expect there to be additional material income tax consequences.

The Statement of Consolidated Cash Flows has not been restated for discontinued operations, therefore the discussion below concerning Operating Activities, Financing Activities, and Investing Activities for the year ended December 31, 2016 includes the results of both Arconic and Alcoa Corporation up through the completion of the Separation Transaction on November 1, 2016.

Operating Activities

Cash provided from operations in 2018 was $217 compared with cash used for operations of $39 in 2017. The increase of $256 was primarily due to lower working capital of $209 and a favorable change in noncurrent liabilities of $169 due primarily to reversals in 2017 related to the Firth Rixson earn-out liability of $81 and separation-related guarantee liability of $25, partially offset by lower operating results. The components of the change in working capital included favorable changes of $277 in accounts payable, $127 in taxes, including income taxes, and $118 in inventories, partially offset by unfavorable changes of $227 in receivables, $74 in accrued expenses, and $12 in prepaid expenses and other current assets.

Cash used for operations in 2017 was $39 compared with Cash provided from operations $95 in 2016. The decrease of $134 was primarily due to lower operating results and higher pension contributions of $20, partially offset by a favorable change in noncurrent assets of $111 due to the prepayment of $200 made in April 2016 related to a gas supply agreement for the Australia alumina refineries (Alcoa Corporation), a favorable change in noncurrent liabilities of $55, and lower cash used for working capital of $17. The components of the change in working capital included favorable changes of $101 in receivables; $87 in prepaid expenses and other current assets; and $278 in accrued expenses; mostly offset by unfavorable changes in working capital, including $163 in inventories; $170 in accounts payable, trade; and $116 in taxes, including income taxes.

Financing Activities

Cash used for financing activities was $649 in 2018 compared with $1,015 in 2017 and $757 in 2016.

The use of cash in 2018 was principally the result of $1,103 in repayments on borrowings under certain revolving credit facilities (see below) and repayments on debt, primarily related to the early redemption of the remaining outstanding 5.72% Notes due in 2019 (see Note P to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K) and $119 in dividends to shareholders. These items were partially offset by $600 in additions to debt, primarily from borrowings under certain revolving credit facilities.

The use of cash in 2017 was principally the result of $1,634 in repayments on borrowings under certain revolving credit facilities (see below) and repayments on debt, primarily related to the early redemption of the Company's 6.50% Bonds due 2018, 6.75% Notes due 2018, and a portion of the 5.72% Notes due 2019 (see Note P to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K); $162 in dividends to shareholders; and $52 in premiums paid on early redemption of debt. These items were partially offset by $816 in additions to debt, primarily from borrowings under certain revolving credit facilities, and $50 of proceeds from the exercise of stock options.

The use of cash in 2016 was principally the result of $2,734 in payments on debt, mostly related to the repayment of borrowings under certain revolving credit facilitates (see below) and the repayment in December 2016 of $750 of outstanding principal of 5.55% Notes due February 2017; $228 in dividends to shareholders; and $175 in net cash paid to noncontrolling interests (Alcoa Corporation). These items were mostly offset by $1,962 in additions to debt, virtually all of which was the result of borrowing under certain revolving credit facilities, and $421 in net cash transferred from Alcoa Corporation at the completion of the Separation Transaction.

In July 2015, through the acquisition of RTI, Arconic assumed the obligation to repay two tranches of convertible debt; one tranche was due and settled in cash on December 1, 2015 (principal amount of $115) and the other tranche is due on October 15, 2019 (principal amount of $403), unless earlier converted or purchased by Arconic at the holder's option under specific conditions. Upon conversion of the 2019 convertible notes, holders will receive, at Arconic's election, cash, shares of common stock (approximately 14,453,000 shares using the December 31, 2018 conversion rate of 35.9125 shares per $1,000 (not in millions) bond or per-share conversion price of $27.8455), or a combination of cash and shares. On the maturity date, each holder of outstanding notes will be entitled to receive $1,000 (not in millions) in cash for each $1,000 (not in millions) bond, together with accrued and unpaid interest.

In September 2014, Arconic completed two public securities offerings under its shelf registration statement for (i) $1,250 of 25 million depositary shares, each representing a 1/10th interest in a share of Arconic's 5.375% Class B Mandatory Convertible Preferred Stock, Series 1, par value $1 per share, liquidation preference $500 per share, and (ii) $1,250 of 5.125% Notes due 2024. The net proceeds of the offerings were used to finance the cash portion of the acquisition of Firth Rixson. On October 2, 2017, all outstanding 24,975,978 depositary shares were converted at a rate of 1.56996 into 39,211,286 common shares; 24,022 depositary shares were previously tendered for early conversion into 31,420 shares of Arconic common stock. No gain or loss was recognized associated with this noncash equity transaction.

Arconic maintains a Five-Year Revolving Credit Agreement (the "Credit Agreement") with a syndicate of lenders and issuers named therein that expires on June 29, 2023 and provides for a senior unsecured revolving credit facility of $3,000. In addition to the Credit Agreement, Arconic has a number of other credit agreements that provide a combined borrowing capacity of $715 as of December 31, 2018. See Note P to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Arconic's costs of borrowing and ability to access the capital markets are affected not only by market conditions but also by the short- and long-term debt ratings assigned to Arconic by the major credit rating agencies.

On May 1, 2017, Standard and Poor's Ratings Services (S&P) affirmed Arconic's long-term debt at BBB-, an investment grade rating, with a stable outlook, and its short-term debt at A-3. On February 7, 2019, S&P changed the outlook from stable to negative credit watch. On November 1, 2016, Moody's Investor Service (Moody's) downgraded Arconic's long-term debt rating from Ba1, a non-investment grade, to Ba2 and its short-term debt rating from Speculative Grade Liquidity-1 to Speculative Grade Liquidity-2. Additionally, Moody's changed the outlook from negative to stable (ratings and outlook were affirmed on November 2, 2017 and October 8, 2018). On April 21, 2016, Fitch affirmed Arconic's long-term debt rating at BB+, a non-investment grade, and short-term debt at B. Additionally, Fitch changed the outlook from positive to evolving. On July 7, 2016, Fitch changed the outlook from evolving to stable (ratings and outlook were affirmed on July 3, 2017). On September

27, 2018, Fitch changed the outlook from stable to positive (ratings and outlook were affirmed on September 27, 2018).

Investing Activities

Cash provided from investing activities was $565 in 2018 compared with $1,320 in 2017 and $591 in 2016.

The source of cash in 2018 included cash receipts from sold receivables of $1,016 and proceeds from the sale of the Texarkana, Texas rolling mill and cast house of $302, partially offset by capital expenditures of $768, including the horizontal heat treat furnace at the Davenport, Iowa plant and an expansion of a wheels plant in Szekesfehervar, Hungary.

The source of cash in 2017 included proceeds of $888 from the sale of a portion of Arconic's investment in Alcoa Corporation common stock, cash receipts from sold receivables of $792, and the receipt of proceeds from the sale of the Yadkin Hydroelectric Project of $243, somewhat offset by cash used for capital expenditures of $596, including the aerospace expansion (very thick plate stretcher and horizontal heat treat furnace) at the Davenport, Iowa plant and a titanium aluminide furnace at the Niles, Ohio facility, and the injection of $10 into the Fusina rolling business prior to its sale.

The source of cash in 2016 was mainly due to $778 of cash receipts from sold receivables, $692 in proceeds from the sale of assets and businesses, including $457 from the redemption of company-owned life insurance policies, $120 in proceeds related to the sale of the Intalco smelter wharf property (Alcoa Corporation), and $102 in proceeds ($99 net of transaction costs) from the sale of the Remmele Medical business, which was part of Arconic's acquisition of RTI in July 2015; and $280 in sales of investments, composed primarily of $145 for an equity interest in a natural gas pipeline in Australia (Alcoa Corporation) and $130 for securities held by Arconic's captive insurance company. These sources of cash were partially offset by $1,125 in capital expenditures ($298 Alcoa Corporation), 29% of which related to growth projects, including the aerospace expansion (very thick plate stretcher) at the Davenport, Iowa plant and a titanium aluminide furnace at the Niles, Ohio facility.

Noncash Financing and Investing Activities

On October 2, 2017, all outstanding 24,975,978 depositary shares (each depositary share representing a 1/10th interest in a share of the mandatory convertible preferred stock) were converted at a rate of 1.56996 into 39,211,286 common shares; 24,022 depositary shares were previously tendered for early conversion into 31,420 shares of Arconic common stock. No gain or loss was recognized associated with this equity transaction. See Note I to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

In the second quarter of 2017, the Company completed a Debt-for-Equity Exchange with the Investment Banks for the remaining portion of Arconic's retained interest in Alcoa Corporation common stock for a portion of the Company's outstanding notes held by the Investment Banks for $465 including accrued and unpaid interest. See Note P to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

On October 5, 2016, Arconic completed a 1-for-3 reverse stock split of its outstanding and authorized shares of common stock, pursuant to the authorization provided at a special meeting of Arconic common shareholders (the "Reverse Stock Split"). The Reverse Stock Split reduced the number of shares of common stock outstanding from approximately 1.3 billion shares to approximately 0.4 billion shares. The par value of the common stock remained at $1.00 per share. Accordingly, Common stock and Additional capital in the Company's Statement of Changes in Consolidated Equity at December 31, 2016 reflect a decrease and increase of $877, respectively.

In August 2016, Arconic retired its outstanding treasury stock consisting of approximately 76 million shares. As a result, Common stock and Additional capital were decreased by $76 and $2,563, respectively, in the Company's Statement of Changes in Consolidated Equity at December 31, 2016, to reflect the retirement of the treasury shares.

Contractual Obligations and Off-Balance Sheet Arrangements

Contractual Obligations. Arconic is required to make future payments under various contracts, including long-term purchase obligations, financing arrangements, and lease agreements. Arconic also has commitments to fund its pension plans, provide payments for other postretirement benefit plans, and fund capital projects. As of December 31, 2018, a summary of Arconic's outstanding contractual obligations is as follows (these contractual obligations are grouped in the same manner as they are classified in the Statement of Consolidated Cash Flows in order to provide a better understanding of the nature of the obligations and to provide a basis for comparison to historical information):

	Total	2019	2020-2021	2022-2023	Thereafter
Operating activities:					
Energy-related purchase obligations	$ 72	$ 37	$ 28	$ 7	$ —
Raw material purchase obligations	829	652	155	19	3
Other purchase obligations	102	81	13	6	2
Operating leases	379	94	128	70	87
Interest related to total debt	2,326	351	592	370	1,013
Estimated minimum required pension funding	1,860	255	840	765	—
Other postretirement benefit payments	730	90	170	170	300
Layoff and other restructuring payments	25	19	4	1	1
Deferred revenue arrangements	18	12	6	—	—
Uncertain tax positions	187	—	—	—	187
Financing activities:					
Total debt	6,330	421	2,243	623	3,043
Dividends to shareholders	—	—	—	—	—
Investing activities:					
Capital projects	665	532	133	—	—
Totals	$ 13,523	$ 2,544	$ 4,312	$ 2,031	$ 4,636

Obligations for Operating Activities

Energy-related purchase obligations consist primarily of electricity and natural gas contracts with expiration dates ranging from one year to five years. Raw material purchase obligations consist mostly of aluminum, titanium sponge, and various other metals with expiration dates ranging from less than one year to six years. Many of these purchase obligations contain variable pricing components, and, as a result, actual cash payments may differ from the estimates provided in the preceding table. Operating leases represent multi-year obligations for certain land and buildings, plant equipment, vehicles, and computer equipment.

Interest related to total debt is based on interest rates in effect as of December 31, 2018 and is calculated on debt with maturities that extend to 2042.

Estimated minimum required pension funding and postretirement benefit payments are based on actuarial estimates using current assumptions for discount rates, long-term rate of return on plan assets, rate of compensation increases, and health care cost trend rates, among others. It is Arconic's policy to fund amounts for pension plans sufficient to meet the minimum requirements set forth in applicable country benefits laws and tax laws. Periodically, Arconic contributes additional amounts as deemed appropriate. In 2018, the Company funded $298, of which $72 was contributed to its U.S. plans in excess of the minimum required under the Employee Retirement Income Security Act (ERISA). The estimates reported in the preceding table include amounts sufficient to meet the minimum required, along with a $34 contribution in 2019 related to an agreement with the Pension Benefit Guaranty Corporation (PBGC) (see Note G to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K). Arconic has determined that it is not practicable to present pension funding and other postretirement benefit payments beyond 2023 and 2028, respectively.

Layoff and other restructuring payments to be paid within one year primarily relate to severance costs, special layoff benefit payments, and lease termination costs, while payments expected to be paid over the next several years relate to lease termination costs.

Deferred revenue arrangements require Arconic to deliver product to a customer over the specified contract period through 2020 for a sheet and plate contract. While these obligations are not expected to result in cash payments, they represent contractual obligations for which the Company would be obligated if the specified product deliveries could not be made.

Uncertain tax positions taken or expected to be taken on an income tax return may result in additional payments to tax authorities. The amount in the preceding table includes interest and penalties accrued related to such positions as of December 31, 2018. The total amount of uncertain tax positions is included in the "Thereafter" column as the Company is not able to reasonably estimate the timing of potential future payments. If a tax authority agrees with the tax position taken or expected to be taken or the applicable statute of limitations expires, then additional payments will not be necessary.

Obligations for Financing Activities

Arconic has historically paid quarterly dividends on its preferred and common stock. Including dividends on preferred stock, Arconic paid $119 in dividends to shareholders during 2018. Because all dividends are subject to approval by Arconic's Board of Directors, amounts are not included in the preceding table unless such authorization has occurred. As of December 31, 2018, there were 483,270,717 shares of outstanding common stock and 546,024 shares of outstanding Class A preferred stock. In 2018, the annual preferred stock dividend was $3.75 per share and the annual common stock dividend was $0.24 per share.

Obligations for Investing Activities

Capital projects in the preceding table only include amounts approved by management as of December 31, 2018. Funding levels may vary in future years based on anticipated construction schedules of the projects. It is expected that significant expansion projects will be funded through various sources, including cash provided from operations. Total capital expenditures are anticipated to be approximately $700 in 2019.

Off-Balance Sheet Arrangements

At December 31, 2018, Arconic has outstanding bank guarantees related to tax matters, outstanding debt, workers' compensation, environmental obligations, energy contracts, and customs duties, among others. The total amount committed under these guarantees, which expire at various dates between 2019 and 2026 was $37 at December 31, 2018.

Pursuant to the Separation and Distribution Agreement between Arconic and Alcoa Corporation, Arconic was required to provide certain guarantees for Alcoa Corporation, which had a combined fair value of $6 and $8 at December 31, 2018 and 2017, respectively, and were included in Other noncurrent liabilities and deferred credits on the accompanying Consolidated Balance Sheet. Arconic was required to provide payment guarantees for Alcoa Corporation issued on behalf of a third party related to project financing for Alcoa Corporation's aluminum complex in Saudi Arabia. During the third quarter of 2018, Arconic was released from this guarantee. Furthermore, Arconic was required to provide guarantees related to two long-term supply agreements for energy for Alcoa Corporation facilities in the event of an Alcoa Corporation payment default. In October 2017, Alcoa Corporation announced that it had terminated one of the two agreements, the electricity contract with Luminant Generation Company LLC that was tied to its Rockdale Operations, effective as of October 1, 2017. As a result of the termination of the Rockdale electricity contract, Arconic recorded income of $25 in the fourth quarter of 2017 associated with reversing the fair value of the electricity contract guarantee. For the remaining long-term supply agreement, Arconic is required to provide a guarantee up to an estimated present value amount of approximately $1,087 and $1,297 at December 31, 2018 and December 31, 2017, respectively, in the event of an Alcoa Corporation payment default. This guarantee expires in 2047. For this guarantee, subject to its provisions, Arconic is secondarily liable in the event of a payment default by Alcoa Corporation. Arconic currently views the risk of an Alcoa Corporation payment default on its obligations under the contract to be remote.

In December 2016, Arconic entered into a one-year claims purchase agreement with a bank covering claims up to $245 related to the Saudi Arabian joint venture and two long-term energy supply agreements. The majority of the premium was paid by Alcoa Corporation. The agreement matured in December 2017 and was not renewed in 2018 due to the decline in exposure to guarantee claims including a substantial reduction in the guarantees related to the Saudi Arabian joint venture and also the elimination of the guarantee related to the Rockdale energy contract. In December 2018, Arconic entered into a one-year insurance policy with a limit of $80 relating to the remaining long-term energy supply agreement. The premium is expected to be paid by Alcoa Corporation. The decision to enter into a claims purchase agreement or insurance policy will be made on an annual basis going forward.

Arconic has outstanding letters of credit primarily related to workers' compensation, environmental obligations, and leasing obligations. The total amount committed under these letters of credit, which automatically renew or expire at various dates, mostly in 2019, was $136 at December 31, 2018.

Pursuant to the Separation and Distribution Agreement, Arconic was required to retain letters of credit of $54 that had previously been provided related to both Arconic and Alcoa Corporation workers' compensation claims which occurred prior to November 1, 2016. Alcoa Corporation workers' compensation claims and letter of credit fees paid by Arconic are being proportionally billed to and are being fully reimbursed by Alcoa Corporation.

Arconic has outstanding surety bonds primarily related to tax matters, contract performance, workers' compensation, environmental-related matters, and customs duties. The total amount committed under these surety bonds, which expire at various dates, primarily in 2019, was $50 at December 31, 2018.

Pursuant to the Separation and Distribution Agreement, Arconic was required to provide surety bonds related to Alcoa Corporation workers' compensation claims which occurred prior to November 1, 2016 and, as a result, Arconic has $25 in outstanding surety bonds relating to these liabilities. Alcoa Corporation workers' compensation claims and surety bond fees paid by Arconic are being proportionally billed to and are being fully reimbursed by Alcoa Corporation.

Critical Accounting Policies and Estimates

The preparation of the Consolidated Financial Statements in accordance with accounting principles generally accepted in the United States of America requires management to make certain judgments, estimates, and assumptions regarding uncertainties that affect the amounts reported in the Consolidated Financial Statements and disclosed in the accompanying Notes. Areas that require significant judgments, estimates, and assumptions include accounting for environmental and litigation matters; the testing of goodwill, other intangible assets, and properties, plants, and equipment for impairment; estimating fair value of businesses acquired or divested; pension plans and other postretirement benefits obligations; stock-based compensation; and income taxes.

Management uses historical experience and all available information to make these judgments, estimates, and assumptions, and actual results may differ from those used to prepare the Company's Consolidated Financial Statements at any given time. Despite these inherent limitations, management believes that Management's Discussion and Analysis of Financial Condition and Results of Operations and the Consolidated Financial Statements and accompanying Notes provide a meaningful and fair perspective of the Company.

A summary of the Company's significant accounting policies is included in Note A to the Consolidated Financial Statements. Management believes that the application of these policies on a consistent basis enables the Company to provide the users of the Consolidated Financial Statements with useful and reliable information about the Company's operating results and financial condition.

Environmental Matters. Expenditures for current operations are expensed or capitalized, as appropriate. Expenditures relating to existing conditions caused by past operations, which will not contribute to future revenues, are expensed. Liabilities are recorded when remediation costs are probable and can be reasonably estimated. The liability may include costs such as site investigations, consultant fees, feasibility studies, outside contractors, and monitoring expenses. Estimates are generally not discounted or reduced by potential claims for recovery. Claims for recovery are recognized when probable and as agreements are reached with third parties. The estimates also include costs related to other potentially responsible parties to the extent that Arconic has reason to believe such parties will not fully pay their proportionate share. The liability is continuously reviewed and adjusted to reflect current remediation progress, prospective estimates of required activity, and other factors that may be relevant, including changes in technology or regulations.

Litigation Matters. For asserted claims and assessments, liabilities are recorded when an unfavorable outcome of a matter is deemed to be probable and the loss is reasonably estimable. Management determines the likelihood of an unfavorable outcome based on many factors such as the nature of the matter, available defenses and case strategy, progress of the matter, views and opinions of legal counsel and other advisors, applicability and success of appeals processes, and the outcome of similar historical matters, among others. Once an unfavorable outcome is deemed probable, management weighs the probability of estimated losses, and the most reasonable loss estimate is recorded. If an unfavorable outcome of a matter is deemed to be reasonably possible, then the matter is disclosed and no liability is recorded. With respect to unasserted claims or assessments, management must first determine that the probability that an assertion will be made is likely, then, a determination as to the likelihood of an unfavorable outcome and the ability to reasonably estimate the potential loss is made. Legal matters are reviewed on a continuous basis to determine if there has been a change in management's judgment regarding the likelihood of an unfavorable outcome or the estimate of a potential loss.

Goodwill. Goodwill is not amortized; instead, it is reviewed for impairment annually (in the fourth quarter) or more frequently if indicators of impairment exist or if a decision is made to sell or realign a business. 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, adverse changes in the markets in which an entity operates, increases in input costs that have a negative effect on earnings and cash flows, or a trend of negative or declining cash flows over multiple periods, among others. The fair value that could be realized in an actual transaction may differ from that used to evaluate the impairment of goodwill.

Goodwill is allocated among and evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment. Arconic had six reporting units for 2018, of which three were included in the Engineered Products and Solutions segment (Arconic Fastening Systems, Arconic Engines, Arconic Engineered Structures), two were included in the Transportation and Construction Solutions segment (Arconic Wheel and Transportation Products and Building and Construction Systems), and the remaining reporting unit was the Global Rolled Products segment.

In reviewing goodwill for impairment, an entity has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not (greater than 50%) that the estimated fair value of a reporting unit is less than its carrying amount. If an entity elects to perform a qualitative assessment and determines that an impairment is more likely than not, the entity is then required to perform the quantitative impairment test (described below), otherwise no further analysis is required. An entity also may elect not to perform the qualitative assessment and, instead, proceed directly to the quantitative impairment test. The ultimate outcome of the goodwill impairment review for a reporting unit should be the same whether an entity chooses to perform the qualitative assessment or proceeds directly to the quantitative impairment test.

Arconic determines annually, based on facts and circumstances, which of its reporting units will be subject to the qualitative assessment. For those reporting units where a qualitative assessment is either not performed or for which the conclusion is that an impairment is more likely than not, a quantitative impairment test will be performed. Arconic's policy is that a quantitative impairment test be performed for each reporting unit at least once during every three-year period.

During the 2018 annual review of goodwill, management proceeded directly to the quantitative impairment test for all six of its reporting units. The estimated fair values for each of the six reporting units exceeded their respective carrying values by more than 25%, thus, there was no goodwill impairment. Under the quantitative impairment test, the evaluation of impairment involves comparing the current fair value of each reporting unit to its carrying value, including goodwill. Arconic uses a discounted cash flow model (DCF) to estimate the current fair value of its reporting units when testing for impairment, as management believes forecasted cash flows are the best indicator of such fair value. A number of significant assumptions and estimates are involved in the application of the DCF model to forecast operating cash flows, including sales growth (volumes and pricing), production costs, capital spending, and discount rate. Most of these assumptions vary significantly among the reporting units. Cash flow forecasts are generally based on approved business unit operating plans for the early years and historical relationships in later years. The WACC rate for the individual reporting units is estimated with the assistance of valuation experts. Arconic would recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value without exceeding the total amount of goodwill allocated to that reporting unit.

Goodwill impairment tests in 2017 and 2016 indicated that goodwill was not impaired for any of the Company's reporting units, except for the Arconic Forgings and Extrusions (AFE) business whose estimated fair value was lower than its carrying value. As such, Arconic recorded an impairment for the full amount of goodwill in the AFE reporting unit of $719. The decrease in the AFE fair value was primarily due to unfavorable performance that was impacting operating margins and a higher discount rate due to an increase in the risk-free rate of return, while the carrying value increased compared to prior year.

Properties, Plants, and Equipment and Other Intangible Assets. Properties, plants, and equipment and Other intangible assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets (asset group) may not be recoverable. Recoverability of assets is determined by comparing the estimated undiscounted net cash flows of the operations related to the assets (asset group) to their carrying amount. An impairment loss would be recognized when the carrying amount of the assets (asset group) exceeds the estimated undiscounted net cash flows. The amount of the impairment loss to be recorded is calculated as the excess of the carrying value of the assets (asset group) over their fair value, with fair value determined using the best information available, which generally is a DCF model. The determination of what constitutes an asset group, the associated estimated undiscounted net cash flows, and the estimated useful lives of assets also require significant judgments.

In the second quarter of 2018, the Company updated its three-year strategic plan and determined that there was a decline in the forecasted financial performance for the disks operations, an asset group within the AEN business unit. As such, the Company evaluated the recoverability of the long-lived assets by comparing their carrying value of approximately $515 to the estimated undiscounted net cash flows of the disks operations, resulting in an estimated fair value in excess of their carrying value of approximately 13%; thus, there was no impairment. If the disks operations do not achieve the revised forecasted financial performance or if there are changes in any significant assumptions, a material non-cash impairment of long-lived assets may occur in future periods. These significant assumptions include sales growth, cost of raw materials, ramp up of additional production capacity, and working capital. A 1% decrease in the forecasted net cash flows would reduce the undiscounted cash flows by approximately $6. There were no indicators of impairment identified for the disks operations during the third or fourth quarters of 2018 and, as such, the Company did not evaluate the recoverability of its long-lived assets.

Discontinued Operations and Assets Held for Sale. The fair values of all businesses to be divested are estimated using accepted valuation techniques such as a DCF model, valuations performed by third parties, earnings multiples, or indicative bids, when available. A number of significant estimates and assumptions are involved in the application of these techniques, including the forecasting of markets and market share, sales volumes and prices, costs and expenses, and multiple other factors. Management considers historical experience and all available information at the time the estimates are made; however, the fair value that is ultimately realized upon the divestiture of a business may differ from the estimated fair value reflected in the Consolidated Financial Statements.

Pension and Other Postretirement Benefits. Liabilities and expenses for pension and other postretirement benefits are determined using actuarial methodologies and incorporate significant assumptions, including the interest rate used to discount the future estimated liability, the expected long-term rate of return on plan assets, and several assumptions relating to the employee workforce (salary increases, health care cost trend rates, retirement age, and mortality).

The interest rate used to discount future estimated liabilities is determined using a Company-specific yield curve model (above-median) developed with the assistance of an external actuary. The cash flows of the plans' projected benefit obligations are discounted using a single equivalent rate derived from yields on high quality corporate bonds, which represent a broad diversification of issuers in various sectors, including finance and banking, industrials, transportation, and utilities, among others. The yield curve model parallels the plans' projected cash flows, which have an average duration of 10 years. The underlying cash flows of the bonds included in the model exceed the cash flows needed to satisfy the Company's plans' obligations multiple times. In 2018, 2017, and 2016, the discount rate used to determine benefit obligations for U.S. pension and other postretirement benefit plans was 4.35%, 3.75%, and 4.20%, respectively. The impact on the liabilities of a change in the discount rate of 1/4 of 1% would be approximately $170 and either a charge or credit of approximately $2 to after-tax earnings in the following year.

In conjunction with the annual measurement of the funded status of Arconic's pension and other postretirement benefit plans at December 31, 2015, management elected to change the manner in which the interest cost component of net periodic benefit cost will be determined in 2016 and beyond. Previously, the interest cost component was determined by multiplying the single equivalent rate described above and the aggregate discounted cash flows of the plans' projected benefit obligations. Under the new methodology, the interest cost component will be determined by aggregating the product of the discounted cash flows of the plans' projected benefit obligations for each year and an individual spot rate (referred to as the "spot rate" approach). This change resulted in a lower interest cost component of net periodic benefit cost under the new methodology compared to the previous methodology in 2018, 2017, and 2016 of $24, $34, and $84, respectively, for pension plans and $4, $6, and $14, respectively, for other postretirement benefit plans. Management believes this new methodology, which represents a change in an accounting estimate, is a better measure of the interest cost as each year's cash flows are specifically linked to the interest rates of bond payments in the same respective year.

The expected long-term rate of return on plan assets is generally applied to a five-year market-related value of plan assets (a fair value at the plan measurement date is used for certain non-U.S. plans). The process used by management to develop this assumption is one that relies on a combination of historical asset return information and forward-looking returns by asset class. As it relates to historical asset return information, management focuses on various historical moving averages when developing this assumption. While consideration is given to recent performance and historical returns, the assumption represents a long-term, prospective return. Management also incorporates expected future returns on current and planned asset allocations using information from various external investment managers and consultants, as well as management's own judgment.

For 2018, 2017, and 2016, management used 7.00%, 7.75%, and 7.75%, respectively, as its expected long-term rate of return, which was based on the prevailing and planned strategic asset allocations, as well as estimates of future returns by asset class. These rates fell within the respective range of the 20-year moving average of actual performance and the expected future return developed by asset class. For 2019, management anticipates that 7.00% will be the expected long-term rate of return. The decrease of 75 basis points in the 2018 expected long-term rate of return was due to a decrease in the expected return by asset class and the 20-year moving average. A change in the assumption for the expected long-term rate of return on plan assets of 1/4 of 1% would impact after-tax earnings by approximately $10 for 2019.

In 2018, a net loss of $114 (after-tax) was recorded in other comprehensive loss, primarily due to the impact of the adoption of new accounting guidance that permits a reclassification to Accumulated deficit for stranded tax effects resulting from the Tax Cuts and Jobs Act of 2017, as well as the plan asset performance that was less than expected, which were partially offset by the increase in the discount rate of 60 basis points and the amortization of actuarial losses. In 2017, a net loss of $220 (after-tax) was recorded in other comprehensive loss, primarily due to the decrease in the discount rate of 45 basis points and plan asset performance less than expected, which were partially offset by the amortization of actuarial losses. In 2016, a net benefit of $1,601 (after-tax and noncontrolling interest) was recorded in other comprehensive loss, primarily due to the transfer of $2,080 to Alcoa Corporation which was partially offset by a net charge of $479. The charge was due to the unfavorable performance of the plan assets and a 9 basis point decrease in the discount rate, which were partially offset by the amortization of actuarial losses.

Stock-Based Compensation. Arconic recognizes compensation expense for employee equity grants using the non-substantive vesting period approach, in which the expense is recognized ratably over the requisite service period based on the grant date fair value. Forfeitures are accounted for as they occur. The fair value of new stock options is estimated on the date of grant using a lattice-pricing model. The fair value of performance awards containing a market condition is valued using a Monte Carlo valuation model. Determining the fair value at the grant date requires judgment, including estimates for the average risk-free interest rate, dividend yield, volatility, and exercise behavior. These assumptions may differ significantly between grant dates because of changes in the actual results of these inputs that occur over time.

Compensation expense recorded in 2018, 2017, and 2016 was $50 ($39 after-tax), $54 ($36 after-tax), and $76 ($51 after-tax), respectively.

Income Taxes. The provision for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, the provision for income taxes represents income taxes paid or payable (or received or receivable) for the current year plus the change in deferred taxes during the year. Deferred taxes represent the future tax consequences expected to occur when the reported amounts of assets and liabilities are recovered or paid, and result from differences between the financial and tax bases of Arconic's assets and liabilities and are adjusted for changes in tax rates and tax laws when enacted.

The 2017 Act created a new requirement that certain income earned by foreign subsidiaries, Global Intangible Low Taxed Income (GILTI), must be included in the gross income of the U.S. shareholder. The 2017 Act also established the Base Erosion and Anti-Abuse Tax (BEAT). Until regulations are finalized, judgement will be required to apply preliminary guidance, including proposed regulations, to Arconic's facts and circumstances.

Valuation allowances are recorded to reduce deferred tax assets when it is more likely than not that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management considers all potential sources of taxable income, including income available in carryback periods, future reversals of taxable temporary differences, projections of taxable income, and income from tax planning strategies, as well as all available positive and negative evidence. Positive evidence includes factors such as a history of profitable operations, projections of future profitability within the carryforward period, including from tax planning strategies, and Arconic's experience with similar operations. Existing favorable contracts and the ability to sell products into established markets are additional positive evidence. Negative evidence includes items such as cumulative losses, projections of future losses, or carryforward periods that are not long enough to allow for the utilization of a deferred tax asset based on existing projections of income. Deferred tax assets for which no valuation allowance is recorded may not be realized upon changes in facts and circumstances, resulting in a future charge to establish a valuation allowance. Existing valuation allowances are re-examined under the same standards of positive and negative evidence. If it is determined that it is more likely than not that a deferred tax asset will be realized, the appropriate amount of the valuation allowance, if any, is released. Deferred tax assets and liabilities are also re-measured to reflect changes in underlying tax rates due to law changes and the granting and lapse of tax holidays.

In 2018, Arconic made a final accounting policy election to apply a tax law ordering approach when considering the need for a valuation allowance on net operating losses expected to offset GILTI income inclusions. Under this approach, reductions in cash tax savings are not considered as part of the valuation allowance assessment. Instead, future GILTI inclusions are considered a source of taxable income that supports the realizability of deferred tax assets.

Tax benefits related to uncertain tax positions taken or expected to be taken on a tax return are recorded when such benefits meet a more likely than not threshold. Otherwise, these tax benefits are recorded when a tax position has been effectively settled, which means that the statute of limitations has expired or the appropriate taxing authority has completed their examination even though the statute of limitations remains open. Interest and penalties related to uncertain tax positions are recognized as part of the provision for income taxes and are accrued beginning in the period that such interest and penalties would be applicable under relevant tax law until such time that the related tax benefits are recognized.

Recently Adopted Accounting Guidance. See the Recently Adopted Accounting Guidance section of Note A to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Recently Issued Accounting Guidance. See the Recently Issued Accounting Guidance section of Note A to the Consolidated Financial Statements in Part II, Item 8. (Financial Statements and Supplementary Data) of this Form 10-K.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

Not material.

Item 8. Financial Statements and Supplementary Data.

Management's Reports to Arconic Shareholders

Management's Report on Financial Statements and Practices

The accompanying Consolidated Financial Statements of Arconic Inc. and its subsidiaries (the "Company") were prepared by management, which is responsible for their integrity and objectivity. The statements were prepared in accordance with accounting principles generally accepted in the United States of America and include amounts that are based on management's best judgments and estimates. The other financial information included in the annual report is consistent with that in the financial statements.

Management also recognizes its responsibility for conducting the Company's affairs according to the highest standards of personal and corporate conduct. This responsibility is characterized and reflected in key policy statements issued from time to time regarding, among other things, conduct of its business activities within the laws of the host countries in which the Company operates and potentially conflicting outside business interests of its employees. The Company maintains a systematic program to assess compliance with these policies.

Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting for the Company. In order to evaluate the effectiveness of internal control over financial reporting, as required by Section 404 of the Sarbanes-Oxley Act, management has conducted an assessment, including testing, using the criteria in *Internal Control—Integrated Framework (2013),* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Company's system of internal control over financial reporting is 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. The Company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with accounting principles generally accepted in the United States of America, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the Company's assets that could have a material effect on the financial statements.

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

Based on the assessment, management has concluded that the Company maintained effective internal control over financial reporting as of December 31, 2018, based on criteria in *Internal Control—Integrated Framework (2013)* issued by the COSO.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which is included herein.

/s/ John C. Plant

John C. Plant
Chairman and Chief Executive Officer

/s/ Ken Giacobbe

Ken Giacobbe
Executive Vice President and
Chief Financial Officer

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of Arconic Inc.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Arconic Inc. and its subsidiaries (the "Company") as of December 31, 2018 and 2017, and the related consolidated statements of operations, comprehensive (loss) income, changes in equity, and cash flows for each of the three years in the period ended December 31, 2018, including the related notes (collectively referred to as the “consolidated financial statements”). We also have audited the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 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 accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by the COSO.

Basis for Opinions

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

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

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

Definition and Limitations of Internal Control over Financial Reporting

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

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

/s/ PricewaterhouseCoopers LLP
Pittsburgh, Pennsylvania
February 21, 2019

We have served as the Company’s auditor since 1950.

Arconic and subsidiaries
Statement of Consolidated Operations
(in millions, except per-share amounts)

For the year ended December 31,	**2018**	**2017**	**2016**
Sales (B and C)	$ 14,014	$ 12,960	$ 12,394
Cost of goods sold (exclusive of expenses below)	11,397	10,221	9,696
Selling, general administrative, and other expenses	604	715	924
Research and development expenses	103	109	130
Provision for depreciation and amortization	576	551	535
Impairment of goodwill (A and O)	—	719	—
Restructuring and other charges (D)	9	165	155
Operating income	1,325	480	954
Interest expense (E)	378	496	499
Other expense (income), net (F)	79	(486)	41
Income from continuing operations before income taxes	868	470	414
Provision for income taxes (H)	226	544	1,476
Income (loss) from continuing operations after income taxes	642	(74)	(1,062)
Income from discontinued operations after income taxes (V)	—	—	184
Net income (loss)	642	(74)	(878)
Less: Net income from discontinued operations attributable to noncontrolling interests (V)	—	—	63
Net income (loss) Attributable to Arconic	$ 642	$ (74)	$ (941)
Amounts Attributable to Arconic Common Shareholders (J):			
Net income (loss)	$ 651	$ (127)	$ (1,010)
Earnings (loss) per share—basic:			
Continuing operations	$ 1.33	$ (0.28)	$ (2.58)
Discontinued operations	—	—	0.27
Net earnings (loss) per share-basic	$ 1.33	$ (0.28)	$ (2.31)
Earnings (loss) per share—diluted			
Continuing operations	$ 1.30	$ (0.28)	$ (2.58)
Discontinued operations	—	—	0.27
Net earnings (loss) per share-diluted	$ 1.30	$ (0.28)	$ (2.31)

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

Arconic and subsidiaries
Statement of Consolidated Comprehensive Income (Loss)
(in millions)

	Arconic			Noncontrolling Interests			Total		
For the year ended December 31,	**2018**	**2017**	**2016**	**2018**	**2017**	**2016**	**2018**	**2017**	**2016**
Net income (loss)	$ 642	$ (74)	$ (941)	$ —	$ —	$ 63	$ 642	$ (74)	$ (878)
Other comprehensive income (loss), net of tax (K):									
Change in unrecognized net actuarial loss and prior service cost/benefit related to pension and other postretirement benefits	255	(220)	(479)	—	—	(3)	255	(220)	(482)
Foreign currency translation adjustments	(146)	252	268	—	2	182	(146)	254	450
Net change in unrealized gains on available-for-sale securities	(1)	(134)	137	—	—	—	(1)	(134)	137
Net change in unrecognized gains/losses on cash flow hedges	(23)	26	(617)	—	—	5	(23)	26	(612)
Total Other comprehensive income (loss), net of tax	85	(76)	(691)	—	2	184	85	(74)	(507)
Comprehensive income (loss)	$ 727	$ (150)	$ (1,632)	$ —	$ 2	$ 247	$ 727	$ (148)	$ (1,385)

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

Arconic and subsidiaries
Consolidated Balance Sheet
(in millions)

December 31,	**2018**	**2017**
Assets		
Current assets:		
Cash and cash equivalents	2,277	$ 2,150
Receivables from customers, less allowances of $4 in 2018 and $8 in 2017 (L)	1,047	1,035
Other receivables (L)	451	339
Inventories (M)	2,492	2,480
Prepaid expenses and other current assets	314	374
Total current assets	6,581	6,378
Properties, plants, and equipment, net (N)	5,704	5,594
Goodwill (A and O)	4,500	4,535
Deferred income taxes (H)	573	743
Intangibles, net (O)	919	987
Other noncurrent assets	416	481
Total assets	$ 18,693	$ 18,718
Liabilities		
Current liabilities:		
Accounts payable, trade	2,129	$ 1,839
Accrued compensation and retirement costs	370	399
Taxes, including income taxes	118	75
Accrued interest payable	113	124
Other current liabilities	356	349
Short-term debt (P and R)	434	38
Total current liabilities	3,520	2,824
Long-term debt, less amount due within one year (P and R)	5,896	6,806
Accrued pension benefits (G)	2,230	2,564
Accrued other postretirement benefits (G)	723	841
Other noncurrent liabilities and deferred credits (Q)	739	759
Total liabilities	13,108	13,794
Contingencies and commitments (U)		
Equity		
Arconic shareholders’ equity:		
Preferred stock (I)	55	55
Common stock (I)	483	481
Additional capital	8,319	8,266
Accumulated deficit (A)	(358)	(1,248)
Accumulated other comprehensive loss (A and K)	(2,926)	(2,644)
Total Arconic shareholders’ equity	5,573	4,910
Noncontrolling interests	12	14
Total equity	5,585	4,924
Total liabilities and equity	$ 18,693	$ 18,718

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

Arconic and subsidiaries
Statement of Consolidated Cash Flows
(in millions)

For the year ended December 31,	2018	2017	2016
Operating activities			
Net income (loss)	$ 642	$ (74)	$ (878)
Adjustments to reconcile net income (loss) to cash provided from (used for) operations:			
Depreciation and amortization	576	551	1,132
Deferred income taxes	31	434	1,125
Equity income, net of dividends	—	—	42
Impairment of goodwill (A and O)	—	719	—
Restructuring and other charges	9	165	257
Net loss (gain) from investing activities - asset sales	10	(513)	(156)
Net periodic pension benefit cost (G)	130	217	304
Stock-based compensation	50	67	86
Other	75	112	63
Changes in assets and liabilities, excluding effects of acquisitions, divestitures, and foreign currency translation adjustments:			
(Increase) in receivables (A)	(1,142)	(915)	(1,016)
(Increase) in inventories	(74)	(192)	(29)
(Increase) decrease in prepaid expenses and other current assets	(1)	11	(76)
Increase in accounts payable, trade	339	62	232
(Decrease) in accrued expenses	(190)	(116)	(394)
Increase (decrease) in taxes, including income taxes	104	(23)	93
Pension contributions	(298)	(310)	(290)
(Increase) in noncurrent assets	(20)	(41)	(152)
(Decrease) in noncurrent liabilities	(24)	(193)	(248)
Cash provided from (used for) operations	217	(39)	95
Financing Activities			
Net change in short-term borrowings (original maturities of three months or less)	(7)	(2)	(3)
Additions to debt (original maturities greater than three months) (P)	600	816	1,962
Payments on debt (original maturities greater than three months) (P)	(1,103)	(1,634)	(2,734)
Premiums paid on early redemption of debt (A and P)	(17)	(52)	(3)
Proceeds from exercise of employee stock options	16	50	4
Dividends paid to shareholders	(119)	(162)	(228)
Distributions to noncontrolling interests	—	(14)	(226)
Contributions from noncontrolling interests	—	—	51
Net cash transferred from Alcoa Corporation at separation	—	—	421
Other	(19)	(17)	(1)
Cash used for financing activities	(649)	(1,015)	(757)
Investing Activities			
Capital expenditures	(768)	(596)	(1,125)
Acquisitions, net of cash acquired (S)	—	—	10
Proceeds from the sale of assets and businesses (S)	309	(9)	692
Sales of investments (S and V)	9	890	280
Cash receipts from sold receivables (A and L)	1,016	792	778
Other (V)	(1)	243	(44)
Cash provided from investing activities	565	1,320	591
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(4)	9	(8)
Net change in cash, cash equivalents and restricted cash (A)	129	275	(79)
Cash, cash equivalents and restricted cash at beginning of year (A)	2,153	1,878	1,957
Cash, cash equivalents and restricted cash at end of year (A)	$ 2,282	$ 2,153	$ 1,878

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

Arconic and subsidiaries
Statement of Changes in Consolidated Equity
(in millions, except per-share amounts)

	Arconic Shareholders								
	Preferred stock	**Mandatory convertible preferred stock**	**Common stock**	**Additional capital**	**Retained earnings (deficit)**	**Treasury stock**	**Accumulated Other Comprehensive Loss**	**Noncontrolling interests**	**Total equity**
Balance at December 31, 2015	$ 55	$ 3	$ 1,391	$ 10,019	$ 8,834	$ (2,825)	$ (5,431)	$ 2,085	$ 14,131
Net (loss) income	—	—	—	—	(941)	—	—	63	(878)
Other comprehensive (loss) income (K)	—	—	—	—	—	—	(691)	184	(507)
Cash dividends declared:									
Preferred–Class A @ $3.75 per share	—	—	—	—	(2)	—	—	—	(2)
Preferred–Class B @ $26.8750 per share	—	—	—	—	(67)	—	—	—	(67)
Common @ $0.36 per share	—	—	—	—	(159)	—	—	—	(159)
Stock-based compensation (I)	—	—	—	86	—	—	—	—	86
Common stock issued: compensation plans (I)	—	—	—	(205)	—	186	—	—	(19)
Retirement of Treasury stock (I)			(76)	(2,563)		2,639			—
Reverse stock split (I)			(877)	877					—
Distribution of Alcoa Corporation					(8,692)		3,554	(2,133)	(7,271)
Distributions	—	—	—	—	—	—	—	(226)	(226)
Contributions	—	—	—	—	—	—	—	51	51
Other	—	—	—	—	—	—	—	2	2
Balance at December 31, 2016	$ 55	$ 3	$ 438	$ 8,214	$ (1,027)	$ —	$ (2,568)	$ 26	$ 5,141
Net loss	—	—	—	—	(74)	—	—	—	(74)
Other comprehensive loss (K)	—	—	—	—	—	—	(76)	2	(74)
Cash dividends declared:									
Preferred–Class A @ $3.75 per share	—	—	—	—	(2)	—	—	—	(2)
Preferred–Class B @ $20.1563 per share	—	—	—	—	(51)	—	—	—	(51)
Common @ $0.24 per share	—	—	—	—	(109)	—	—	—	(109)
Stock-based compensation (I)	—	—	—	67	—	—	—	—	67
Common stock issued: compensation plans (I)	—	—	—	21	—	—	—	—	21
Conversion of mandatory convertible preferred stock (I)	—	(3)	39	(36)	—	—	—	—	—
Issuance of common stock (I)	—	—	4	—	—	—	—	—	4
Distributions	—	—	—	—	—	—	—	(14)	(14)
Other	—	—	—	—	15	—	—	—	15
Balance at December 31, 2017	$ 55	$ —	$ 481	$ 8,266	$ (1,248)	$ —	$ (2,644)	$ 14	$ 4,924
Adoption of accounting standard (A)	—	—	—	—	367	—	(367)	—	—
Net income	—	—	—	—	642	—	—	—	642
Other comprehensive income (K)	—	—	—	—	—	—	85	—	85
Cash dividends declared:									
Preferred–Class A @ $3.75 per share	—	—	—	—	(2)	—	—	—	(2)
Common @ $0.24 per share	—	—	—	—	(117)	—	—	—	(117)
Stock-based compensation (I)	—	—	—	50	—	—	—	—	50
Common stock issued: compensation plans (I)	—	—	2	3	—	—	—	—	5
Other	—	—	—	—	—	—	—	(2)	(2)
Balance at December 31, 2018	$ 55	$ —	$ 483	$ 8,319	$ (358)	$ —	$ (2,926)	$ 12	$ 5,585

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

Arconic and subsidiaries
Notes to the Consolidated Financial Statements
(dollars in millions, except per-share amounts)

A. Summary of Significant Accounting Policies

Basis of Presentation. The Consolidated Financial Statements of Arconic Inc. and subsidiaries ("Arconic" or the "Company") are prepared in conformity with accounting principles generally accepted in the United States of America (GAAP) and require management to make certain judgments, estimates, and assumptions. These may affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements. They also may affect the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates upon subsequent resolution of identified matters. Certain amounts in previously issued financial statements were reclassified to conform to the current period presentation (see below and Note C)

On January 1, 2018, Arconic adopted new guidance issued by the Financial Accounting Standards Board (FASB) related to the following: presentation of net periodic pension cost and net periodic postretirement benefit cost that required a reclassification of costs within the Statement of Consolidated Operations; presentation of certain cash receipts and cash payments within the Statement of Consolidated Cash Flows that required a reclassification of amounts between operating and either financing or investing activities; the classification of restricted cash within the Statement of Consolidated Cash Flows; and the reclassification from Accumulated other comprehensive loss to Accumulated deficit in the Consolidated Balance Sheet of stranded tax effects resulting from the Tax Cuts and Jobs Act enacted on December 22, 2017. See Recently Adopted Accounting Guidance below for further details.

Also on January 1, 2018, the Company changed its primary measure of segment performance from Adjusted earnings before interest, tax, depreciation and amortization ("Adjusted EBITDA") to Segment operating profit, which more closely aligns segment performance with Operating income as presented in the Statement of Consolidated Operations. See Note C for further details.

The separation of Alcoa Inc. into two standalone, publicly-traded companies, Arconic Inc. (the new name for Alcoa Inc.) and Alcoa Corporation, became effective on November 1, 2016 (the "Separation Transaction"). The financial results of Alcoa Corporation for 2016 have been retrospectively reflected in the Statement of Consolidated Operations as discontinued operations and, as such, have been excluded from continuing operations and segment results for 2016. The cash flows and comprehensive income related to Alcoa Corporation have not been segregated and are included in the Statement of Consolidated Cash Flows and Statement of Consolidated Comprehensive Income (Loss), respectively, for 2016. See Note V for additional information related to the Separation Transaction and discontinued operations.

Principles of Consolidation. The Consolidated Financial Statements include the accounts of Arconic and companies in which Arconic has a controlling interest. Intercompany transactions have been eliminated. Investments in affiliates in which Arconic cannot exercise significant influence are accounted for on the cost method.

Management also evaluates whether an Arconic entity or interest is a variable interest entity and whether Arconic is the primary beneficiary. Consolidation is required if both of these criteria are met. Arconic does not have any variable interest entities requiring consolidation.

Cash Equivalents. Cash equivalents are highly liquid investments purchased with an original maturity of three months or less.

Inventory Valuation. Inventories are carried at the lower of cost and net realizable value, with cost for approximately half of U.S. inventories determined under the last-in, first-out (LIFO) method. The cost of other inventories is determined under a combination of the first-in, first-out (FIFO) and average-cost methods.

Properties, Plants, and Equipment. Properties, plants, and equipment are recorded at cost. Depreciation is recorded principally on the straight-line method at rates based on the estimated useful lives of the assets. The following table details the weighted-average useful lives of structures and machinery and equipment by reporting segment (numbers in years):

	Structures	Machinery and equipment
Engineered Products and Solutions	29	17
Global Rolled Products	31	21
Transportation and Construction Solutions	27	18

Gains or losses from the sale of asset groups are generally recorded in Restructuring and other charges while the sale of individual assets are recorded in Other expense (income), net (see policy below for assets classified as held for sale and discontinued operations). Repairs and maintenance are charged to expense as incurred. Interest related to the construction of qualifying assets is capitalized as part of the construction costs.

Properties, plants, and equipment are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets (asset group) may not be recoverable. Recoverability of assets is determined by comparing the estimated undiscounted net cash flows of the operations related to the assets (asset group) to their carrying amount. An impairment loss would be recognized when the carrying amount of the assets (asset group) exceeds the estimated undiscounted net cash flows. The amount of the impairment loss to be recorded is calculated as the excess of the carrying value of the assets (asset group) over their fair value, with fair value determined using the best information available, which generally is a discounted cash flow (DCF) model. The determination of what constitutes an asset group, the associated estimated undiscounted net cash flows, and the estimated useful lives of the assets also require significant judgments. See Note N for further information.

Goodwill. Goodwill is not amortized; instead, it is reviewed for impairment annually (in the fourth quarter) or more frequently if indicators of impairment exist or if a decision is made to sell or realign a business. 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, adverse changes in the markets in which an entity operates, increases in input costs that have a negative effect on earnings and cash flows, or a trend of negative or declining cash flows over multiple periods, among others. The fair value that could be realized in an actual transaction may differ from that used to evaluate the impairment of goodwill.

Goodwill is allocated among and evaluated for impairment at the reporting unit level, which is defined as an operating segment or one level below an operating segment. Arconic had eight reporting units for 2017 and 2016, of which four were included in the Engineered Products and Solutions segment (Arconic Fastening Systems and Rings, Arconic Power and Propulsion, Arconic Forgings and Extrusions, and Arconic Titanium and Engineered Products), three were included in the Transportation and Construction Solutions segment (Arconic Wheel and Transportation Products, Building and Construction Systems, and Latin America Extrusions), and the remaining reporting unit was the Global Rolled Products segment.

In January 2018, management changed the organizational structure of the businesses in the Engineered Products and Solutions segment from four business units to three business units with a focus on aligning its internal structure to core markets and customers and reducing cost. As a result, management assessed and concluded that each of the three new business units (Arconic Fastening Systems (AFS), Arconic Engines (AEN), and Arconic Engineered Structures (AES)) represent reporting units for goodwill impairment evaluation purposes. Goodwill was reallocated to the three new reporting units and both the historical and new Engineered Products and Solutions reporting units were evaluated for impairment during the first quarter of 2018. The estimated fair value of each reporting unit substantially exceeded its carrying value; thus, there was no goodwill impairment. In April 2018, Arconic completed the sale of its Latin America extrusions business and, therefore, it is no longer a reporting unit for the Company. More than 90% of Arconic’s total goodwill at December 31, 2018 was allocated to the three Engineered Products and Solutions reporting units: AEN ($2,065), AFS ($1,607), and AES ($507).

In reviewing goodwill for impairment, an entity has the option to first assess qualitative factors to determine whether the existence of events or circumstances leads to a determination that it is more likely than not (greater than 50%) that the estimated fair value of a reporting unit is less than its carrying amount. If an entity elects to perform a qualitative assessment and determines that an impairment is more likely than not, the entity is then required to perform the quantitative impairment test (described below), otherwise no further analysis is required. An entity also may elect not to perform the qualitative assessment and, instead, proceed directly to the quantitative impairment test. The ultimate outcome of the goodwill impairment review for a reporting unit should be the same whether an entity chooses to perform the qualitative assessment or proceeds directly to the quantitative impairment test.

Arconic determines annually, based on facts and circumstances, which of its reporting units will be subject to the qualitative assessment. For those reporting units where a qualitative assessment is either not performed or for which the conclusion is that an impairment is more likely than not, a quantitative impairment test will be performed. Arconic’s policy is that a quantitative impairment test be performed for each reporting unit at least once during every three-year period.

Under the qualitative assessment, various events and circumstances (or factors) that would affect the estimated fair value of a reporting unit are identified (similar to impairment indicators above). These factors are then classified by the type of impact they would have on the estimated fair value using positive, neutral, and adverse categories based on current business conditions. Additionally, an assessment of the level of impact that a particular factor would have on the estimated fair value is determined using high, medium, and low weighting. Furthermore, management considers the results of the most recent quantitative impairment test completed for a reporting unit and compares the weighted average cost of capital (WACC) between the current and prior years for each reporting unit.

During the 2018 annual review of goodwill, management proceeded directly to the quantitative impairment test for all six of its reporting units. The estimated fair values for each of the six reporting units exceeded their respective carrying values by more than 25%, thus, there was no goodwill impairment. Under the quantitative impairment test, the evaluation of impairment involves comparing the current fair value of each reporting unit to its carrying value, including goodwill. Arconic uses a discounted cash flow model (DCF) to estimate the current fair value of its reporting units when testing for impairment, as management believes forecasted cash flows are the best indicator of such fair value. A number of significant assumptions and estimates are involved in the application of the DCF model to forecast operating cash flows, including sales growth (volumes and pricing), production costs, capital spending, and discount rate. Most of these assumptions vary significantly among the reporting units. Cash flow forecasts are generally based on approved business unit operating plans for the early years and historical relationships in later years. The WACC rate for the individual reporting units is estimated with the assistance of valuation experts. Arconic would recognize an impairment charge for the amount by which the carrying amount exceeds the reporting unit's fair value without exceeding the total amount of goodwill allocated to that reporting unit.

In connection with the interim impairment evaluation of long-lived assets for the disks operations (an asset group within the AEN business unit) in the second quarter of 2018, which resulted from a decline in forecasted financial performance for the business in connection with its updated three-year strategic plan, the Company also performed an interim impairment evaluation of goodwill for the AEN reporting unit. The estimated fair value of the reporting unit was substantially in excess of the carrying value; thus, there was no impairment of goodwill.

Goodwill impairment tests in 2017 and 2016 indicated that goodwill was not impaired for any of the Company's reporting units, except for the Arconic Forgings and Extrusions (AFE) business whose estimated fair value was lower than its carrying value. As such, Arconic recorded an impairment for the full amount of goodwill in the AFE reporting unit of $719. The decrease in the AFE fair value was primarily due to unfavorable performance that was impacting operating margins and a higher discount rate due to an increase in the risk-free rate of return, while the carrying value increased compared to prior year.

Other Intangible Assets. Intangible assets with indefinite useful lives are not amortized while intangible assets with finite useful lives are amortized generally on a straight-line basis over the periods benefited. The following table details the weighted-average useful lives of software and other intangible assets by reporting segment (numbers in years):

	Software	Other intangible assets
Engineered Products and Solutions	5	33
Global Rolled Products	5	9
Transportation and Construction Solutions	5	16

Revenue Recognition. The Company's contracts with customers are comprised of acknowledged purchase orders incorporating the Company's standard terms and conditions, or for larger customers, may also generally include terms under negotiated multi-year agreements. These contracts with customers typically consist of the manufacture of products which represent single performance obligations that are satisfied upon transfer of control of the product to the customer. The Company produces fastening systems; seamless rolled rings; investment castings, including airfoils and forged jet engine components; extruded, machined and formed aircraft parts; aluminum sheet and plate; integrated aluminum structural systems; architectural extrusions; and forged aluminum commercial vehicle wheels. Transfer of control is assessed based on alternative use of the products we produce and our enforceable right to payment for performance to date under the contract terms. Transfer of control and revenue recognition generally occur upon shipment or delivery of the product, which is when title, ownership and risk of loss pass to the customer and is based on the applicable shipping terms. The shipping terms vary across all businesses and depend on the product, the country of origin, and the type of transportation (truck, train, or vessel). An invoice for payment is issued at time of shipment. The Company's objective is to have net 30-day terms. Our business units set commercial terms on which Arconic sells products to its customers. These terms are influenced by industry custom, market conditions, product line (specialty versus commodity products), and other considerations.

In certain circumstances, Arconic receives advanced payments from its customers for product to be delivered in future periods. These advanced payments are recorded as deferred revenue until the product is delivered and title and risk of loss have passed to the customer in accordance with the terms of the contract. Deferred revenue is included in Other current liabilities and Other noncurrent liabilities and deferred credits on the accompanying Consolidated Balance Sheet.

Environmental Matters. Expenditures for current operations are expensed or capitalized, as appropriate. Expenditures relating to existing conditions caused by past operations, which will not contribute to future revenues, are expensed. Liabilities are recorded when remediation costs are probable and can be reasonably estimated. The liability may include costs such as site investigations, consultant fees, feasibility studies, outside contractors, and monitoring expenses. Estimates are generally not discounted or reduced by potential claims for recovery. Claims for recovery are recognized when probable and as agreements are reached with third parties. The estimates also include costs related to other potentially responsible parties to the extent that Arconic has reason to believe such parties will not fully pay their proportionate share. The liability is continuously reviewed and adjusted to reflect current remediation progress, prospective estimates of required activity, and other factors that may be relevant, including changes in technology or regulations.

Litigation Matters. For asserted claims and assessments, liabilities are recorded when an unfavorable outcome of a matter is deemed to be probable and the loss is reasonably estimable. Management determines the likelihood of an unfavorable outcome based on many factors such as the nature of the matter, available defenses and case strategy, progress of the matter, views and opinions of legal counsel and other advisors, applicability and success of appeals processes, and the outcome of similar historical matters, among others. Once an unfavorable outcome is deemed probable, management weighs the probability of estimated losses, and the most reasonable loss estimate is recorded. If an unfavorable outcome of a matter is deemed to be reasonably possible, then the matter is disclosed and no liability is recorded. With respect to unasserted claims or assessments, management must first determine that the probability that an assertion will be made is likely, then, a determination as to the likelihood of an unfavorable outcome and the ability to reasonably estimate the potential loss is made. Legal matters are reviewed on a continuous basis to determine if there has been a change in management's judgment regarding the likelihood of an unfavorable outcome or the estimate of a potential loss.

Income Taxes. The provision for income taxes is determined using the asset and liability approach of accounting for income taxes. Under this approach, the provision for income taxes represents income taxes paid or payable (or received or receivable) for the current year plus the change in deferred taxes during the year. Deferred taxes represent the future tax consequences expected to occur when the reported amounts of assets and liabilities are recovered or paid, and result from differences between the financial and tax bases of Arconic's assets and liabilities and are adjusted for changes in tax rates and tax laws when enacted.

Valuation allowances are recorded to reduce deferred tax assets when it is more likely than not that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management considers all potential sources of taxable income, including income available in carryback periods, future reversals of taxable temporary differences, projections of taxable income, and income from tax planning strategies, as well as all available positive and negative evidence. Positive evidence includes factors such as a history of profitable operations, projections of future profitability within the carryforward period, including from tax planning strategies, and Arconic's experience with similar operations. Existing favorable contracts and the ability to sell products into established markets are additional positive evidence. Negative evidence includes items such as cumulative losses, projections of future losses, or carryforward periods that are not long enough to allow for the utilization of a deferred tax asset based on existing projections of income. Deferred tax assets for which no valuation allowance is recorded may not be realized upon changes in facts and circumstances, resulting in a future charge to establish a valuation allowance. Existing valuation allowances are re-examined under the same standards of positive and negative evidence. If it is determined that it is more likely than not that a deferred tax asset will be realized, the appropriate amount of the valuation allowance, if any, is released. Deferred tax assets and liabilities are also re-measured to reflect changes in underlying tax rates due to law changes and the granting and lapse of tax holidays.

In 2018, Arconic made a final accounting policy election to apply a tax law ordering approach when considering the need for a valuation allowance on net operating losses expected to offset Global Intangible Low Taxed Income (GILTI) income inclusions. Under this approach, reductions in cash tax savings are not considered as part of the valuation allowance assessment. Instead, future GILTI inclusions are considered a source of taxable income that support the realizability of deferred tax assets.

Tax benefits related to uncertain tax positions taken or expected to be taken on a tax return are recorded when such benefits meet a more likely than not threshold. Otherwise, these tax benefits are recorded when a tax position has been effectively settled, which means that the statute of limitations has expired or the appropriate taxing authority has completed their examination even though the statute of limitations remains open. Interest and penalties related to uncertain tax positions are recognized as part of the provision for income taxes and are accrued beginning in the period that such interest and penalties would be applicable under relevant tax law until such time that the related tax benefits are recognized.

Stock-Based Compensation. Arconic recognizes compensation expense for employee equity grants using the non-substantive vesting period approach, in which the expense is recognized ratably over the requisite service period based on the grant date fair value. Forfeitures are accounted for as they occur. The fair value of new stock options is estimated on the date of grant using a lattice-pricing model. The fair value of performance awards containing a market condition is valued using a Monte Carlo valuation model. Determining the fair value at the grant date requires judgment, including estimates for the average risk-free interest rate, dividend yield, volatility, and exercise behavior. These assumptions may differ significantly between grant dates because of changes in the actual results of these inputs that occur over time.

Foreign Currency. The local currency is the functional currency for Arconic's significant operations outside the United States, except for certain operations in Canada and Russia, where the U.S. dollar is used as the functional currency. The determination of the functional currency for Arconic's operations is made based on the appropriate economic and management indicators.

Acquisitions. Arconic's business acquisitions are accounted for using the acquisition method. The purchase price is allocated to the assets acquired and liabilities assumed based on their estimated fair values. Any excess purchase price over the fair value of the net assets acquired is recorded as goodwill. For all acquisitions, operating results are included in the Statement of Consolidated Operations from the date of the acquisition.

Discontinued Operations and Assets Held for Sale. For those businesses where management has committed to a plan to divest, each business is valued at the lower of its carrying amount or estimated fair value less cost to sell. If the carrying amount of the business exceeds its estimated fair value, an impairment loss is recognized. Fair value is estimated using accepted valuation techniques such as a DCF model, valuations performed by third parties, earnings multiples, or indicative bids, when available. A number of significant estimates and assumptions are involved in the application of these techniques, including the forecasting of markets and market share, sales volumes and prices, costs and expenses, and multiple other factors. Management considers historical experience and all available information at the time the estimates are made; however, the fair value that is ultimately realized upon the divestiture of a business may differ from the estimated fair value reflected in the Consolidated Financial Statements. Depreciation and amortization expense is not recorded on assets of a business to be divested once they are classified as held for sale. Businesses to be divested are generally classified in the Consolidated Financial Statements as either discontinued operations or held for sale.

For businesses classified as discontinued operations, the balance sheet amounts and results of operations are reclassified from their historical presentation to assets and liabilities of discontinued operations on the Consolidated Balance Sheet and to discontinued operations on the Statement of Consolidated Operations, respectively, for all periods presented. The gains or losses associated with these divested businesses are recorded in discontinued operations on the Statement of Consolidated Operations. The Statement of Consolidated Cash Flows is not required to be reclassified for discontinued operations for any period. Segment information does not include the assets or operating results of businesses classified as discontinued operations for all periods presented. These businesses are expected to be disposed of within one year.

For businesses classified as held for sale that do not qualify for discontinued operations treatment, the balance sheet and cash flow amounts are reclassified from their historical presentation to assets and liabilities of operations held for sale for all periods presented. The results of operations continue to be reported in continuing operations. The gains or losses associated with these divested businesses are recorded in Restructuring and other charges on the Statement of Consolidated Operations. The segment information includes the assets and operating results of businesses classified as held for sale for all periods presented.

Recently Adopted Accounting Guidance. In May 2014, the FASB issued changes to the recognition of revenue from contracts with customers. These changes created a comprehensive framework for all entities in all industries to apply in the determination of when to recognize revenue and, therefore, supersede virtually all existing revenue recognition requirements and guidance. This framework is expected to result in less complex guidance in application while providing a consistent and comparable methodology for revenue recognition. The core principle of the guidance is that an entity should 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. To achieve this principle, an entity should apply the following steps: (i) identify the contract(s) with a customer, (ii) identify the performance obligations in the contract(s), (iii) determine the transaction price, (iv) allocate the transaction price to the performance obligations in the contract(s), and (v) recognize revenue when, or as, the entity satisfies a performance obligation. These changes became effective for Arconic on January 1, 2018. Arconic adopted this new guidance using the modified retrospective transition approach applied to those contracts that were not completed as of January 1, 2018. There was no cumulative effect adjustment to the opening balance of retained earnings in the Consolidated Balance Sheet in 2018, as the adoption did not result in a change to our timing of revenue recognition, which continues to be at a point in time. See the Revenue Recognition policy above.

In January 2016, the FASB issued changes to equity investments. These changes require equity investments (except those accounted for under the equity method of accounting or those that result in consolidation of the investee) to be measured at fair value with changes in fair value recognized in net income. However, an entity may choose to measure equity investments that do not have readily determinable fair values using the measurement alternative of cost minus impairment, if any, plus or minus changes resulting from observable price changes in orderly transactions for the identical or similar investment of the same issuer. Also, the impairment assessment of equity investments without readily determinable fair values has been simplified by requiring a qualitative assessment to identify impairment. Also, the new guidance required changes in fair value of equity securities to be recognized immediately as a component of net income instead of being reported in accumulated other comprehensive loss until the gain (loss) is realized. These changes became effective for Arconic on January 1, 2018 and have been applied on a prospective basis. Arconic elected the measurement alternative for its equity investments that do not have readily determinable fair values. The adoption of this guidance did not have a material impact on the Consolidated Financial Statements.

In August 2016, the FASB issued changes to the classification of certain cash receipts and cash payments within the statement of cash flows. The guidance identifies eight specific cash flow items and the sections where they must be presented within the statement of cash flows. These changes became effective for Arconic on January 1, 2018 and have been be applied retrospectively. As a result of the adoption, Arconic reclassified cash received related to beneficial interest in previously transferred trade accounts receivable from operating activities to investing activities in the Statement of Consolidated Cash Flows. This new accounting standard does not reflect a change in our underlying business or activities. The reclassification of cash received related to beneficial interest in previously transferred trade accounts receivable was $792 and $778 for 2017 and

2016, respectively. In addition, Arconic reclassified $52 and $3 of cash paid for debt prepayments including extinguishment costs from operating activities to financing activities for 2017 and 2016, respectively.

In November 2016, the FASB issued changes to the classification of cash and cash equivalents within the statement of cash flow. Restricted cash and cash equivalents will be included within the cash and cash equivalents line on the cash flow statement and a reconciliation must be prepared to the statement of financial position. Transfers between restricted cash and cash equivalents and cash and cash equivalents will no longer be presented as cash flow activities in the Statement of Consolidated Cash Flows and for material balances of restricted cash and cash equivalents, Arconic will disclose information regarding the nature of the restrictions. These changes became effective for Arconic on January 1, 2018 and have been applied retrospectively. Management has determined that the adoption of this guidance did not have a material impact on the Statement of Consolidated Cash Flows. Restricted cash was $6, $4, and $15 in 2018, 2017, and 2016, respectively.

In March 2017, the FASB issued changes to the presentation of net periodic pension cost and net periodic postretirement benefit cost. The new guidance requires registrants to present the service cost component of net periodic benefit cost in the same income statement line item or items as other employee compensation costs arising from services rendered during the period. Also, only the service cost component will be eligible for asset capitalization. Registrants will present the other components of net periodic benefit cost separately from the service cost component; and, the line item or items used in the income statement to present the other components of net periodic benefit cost must be disclosed. These changes became effective for Arconic on January 1, 2018 and were adopted retrospectively for the presentation of the service cost component and the other components of net periodic benefit cost in the Statement of Consolidated Operations, and prospectively for the asset capitalization of the service cost component of net periodic benefit cost. The Company recorded the service related net periodic benefit cost within Cost of goods sold, Selling, general administrative, and other expenses and Research and development expenses and recorded the non-service related net periodic benefit cost (except for the curtailment cost which was recorded in Restructuring and other charges) separately from service cost in Other expense (income), net within the Statement of Consolidated Operations. The impact of the retrospective adoption of this guidance was an increase to consolidated Operating income of $154 and $135, while there was no impact to consolidated Net income, for 2017 and 2016, respectively.

In May 2017, the FASB issued clarification to guidance on the modification accounting criteria for share-based payment awards. The new guidance requires registrants to apply modification accounting unless three specific criteria are met. The three criteria are 1) the fair value of the award is the same before and after the modification, 2) the vesting conditions are the same before and after the modification and 3) the classification as a debt or equity award is the same before and after the modification. These changes became effective for Arconic on January 1, 2018 and were applied prospectively to new awards modified after adoption. The adoption of this guidance did not have a material impact on the Consolidated Financial Statements.

In February 2018, the FASB issued guidance that allows an optional reclassification from Accumulated other comprehensive loss to Accumulated deficit for stranded tax effects resulting from the Tax Cuts and Jobs Act enacted on December 22, 2017. Stranded tax effects were created when deferred taxes, originally established in Other comprehensive income at 35%, were revalued to 21% as a component of income tax expense from continuing operations. The Company elected to early adopt this provision in the fourth quarter of 2018 and reclassified $367 of beneficial stranded tax effects in Accumulated other comprehensive loss to Accumulated deficit in its Consolidated Balance Sheet and Statement of Changes in Consolidated Equity.

In August 2018, the FASB issued guidance which requires cloud computing arrangement implementation costs to be accounted for in accordance with the software stage model, regardless of whether or not the cloud computing arrangement contains a license. Arconic adopted this guidance in the third quarter of 2018. The adoption of this guidance did not have a material impact on the Consolidated Financial Statements.

Also, in August 2018, the Securities and Exchange Commission (SEC) issued guidance to eliminate or modify certain disclosure requirements that have become redundant, overlapping, outdated or superseded in light of other SEC rules, GAAP or changes in the information environment. This guidance became effective on November 5, 2018 and will be applied to filings thereafter. The adoption of this guidance did not have a material impact on the Consolidated Financial Statements.

Recently Issued Accounting Guidance. In February 2016, the FASB issued changes to the accounting and presentation of leases. These changes require lessees to recognize a right of use asset and lease liability on the balance sheet for all leases with terms longer than 12 months. For leases with a term of 12 months or less, a lessee is permitted to make an accounting policy election by class of underlying asset not to recognize a right of use asset and lease liability. Also, when measuring assets and liabilities arising from a lease, optional payments should be included only if the lessee is reasonably certain to exercise an option to extend the lease, exercise a purchase option, or not exercise an option to terminate the lease. As originally released, the standards update required application at the beginning of the earliest comparative period presented at the time of adoption. However, in July 2018, the FASB provided entities the option to instead apply the provisions of the new leases guidance at the effective date, without adjusting the comparative periods presented. The Company expects to apply the provisions of the new leases guidance at the effective date, without adjusting the comparative periods presented. These changes became effective for Arconic on January 1, 2019.

Arconic’s current operating lease portfolio is primarily comprised of land and buildings, plant equipment, vehicles, and computer equipment. A cross-functional implementation team has determined the scope of arrangements that will be subject to this standard and continues to assess the impact to the Company’s systems, processes and internal controls. Arconic has contracted with a third-party vendor to implement a software solution. Concurrently, Arconic has been compiling and uploading lease data into the software solution to account for leases under the new standard. Management continues to evaluate the impact of these changes on the Consolidated Balance Sheet, which will require right of use assets and lease liabilities be recorded for operating leases. Arconic anticipates the impact of adoption on January 1, 2019 will result in a right of use asset and total lease liability related to operating leases in the range of $300 to $340, while the accounting for capital leases will remain unchanged. The adoption is not expected to have a material impact on the Statement of Consolidated Operations or Statement of Consolidated Cash Flows.

In June 2016, the FASB added a new impairment model (known as the current expected credit loss (CECL) model) that is based on expected losses rather than incurred losses. Under the new guidance, an entity recognizes as an allowance its estimate of expected credit losses. The CECL model applies to most debt instruments, trade receivables, lease receivables, financial guarantee contracts, and other loan commitments. The CECL model does not have a minimum threshold for recognition of impairment losses and entities will need to measure expected credit losses on assets that have a low risk of loss. These changes become effective for Arconic on January 1, 2020. Management is currently evaluating the potential impact of these changes on the Consolidated Financial Statements.

In August 2017, the FASB issued guidance that will make more financial and nonfinancial hedging strategies eligible for hedge accounting. It also amends the presentation and disclosure requirements and changes how companies assess effectiveness. It is intended to more closely align hedge accounting with companies’ risk management strategies, simplify the application of hedge accounting, and increase transparency as to the scope and results of hedging programs. These changes became effective for Arconic on January 1, 2019. For cash flow and net investment hedges existing at the date of adoption, Arconic will apply a cumulative-effect adjustment related to eliminating the separate measurement of ineffectiveness to Accumulated other comprehensive loss with a corresponding adjustment to the opening balance of Accumulated deficit as of the beginning of the fiscal year in which the amendment is adopted. The amended presentation and disclosure guidance is required only prospectively. Arconic has engaged a third-party consultant to assist with a review of the Company’s risk management and hedging strategies, with any changes to be implemented in conjunction with the adoption of the new guidance. Under the new guidance, Management expects to utilize cash flow hedge accounting of its variable priced purchases and sales. Management determined that the adoption of this guidance will not have a material impact on the Consolidated Financial Statements.

In August 2018, the FASB issued guidance that impacts disclosures for defined benefit pension plans and other postretirement benefit plans. These changes become effective for Arconic's annual report for the year ending December 31, 2020, with early adoption permitted. Management has determined that the adoption of this guidance will not have a material impact on the Consolidated Financial Statements.

B. Revenue from Contracts with Customers

The following table disaggregates revenue by major end market served. Differences between segment totals and consolidated Arconic are in Corporate. In 2018, Corporate included $38 of costs related to settlements of certain customer claims primarily related to product introductions.

For the year ended December 31,	Engineered Products and Solutions	Global Rolled Products	Transportation and Construction Solutions	Total Segment
2018				
Aerospace	$ 4,947	$ 891	$ —	$ 5,838
Transportation	440	2,443	969	3,852
Building and construction	—	217	1,150	1,367
Industrial and Other	929	2,053	7	2,989
Total end-market revenue	$ 6,316	$ 5,604	$ 2,126	$ 14,046
2017				
Aerospace	$ 4,572	$ 883	$ —	$ 5,455
Transportation	383	1,981	805	3,169
Building and construction	—	204	1,113	1,317
Industrial and Other	988	1,932	93	3,013
Total end-market revenue	$ 5,943	$ 5,000	$ 2,011	$ 12,954
2016				
Aerospace	$ 4,358	$ 942	$ —	$ 5,300
Transportation	347	1,577	708	2,632
Building and construction	—	200	1,060	1,260
Industrial and Other	1,023	2,146	34	3,203
Total end-market revenue	$ 5,728	$ 4,865	$ 1,802	$ 12,395

C. Segment and Geographic Area Information

Arconic is a global leader in lightweight metals engineering and manufacturing. Arconic's innovative, multi-material products, which include aluminum, titanium, and nickel, are used worldwide in aerospace, automotive, commercial transportation, building and construction, industrial applications, defense, and packaging. Arconic's segments are organized by product on a worldwide basis. In the first quarter of 2018, the Company changed its primary measure of segment performance from Adjusted earnings before interest, tax, depreciation, and amortization ("Adjusted EBITDA") to Segment operating profit, which more closely aligns segment performance with Operating income as presented in the Statement of Consolidated Operations. Segment performance under Arconic's management reporting system is evaluated based on a number of factors; however, the primary measure of performance is Segment operating profit. Arconic's definition of Segment operating profit is Operating income excluding Special items. Special items include Restructuring and other charges and Impairment of goodwill. Segment operating profit also includes certain items that, under the previous segment performance measure, were recorded in Corporate, such as the impact of LIFO inventory accounting, metal price lag, intersegment profit eliminations, and derivative activities. Segment operating profit may not be comparable to similarly titled measures of other companies. Differences between segment totals and consolidated Arconic are in Corporate. Prior period financial information has been recast to conform to current year presentation.

The accounting policies of the segments are the same as those described in the Summary of Significant Accounting Policies (see Note A). Transactions among segments are established based on negotiation among the parties. Differences between segment totals and Arconic's consolidated totals for line items not reconciled are in Corporate.

Arconic's operations consist of three worldwide reportable segments as follows:

Engineered Products and Solutions. This segment produces products that are used primarily in the aerospace (commercial and defense), industrial, commercial transportation, and power generation end markets. Such products include fastening systems (titanium, steel, and nickel superalloys); seamless rolled rings (mostly nickel superalloys); investment castings (nickel superalloys, titanium, and aluminum), including airfoils and forged jet engine components (e.g., jet engine disks); and extruded, machined and formed aircraft parts (titanium and aluminum), all of which are sold directly to customers and through distributors. More than 75% of the third-party sales in this segment are from the aerospace end market. A small part of this segment also produces various forged, extruded, and machined metal products (titanium, aluminum and steel) for the oil and gas, automotive, and land and sea defense end markets. Seasonal decreases in sales are generally experienced in the third quarter of the year due to the European summer slowdown across all end markets.

Global Rolled Products. This segment produces aluminum sheet and plate for a variety of end markets. Sheet and plate is sold directly to customers and through distributors related to the aerospace, automotive, commercial transportation, packaging, building and construction, and industrial products (mainly used in the production of machinery and equipment and consumer durables) end markets. A small portion of this segment also produces aseptic foil for the packaging end market. While the customer base for flat-rolled products is large, a significant amount of sales of sheet and plate is to a relatively small number of customers.

Transportation and Construction Solutions. This segment produces products that are used mostly in the commercial transportation and nonresidential building and construction end markets. Such products include integrated aluminum structural systems, architectural extrusions, and forged aluminum commercial vehicle wheels, which are sold both directly to customers and through distributors. A small part of this segment also produces aluminum products for the industrial products end market.

The operating results and assets of Arconic's reportable segments were as follows:

	Engineered Products and Solutions	Global Rolled Products	Transportation and Construction Solutions	Total
2018				
Sales:				
Third-party sales	$ 6,316	$ 5,604	$ 2,126	$ 14,046
Intersegment sales	—	160	—	160
Total sales	$ 6,316	$ 5,764	$ 2,126	$ 14,206
Profit and loss:				
Segment operating profit	$ 891	$ 386	$ 304	$ 1,581
Restructuring and other charges	71	(156)	1	(84)
Provision for depreciation and amortization	282	212	50	544
2017				
Sales:				
Third-party sales	$ 5,943	$ 5,000	$ 2,011	$ 12,954
Intersegment sales	—	148	—	148
Total sales	$ 5,943	$ 5,148	$ 2,011	$ 13,102
Profit and loss:				
Segment operating profit	$ 964	$ 424	$ 290	$ 1,678
Restructuring and other charges	30	72	52	154
Provision for depreciation and amortization	268	205	50	523
2016				
Sales:				
Third-party sales	$ 5,728	$ 4,865	$ 1,802	$ 12,395
Intersegment sales	—	118	—	118
Total sales	$ 5,728	$ 4,983	$ 1,802	$ 12,513
Profit and loss:				
Segment operating profit	$ 955	$ 421	$ 246	$ 1,622
Restructuring and other charges	78	40	14	132
Provision for depreciation and amortization	255	201	48	504
2018				
Assets:				
Capital expenditures	$ 349	$ 255	$ 111	$ 715
Goodwill	4,179	245	76	4,500
Total assets	10,346	3,934	1,089	15,369
2017				
Assets:				
Capital expenditures	$ 308	$ 178	$ 57	$ 543
Goodwill	4,205	252	78	4,535
Total assets	10,325	3,955	1,041	15,321

The following tables reconcile certain segment information to consolidated totals:

For the year ended December 31,	2018	2017	2016
Sales:			
Total segment sales	$ 14,206	$ 13,102	$ 12,513
Elimination of intersegment sales	(160)	(148)	(118)
Corporate	(32)	6	(1)
Consolidated sales	$ 14,014	$ 12,960	$ 12,394

For the year ended December 31,	2018	2017	2016
Total segment operating profit	$ 1,581	$ 1,678	$ 1,622
Unallocated amounts:			
Impairment of goodwill	—	(719)	—
Restructuring and other charges	(9)	(165)	(155)
Corporate expense	(247)	(314)	(513)
Consolidated operating income	$ 1,325	$ 480	$ 954
Interest expense	(378)	(496)	(499)
Other (expense) income, net	(79)	486	(41)
Consolidated income before income taxes	$ 868	$ 470	$ 414

December 31,	2018	2017
Assets:		
Total segment assets	$ 15,369	$ 15,321
Unallocated amounts:		
Cash and cash equivalents	2,277	2,150
Deferred income taxes	573	743
Corporate fixed assets, net	305	310
Fair value of derivative contracts	37	91
Other	132	103
Consolidated assets	$ 18,693	$ 18,718

Sales by major product grouping were as follows:

For the year ended December 31,	2018	2017	2016
Sales:			
Innovative flat-rolled products	$ 5,588	$ 4,992	$ 4,864
Engines	2,940	2,708	2,560
Engineered structures	1,839	1,743	1,683
Fastening systems	1,531	1,484	1,463
Architectural aluminum systems	1,140	1,065	1,010
Aluminum wheels	969	805	689
Other	7	163	125
	$ 14,014	$ 12,960	$ 12,394

Geographic information for sales was as follows (based upon the country where the point of sale occurred):

For the year ended December 31,	2018	2017	2016
Sales:			
United States	$ 9,137	$ 8,167	$ 7,823
France	936	965	930
Hungary	823	739	619
United Kingdom	737	721	711
China	632	615	582
Russia	553	500	433
Germany	302	309	284
Canada	285	261	262
Brazil	214	285	250
Japan	170	141	145
Other	225	257	355
	$ 14,014	$ 12,960	$ 12,394

Geographic information for long-lived assets was as follows (based upon the physical location of the assets):

December 31,	2018	2017
Long-lived assets:		
United States	$ 4,148	$ 4,005
China	326	347
Hungary	257	227
Russia	253	276
United Kingdom	253	259
France	163	159
Germany	84	88
Canada	61	63
Brazil	54	62
Other	105	108
	$ 5,704	$ 5,594

D. Restructuring and Other Charges

Restructuring and other charges for each year in the three-year period ended December 31, 2018 were comprised of the following:

	2018	2017	2016
Asset impairments	$ 13	$ 58	$ 80
Layoff costs	20	64	68
Pension and Other postretirement benefits - net settlement and curtailment charges	91	—	2
Net (gain) loss on divestitures of assets and businesses (T)	(109)	57	3
Other	13	(3)	27
Reversals of previously recorded layoff costs	(19)	(11)	(25)
Restructuring and other charges	$ 9	$ 165	$ 155

Layoff costs were recorded based on approved detailed action plans submitted by the operating locations that specified positions to be eliminated, benefits to be paid under existing severance plans, union contracts or statutory requirements, and the expected timetable for completion of the plans.

2018 Actions. In 2018, Arconic recorded Restructuring and other charges of $9 ($9 after-tax), which included a net gain on the sale of several assets and businesses of $109 ($81 after-tax), primarily made up of a gain on the asset sale of Texarkana of $154 ($119 after-tax) and loss on the sale of the Eger, Hungary forgings business of $43 ($39 after-tax) (see note T); charges of $96 ($75 after-tax) for pension settlement and $23 ($18 after-tax) for pension curtailment; a postretirement curtailment benefit of $28 ($22 after-tax) (see note G); and a charge of $20 ($17 after-tax) for layoff costs, including the separation of approximately 125 employees (89 in the Engineered Products and Solutions segment and 36 in Corporate); a charge of $12 ($9 after-tax) for contract termination costs and asset impairments associated with the shutdown of a facility in Acuna, Mexico; a charge of $6 ($4 after-tax) for contract termination costs related to the New York office; a charge of $8 ($4 after-tax) for other miscellaneous items including accelerated depreciation and asset impairments; and a benefit of $19 ($15 after-tax) for the reversal of a number of layoff reserves related to prior periods.

As of December 31, 2018, approximately 110 of the 125 employees were separated. The remaining separations for 2018 restructuring programs are expected to be completed by the end of 2019. In 2018, cash payments of $9 were made against layoff reserves related to the 2018 restructuring programs.

2017 Actions. In 2017, Arconic recorded Restructuring and other charges of $165 ($143 after-tax), which were comprised of the following components: $69 ($47 after-tax) for layoff costs related to cost reduction initiatives including the separation of approximately 880 employees (400 in the Engineered Products and Solutions segment, 245 in the Global Rolled Products segment, 135 in the Transportation and Construction Solutions segment, and 100 in Corporate), a charge of $60 ($60 after-tax) related to the sale of the Fusina, Italy rolling mill; a charge of $41 ($41 after-tax) for the impairment of assets associated with the sale of the Latin America extrusions business (see Note T); a net benefit of $6 ($4 after-tax) for the reversal of forfeited executive stock compensation of $13, partially offset by a charge of $7 for the related severance; a net charge of $12 ($7 after-tax) for other miscellaneous items; and a favorable benefit of $11 ($8 after-tax) for the reversal of a number of small layoff reserves related to prior periods.

As of December 31, 2018, approximately 570 of the 660 employees (previously 760) were separated. The total number of employees associated with 2017 restructuring programs was updated to reflect employees, who were initially identified for separation, accepting other positions within Arconic and natural attrition. The remaining separations for 2017 restructuring programs are expected to be completed by the end of 2019. In 2018 and 2017, cash payments of $34 and $28, respectively, were made against layoff reserves related to 2017 restructuring programs.

2016 Actions. In 2016, Arconic recorded Restructuring and other charges of $155 ($114 after-tax), which were comprised of the following components: $57 ($46 after-tax) for costs related to the exit of certain legacy Firth Rixson operations in the U.K.; $37 ($24 after-tax) for exit costs related to the decision to permanently shut down a can sheet facility; $20 ($14 after-tax) for costs related to the closures of five facilities, primarily in the Transportation and Construction Solutions segment and Engineered Products and Solutions segment, including the separation of approximately 280 employees; $53 ($33 after-tax) for other layoff costs, including the separation of approximately 1,315 employees (1,045 in the Engineered Products and Solutions segment, 210 in Corporate, 30 in the Global Rolled Products segment, and 30 in the Transportation and Construction Solutions segment); $11 ($8 after-tax) for other miscellaneous items, including $3 ($2 after-tax) for the sale of Remmele Medical, an RTI subsidiary; $2 ($1 after-tax) for a pension settlement; and $25 ($12 after-tax) for the reversal of a number of small layoff reserves related to prior periods.

In 2016, management made the decision to exit certain legacy Firth Rixson facilities in the U.K. Costs related to these actions included asset impairments and accelerated depreciation of $51; other exit costs of $4; and $2 for the separation of 60 employees.

Also in 2016, management approved the shutdown and demolition of the can sheet facility in Tennessee upon completion of the Toll Processing and Services Agreement with Alcoa Corporation. Costs related to this action included $21 in asset impairments; $9 in other exit costs; and $7 for the separation of 145 employees. The other exit costs of $9 represent $4 in asset retirement obligations and $3 in environmental remediation, both of which were triggered by the decision to permanently shut down and demolish the can sheet facility in Tennessee, and $2 in other exit costs.

As of December 31, 2018, the separations associated with the 2016 restructuring programs were essentially complete. In 2018, 2017, and 2016, cash payments of $4, $26, and $16, respectively, were made against layoff reserves related to 2016 restructuring programs.

Activity and reserve balances for restructuring charges were as follows:

	Layoff costs	Other exit costs	Total
Reserve balances at December 31, 2015	$ 84	$ 9	$ 93
2016			
Cash payments	(73)	(13)	(86)
Restructuring charges	70	27	97
Other[(1)]	(31)	(14)	(45)
Reserve balances at December 31, 2016	$ 50	$ 9	$ 59
2017			
Cash payments	$ (59)	$ (6)	$ (65)
Restructuring charges	64	1	65
Other[(2)]	1	(2)	(1)
Reserve balances at December 31, 2017	$ 56	$ 2	$ 58
2018			
Cash payments	$ (47)	$ (2)	$ (49)
Restructuring charges	111	13	124
Other[(3)]	(110)	2	(108)
Reserve balances at December 31, 2018	$ 10	$ 15	$ 25

(1) In 2016, Other for layoff costs included reversals of previously recorded restructuring charges of $25, effects of foreign currency translation and other of $4, and a reclassification of $2 in pension costs, as the impact was reflected in Arconic’s separate liability for Accrued pension benefits. Other for other exit costs included reclassifications of $8 in asset retirement and $2 in environmental obligations, as the impacts were reflected in Arconic’s separate liabilities

for asset retirement obligations and environmental remediation, and a reclassification of $4 in legal obligations, as the impact was included in Arconic's separate liability for legal costs.

(2) In 2017, Other for layoff costs included a reclassification of a stock awards reversal of $13, offset by reversals of previously recorded restructuring charges of $11 and foreign currency translation of $1.

(3) In 2018, Other for layoff costs included reclassifications of $119 in pension costs and a $28 credit in postretirement benefits, as the impacts were reflected in Arconic's separate liabilities for Accrued pension benefits and Accrued postretirement benefits, and reversals of previously recorded restructuring charges of $19.

The remaining reserves are expected to be paid in cash during 2019, with the exception of approximately $5 to $7, which is expected to be paid over the next several years for lease termination costs.

E. Interest Cost Components

For the year ended December 31,	2018	2017	2016
Amount charged to expense	$ 378	$ 496	$ 499
Amount capitalized	23	22	32
	$ 401	$ 518	$ 531

F. Other Expense (Income), Net

For the year ended December 31,	2018	2017	2016
Non-service related net periodic benefit cost	$ 112	$ 154	$ 135
Interest income	(23)	(19)	(16)
Foreign currency losses (gains), net	26	(5)	(4)
Net loss (gain) from asset sales	10	(513)	11
Other, net	(46)	(103)	(85)
	$ 79	$ (486)	$ 41

In 2018, Non-service related net periodic benefit cost included lower net actuarial losses as a result of pension actions taken during 2018 (see Note G) and Other, net included a benefit from establishing a tax indemnification receivable of $29 reflecting Alcoa Corporation's 49% share of a Spanish tax reserve (see Note U). In 2017, Net loss (gain) from asset sales included a gain on the sale of a portion of Arconic's investment in Alcoa Corporation common stock of $351 (see Note V) and a gain of $167 on the Debt-for-Equity Exchange (see Note V). In 2017, Other, net included an adjustment of $81 to the contingent earn-out liability related to the 2014 acquisition of Firth Rixson (see Note T) and an adjustment of $25 associated with a separation-related guarantee liability (see Note U). In 2016, Non-service related net periodic benefit cost included a reduction of the recognition of actuarial losses and a methodology change in the calculation of interest cost, which were partially offset by the reduction in the expected return on plan assets. In 2016, Other, net included an adjustment of $56 to the contingent earn-out liability and a post-closing adjustment of $20, both related to the acquisition of Firth Rixson.

G. Pension and Other Postretirement Benefits

Arconic maintains pension plans covering most U.S. employees and certain employees in foreign locations. Pension benefits generally depend on length of service, job grade, and remuneration. Substantially all benefits are paid through pension trusts that are sufficiently funded to ensure that all plans can pay benefits to retirees as they become due. Most salaried and non-bargaining hourly U.S. employees hired after March 1, 2006 participate in a defined contribution plan instead of a defined benefit plan.

Arconic also maintains health care and life insurance postretirement benefit plans covering eligible U.S. retired employees and certain retirees from foreign locations. Generally, the medical plans are unfunded and pay a percentage of medical expenses, reduced by deductibles and other coverage. Life benefits are generally provided by insurance contracts. Arconic retains the right, subject to existing agreements, to change or eliminate these benefits. All salaried and certain non-bargaining hourly U.S. employees hired after January 1, 2002 and certain bargaining hourly U.S. employees hired after July 1, 2010 are not eligible for postretirement health care benefits. All salaried and certain hourly U.S. employees that retire on or after April 1, 2008 are not eligible for postretirement life insurance benefits.

Effective January 1, 2015, Arconic no longer offers postretirement health care benefits to Medicare-eligible, primarily non-bargaining, U.S. retirees through Company-sponsored plans. Qualifying retirees (hired prior to January 1, 2002), both current and future, may access these benefits in the marketplace by purchasing coverage directly from insurance carriers.

In the first quarter of 2018, the Company announced that, effective April 1, 2018, benefit accruals for future service and compensation under all of the Company's qualified and non-qualified defined benefit pension plans for U.S. salaried and non-bargaining hourly employees ceased. As a result of this change, in the first quarter of 2018, the Company recorded a decrease to the Accrued pension benefits liability of $136 related to the reduction of future benefits, $141 offset in Accumulated other comprehensive loss, and curtailment charges of $5 in Restructuring and other charges.

On April 13, 2018, the United Auto Workers ratified a new five-year labor agreement, covering approximately 1,300 U.S. employees of Arconic, which expires on March 31, 2023. A provision within the agreement includes a retirement benefit increase for future retirees that participate in a defined benefit pension plan, which impacts approximately 300 of those employees. In addition, effective January 1, 2019, benefit accruals for future service will cease. As result of these changes, a curtailment charge of $9 was recorded in Restructuring and other charges in the second quarter of 2018.

In the third quarter of 2018, the Company announced that effective December 31, 2018, it will end all pre-Medicare medical, prescription drug and vision coverage for current and future salaried and non-bargained hourly employees and retirees of the Company and its subsidiaries. As a result of this change, in the third quarter of 2018, the Company recorded a decrease to the Accrued other postretirement benefits liability of $32 related to the reduction of future benefits, $4 offset in Accumulated other comprehensive loss, and a curtailment benefit of $28 in Restructuring and other charges.

In the fourth quarter, the company communicated to plan participants that effective in the first quarter of 2019, benefit accruals for future service and compensation for employees in the United Kingdom defined benefit pension plans will cease. The plan curtailment resulted in a $13 decrease in the Accrued pension benefits liability which was offset in Accumulated other comprehensive loss. Additionally, on October 29, 2018, the United Kingdom High Court ruled that defined benefit pension plans offering Guaranteed Minimum Pensions must review benefits accrued between May 1990 to April 1997 to ensure gender pay equality. The review resulted in an increase to the Accrued pension benefits liability of $9 and a corresponding curtailment charge that was recorded in Restructuring and other charges.

In the third and fourth quarters of 2018, settlement accounting applied to certain U.S. pension plans due to lump sum payments to participants, resulting in settlement charges of $96 that were recorded in Restructuring and other charges.

The funded status of all of Arconic's pension and other postretirement benefit plans are measured as of December 31 each calendar year.

Obligations and Funded Status

	Pension benefits		Other postretirement benefits	
December 31,	**2018**	**2017**	**2018**	**2017**
Change in benefit obligation				
Benefit obligation at beginning of year	$ 7,359	$ 7,026	$ 927	$ 980
Service cost	46	90	7	7
Interest cost	219	234	28	30
Amendments	18	1	(25)	—
Actuarial (gains) losses	(372)	311	(51)	1
Settlements	(146)	—	—	—
Curtailments	(154)	—	—	—
Benefits paid	(422)	(425)	(86)	(98)
Medicare Part D subsidy receipts	—	—	6	7
Foreign currency translation impact	(72)	122	—	—
Benefit obligation at end of year[(1)]	$ 6,476	$ 7,359	$ 806	$ 927
Change in plan assets[(1)]				
Fair value of plan assets at beginning of year	$ 4,862	$ 4,666	$ —	$ —
Actual return on plan assets	(144)	212	—	—
Employer contributions	298	310	—	—
Benefits paid	(397)	(404)	—	—
Administrative expenses	(33)	(33)	—	—
Settlements	(178)	—	—	—
Foreign currency translation impact	(74)	111	—	—
Fair value of plan assets at end of year[(1)]	$ 4,334	$ 4,862	$ —	$ —
Net funded status	$ (2,142)	$ (2,497)	$ (806)	$ (927)
Amounts recognized in the Consolidated Balance Sheet consist of:				
Noncurrent assets	$ 111	$ 89	$ —	$ —
Current liabilities	(23)	(22)	(83)	(86)
Noncurrent liabilities	(2,230)	(2,564)	(723)	(841)
Net amount recognized	$ (2,142)	$ (2,497)	$ (806)	$ (927)
Amounts recognized in Accumulated Other Comprehensive Loss consist of:				
Net actuarial loss	$ 2,957	$ 3,240	$ 87	$ 146
Prior service cost (benefit)	3	10	(27)	(37)
Net amount recognized, before tax effect	$ 2,960	$ 3,250	$ 60	$ 109
Other changes in plan assets and benefit obligations recognized in Other Comprehensive Loss consist of:				
Net actuarial (gain) loss	$ (19)	$ 481	$ (52)	$ 1
Amortization of accumulated net actuarial loss	(264)	(220)	(7)	(5)
Prior service cost (benefit)	19	—	(25)	—
Amortization of prior service (cost) benefit	(26)	(5)	35	8
Net amount recognized, before tax effect	$ (290)	$ 256	$ (49)	$ 4

(1) At December 31, 2018, the benefit obligation, fair value of plan assets, and funded status for U.S. pension plans were $5,282, $3,123, and $(2,159), respectively. At December 31, 2017, the benefit obligation, fair value of plan assets, and funded status for U.S. pension plans were $6,018, $3,544, and $(2,474) respectively.

Pension Plan Benefit Obligations

	Pension benefits	
	2018	2017
The projected benefit obligation and accumulated benefit obligation for all defined benefit pension plans was as follows:		
Projected benefit obligation	$ 6,476	$ 7,359
Accumulated benefit obligation	6,444	7,169
The aggregate projected benefit obligation and fair value of plan assets for pension plans with projected benefit obligations in excess of plan assets was as follows:		
Projected benefit obligation	5,435	6,600
Fair value of plan assets	3,182	4,016
The aggregate accumulated benefit obligation and fair value of plan assets for pension plans with accumulated benefit obligations in excess of plan assets was as follows:		
Accumulated benefit obligation	5,415	6,422
Fair value of plan assets	3,179	3,998

Components of Net Periodic Benefit Cost

	Pension benefits(1)			Other postretirement benefits(2)		
For the year ended December 31,	**2018**	**2017**	**2016**	**2018**	**2017**	**2016**
Service cost	$ 46	$ 90	$ 155	$ 7	$ 7	$ 13
Interest cost	219	234	431	28	30	63
Expected return on plan assets	(306)	(332)	(677)	—	—	—
Recognized net actuarial loss	168	220	380	7	5	24
Amortization of prior service cost (benefit)	3	5	13	(7)	(8)	(24)
Settlements(3)	96	—	19	—	—	—
Curtailments(4)	23	—	—	(28)	—	—
Special termination benefits(5)	—	—	2	—	—	—
Net periodic benefit cost(6)	$ 249	$ 217	$ 323	$ 7	$ 34	$ 76
Discontinued operations	—	—	122	—	—	41
Net amount recognized in Statement of Consolidated Operations	$ 249	$ 217	$ 201	$ 7	$ 34	$ 35

Note: the footnotes below include components of Net Periodic Benefit Cost related to Alcoa Corporation through the completion of the Separation Transaction in 2016.

(1) In 2018, 2017 and 2016, net periodic benefit cost for U.S. pension plans was $239, $206, and $261, respectively.

(2) In 2018, 2017 and 2016, net periodic benefit cost for other postretirement benefits reflects a reduction of $10, $11, and $22, respectively, related to the recognition of the federal subsidy awarded under Medicare Part D.

(3) In 2018 and 2016, settlements were due to workforce reductions (see Note D) and the payment of lump sum benefits and/or purchases of annuity contracts.

(4) In 2018, curtailments were due to a reduction of future benefits, resulting in the recognition of favorable and unfavorable plan amendments.

(5) In 2016, special termination benefits were due to workforce reductions (see Note D).

(6) Amounts attributed to joint venture partners are not included. Service cost was included within Cost of goods sold, Selling, general administrative, and other expenses, and Research and development expenses; curtailments and settlements were included in Restructuring and other charges; and all other cost components were recorded in Other expense (income), net in the Statement of Consolidated Operations.

Amounts Expected to be Recognized in Net Periodic Benefit Cost

	Pension benefits	Other postretirement benefits
December 31,	**2019**	**2019**
Net actuarial loss recognition	$ 139	$ 3
Prior service cost (benefit) recognition	2	(4)

Assumptions

Weighted average assumptions used to determine benefit obligations for U.S. pension and other postretirement benefit plans were as follows (assumptions for non-U.S. plans did not differ materially):

December 31,	2018	2017
Discount rate	4.35%	3.75%
Rate of compensation increase	3.50	3.50
Cash balance plan interest crediting rate	3.00	3.00

The discount rate is determined using a Company-specific yield curve model (above-median) developed with the assistance of an external actuary. The cash flows of the plans' projected benefit obligations are discounted using a single equivalent rate derived from yields on high quality corporate bonds, which represent a broad diversification of issuers in various sectors, including finance and banking, industrials, transportation, and utilities, among others. The yield curve model parallels the plans' projected cash flows, which have an average duration of 10 years. The underlying cash flows of the bonds included in the model exceed the cash flows needed to satisfy the Company's plans' obligations multiple times.

The rate of compensation increase is based upon actual experience. For 2019, the rate of compensation increase will be 3.5%, which approximates the five-year average.

Weighted average assumptions used to determine net periodic benefit cost for U.S. pension and other postretirement benefit plans were as follows (assumptions for non-U.S. plans did not differ materially):

	2018	2017	2016
Discount rate to calculate service cost[(1)]	3.75%	4.20%	4.29%
Discount rate to calculate interest cost[(1)]	3.30	3.60	3.15
Expected long-term rate of return on plan assets	7.00	7.75	7.75
Rate of compensation increase	3.50	3.50	3.50
Cash balance plan interest crediting rate	3.00	3.00	3.00

(1) In all periods presented, the respective discount rates were used to determine net periodic benefit cost for most U.S. pension plans for the full annual period. However, the discount rates for a limited number of plans were updated during 2018, 2017, and 2016 to reflect the remeasurement of these plans due to new union labor agreements, settlements, and/or curtailments. The updated discount rates used were not significantly different from the discount rates presented.

In conjunction with the annual measurement of the funded status of Arconic's pension and other postretirement benefit plans at December 31, 2015, management elected to change the manner in which the interest cost component of net periodic benefit costs is determined in 2016 and beyond. Previously, the interest component was determined by multiplying the single equivalent rate and the aggregate discounted cash flows of the plans' projected benefit obligations. Under the new methodology, the interest cost component is determined by aggregating the product of the discounted cash flows of the plans' projected benefit obligations for each year and an individual spot rate (referred to as the "spot rate" approach). This change resulted in a lower interest cost component of net periodic benefit cost under the new methodology compared to the previous methodology in 2018, 2017, and 2016 of $24, $34, and $84, respectively, for pension plans and $4, $6, and $14, respectively, for other postretirement benefit plans. Management believes this new methodology, which represents a change in an accounting estimate, is a better measure of the interest cost as each year's cash flows are specifically linked to the interest rates of bond payments in the same respective year.

The expected long-term rate of return on plan assets is generally applied to a five-year market-related value of plan assets (a fair value at the plan measurement date is used for certain non-U.S. plans). The process used by management to develop this assumption is one that relies on a combination of historical asset return information and forward-looking returns by asset class. As it relates to historical asset return information, management focuses on various historical moving averages when developing this assumption. While consideration is given to recent performance and historical returns, the assumption represents a long-term, prospective return. Management also incorporates expected future returns on current and planned asset allocations using information from various external investment managers and consultants, as well as management's own judgment.

For 2018, 2017, and 2016, the expected long-term rate of return used by management was based on the prevailing and planned strategic asset allocations, as well as estimates of future returns by asset class. These rates fell within the respective range of the 20-year moving average of actual performance and the expected future return developed by asset class. In 2018, management reduced the expected long-term rate of return by 75 basis points due to a decrease in the expected return by asset class and the 20-year moving average. For 2019, management anticipates that 7.00% will be the expected long-term rate of return.

Assumed health care cost trend rates for U.S. other postretirement benefit plans were as follows (assumptions for non-U.S. plans did not differ materially):

	2018	2017	2016
Health care cost trend rate assumed for next year	5.50%	5.50%	5.50%
Rate to which the cost trend rate gradually declines	4.50	4.50	4.50
Year that the rate reaches the rate at which it is assumed to remain	2022	2021	2020

The assumed health care cost trend rate is used to measure the expected cost of gross eligible charges covered by Arconic's other postretirement benefit plans. For 2019, a 5.5% trend rate will be used, reflecting management's best estimate of the change in future health care costs covered by the plans. The plans' actual annual health care cost trend experience over the past three years has ranged from (3.3)% to (0.5)%. Management does not believe this three-year range is indicative of expected increases for future health care costs over the long-term.

Assumed health care cost trend rates have an effect on the amounts reported for the health care plan. A one-percentage point change in these assumed rates would have the following effects:

	1% increase	1% decrease
Effect on other postretirement benefit obligations	$ 22	$ (22)
Effect on total of service and interest cost components	1	(1)

Plan Assets

Arconic's pension plans' investment policy and weighted average asset allocations at December 31, 2018 and 2017, by asset class, were as follows:

		Plan assets at December 31,	
Asset class	**Policy range**	**2018**	**2017**
Equities	20–55%	29%	28%
Fixed income	25–55%	48	47
Other investments	15–35%	23	25
Total		100%	100%

The principal objectives underlying the investment of the pension plans' assets are to ensure that Arconic can properly fund benefit obligations as they become due under a broad range of potential economic and financial scenarios, maximize the long-term investment return with an acceptable level of risk based on such obligations, and broadly diversify investments across and within various asset classes to protect asset values against adverse movements. Specific objectives for long-term investment strategy include reducing the volatility of pension assets relative to pension liabilities and achieving diversification across the balance of the asset portfolio. The use of derivative instruments is permitted where appropriate and necessary for achieving overall investment policy objectives. The investment strategy has used long duration cash bonds and derivative instruments to offset a portion of the interest rate sensitivity of U.S. pension liabilities. Exposure to broad equity risk has been decreased and diversified through investments in discretionary and systematic macro hedge funds, long/short equity hedge funds, high yield bonds, emerging market debt and global and emerging market equities. Investments are further diversified by strategy, asset class, geography, and sector to enhance returns and mitigate downside risk. A large number of external investment managers are used to gain broad exposure to the financial markets and to mitigate manager-concentration risk.

Investment practices comply with the requirements of the Employee Retirement Income Security Act of 1974 (ERISA) and other applicable laws and regulations.

The following section describes the valuation methodologies used by the trustees to measure the fair value of pension plan assets, including an indication of the level in the fair value hierarchy in which each type of asset is generally classified (see Note R for the definition of fair value and a description of the fair value hierarchy).

Equities. These securities consist of: (i) direct investments in the stock of publicly traded U.S. and non-U.S. companies, and equity derivatives, that are valued based on the closing price reported in an active market on which the individual securities are traded (generally classified in Level 1); (ii) the plans' share of commingled funds that are invested in the stock of publicly traded companies and are valued at the net asset value of shares held at December 31 (included in Level 1); and (iii) direct investments in long/short equity hedge funds and private equity (limited partnerships and venture capital partnerships) that are valued at net asset value.

Fixed income. These securities consist of: (i) U.S. government debt that are generally valued using quoted prices (included in Level 1); (ii) cash and cash equivalents invested in publicly-traded funds and are valued based on the closing price reported in an active market on which the individual securities are traded (generally classified in Level 1); (iii) publicly traded U.S. and non-U.S. fixed interest obligations (principally corporate bonds and debentures) and are valued through consultation and evaluation with brokers in the institutional market using quoted prices and other observable market data (included in Level 2); (iv) fixed income derivatives that are generally valued using industry standard models with market-based observable inputs (included in Level 2); and (v) cash and cash equivalents invested in institutional funds and are valued at net asset value.

Other investments. These investments include, among others: (i) exchange traded funds, such as gold, and real estate investment trusts and are valued based on the closing price reported in an active market on which the investments are traded (included in Level 1) and (ii) direct investments of discretionary and systematic macro hedge funds and private real estate (includes limited partnerships) and are valued at net asset value.

The fair value methods described above may not be indicative of net realizable value or reflective of future fair values. Additionally, while Arconic believes the valuation methods used by the plans' trustees are appropriate and consistent with other market participants, the use of different methodologies or assumptions to determine the fair value of certain financial instruments could result in a different fair value measurement at the reporting date.

The following table presents the fair value of pension plan assets classified under the appropriate level of the fair value hierarchy or net asset cost:

December 31, 2018	Level 1	Level 2	Net asset value	Total
Equities:				
Equity securities	$ 318	$ —	$ 578	$ 896
Long/short equity hedge funds	—	—	232	232
Private equity	—	—	147	147
	$ 318	$ —	$ 957	$ 1,275
Fixed income:				
Intermediate and long duration government/credit	$ 200	$ 934	$ 770	$ 1,904
Other	9	9	152	170
	$ 209	$ 943	$ 922	$ 2,074
Other investments:				
Real estate	$ 81	$ —	$ 164	$ 245
Discretionary and systematic macro hedge funds	—	—	471	471
Other	56	—	212	268
	$ 137	$ —	$ 847	$ 984
Net plan assets[(1)]	$ 664	$ 943	$ 2,726	$ 4,333

December 31, 2017	Level 1	Level 2	Net Asset Value	Total
Equities				
Equity securities	$ 379	$ —	$ 593	$ 972
Long/short equity hedge funds	—	—	230	230
Private equity	—	—	155	155
	$ 379	$ —	$ 978	$ 1,357
Fixed income:				
Intermediate and long duration government/credit	$ 201	$ 981	$ 779	$ 1,961
Other	164	8	145	317
	$ 365	$ 989	$ 924	$ 2,278
Other investments:				
Real estate	$ 85	$ —	$ 172	$ 257
Discretionary and systematic macro hedge funds	—	—	583	583
Other	77	7	275	359
	$ 162	$ 7	$ 1,030	$ 1,199
Net plan assets[(2)]	$ 906	$ 996	$ 2,932	$ 4,834

(1) As of December 31, 2018, the total fair value of pension plans' assets excludes a net receivable of $1, which represents securities purchased and sold but not yet settled plus interest and dividends earned on various investments.

(2) As of December 31, 2017, the total fair value of pension plans' assets excludes a net receivable of $28, which represents assets due from Alcoa Corporation as a result of plan separations and securities sold not yet settled plus interest and dividends earned on various investments.

Funding and Cash Flows

It is Arconic's policy to fund amounts for pension plans sufficient to meet the minimum requirements set forth in applicable country benefits laws and tax laws. Periodically, Arconic contributes additional amounts as deemed appropriate. In 2018 and 2017, cash contributions to Arconic's pension plans were $298 and $310, respectively. The $298 includes $72 contributed to the Company's U.S. plans that was in excess of the minimum required under ERISA.

The minimum required contribution to pension plans in 2019 is estimated to be $255 (of which $230 is for U.S. plans) and includes $34 related to an agreement reached with the Pension Benefit Guaranty Corporation (PBGC), as discussed in the following paragraph.

During the third quarter of 2016, the PBGC approved management's plan to separate the Alcoa Inc. pension plans between Arconic Inc. and Alcoa Corporation. The plan stipulates that Arconic will make cash contributions over a period of 30 months (from November 1, 2016) to its two largest pension plans. Payments are expected to be made in three increments of no less than $50 each ($150 total) over this 30-month period. The Company made payments of $50 in March 2018 and $50 in April 2017. In the third quarter of 2018, the 2018 U.S. pension plan valuations were completed and additional pension contributions of $16 that were made in the first quarter of 2018 were able to be used to partially satisfy the third $50 requirement. The remaining $34 payment is expected to be made in 2019. Through the end of 2018, $116 of pension contributions have been made toward the $150 requirement.

Benefit payments expected to be paid to pension and other postretirement benefit plans' participants and expected Medicare Part D subsidy receipts are as follows utilizing the current assumptions outlined above:

For the year ended December 31,	Pension benefits paid	Gross Other post-retirement benefits	Medicare Part D subsidy receipts	Net Other post-retirement benefits
2019	$ 460	$ 90	$ 5	$ 85
2020	460	85	5	80
2021	455	85	5	80
2022	455	85	5	80
2023	450	85	5	80
Thereafter	2,170	300	25	275
	$ 4,450	$ 730	$ 50	$ 680

Defined Contribution Plans

Arconic sponsors savings and investment plans in various countries, primarily in the United States. Arconic's contributions and expenses related to these plans were $123 in 2018, $89 in 2017, and $71 in 2016. In the United States, employees may contribute a portion of their compensation to the plans, and Arconic matches a portion of these contributions in equivalent form of the investments elected by the employee.

H. Income Taxes

The components of income from continuing operations before income taxes were as follows:

For the year ended December 31,	2018	2017	2016
United States	$ 518	$ 500	$ 84
Foreign	350	(30)	330
	$ 868	$ 470	$ 414

The provision for income taxes consisted of the following:

For the year ended December 31,	2018	2017	2016
Current:			
Federal[1]	$ 45	$ —	$ —
Foreign	138	98	133
State and local	4	(2)	1
	187	96	134
Deferred:			
Federal	146	489	1,208
Foreign	(94)	37	136
State and local	(13)	(78)	(2)
	39	448	1,342
Total	$ 226	$ 544	$ 1,476

(1) Includes U.S. taxes related to foreign income

Arconic has unamortized tax-deductible goodwill of $26 resulting from intercompany stock sales and reorganizations. Arconic recognizes the tax benefits (at a 25% rate) associated with this tax-deductible goodwill when it is amortized for local income tax purposes rather than in the period in which the transaction is consummated.

A reconciliation of the U.S. federal statutory rate to Arconic’s effective tax rate was as follows (the effective tax rate for all periods was a provision on income):

For the year ended December 31,	2018	2017	2016
U.S. federal statutory rate	21.0 %	35.0 %	35.0 %
Taxes on foreign operations	4.0	(8.8)	(11.5)
U.S. State and local taxes	1.5	0.7	(0.4)
Federal benefit of state tax	(0.3)	3.7	0.4
Permanent differences on restructuring and other charges and asset disposals[1]	(16.9)	(167.4)	(107.8)
Non-deductible acquisition costs	—	0.3	8.4
Statutory tax rate and law changes[2]	6.5	52.5	(15.7)
Tax holidays	(1.6)	(3.0)	(0.8)
Changes in valuation allowances	0.9	137.9	426.8
Impairment of goodwill	—	53.5	—
Company-owned life insurance/split-dollar net premiums	—	—	23.0
Changes in uncertain tax positions	12.8	10.1	2.1
Prior year tax adjustments	(2.6)	(0.9)	(1.7)
Other	0.7	2.1	(1.3)
Effective tax rate	26.0 %	115.7 %	356.5 %

(1) Additional losses were reported in Spain's 2017 tax return related to the Separation Transaction which are offset by an increased valuation allowance.

(2) In 2018, the Company finalized its accounting for the Tax Cuts and Jobs Act of 2017 ("the 2017 Act”) and recorded an additional $59 charge. In December 2017, an estimated $272 tax charge was recorded with respect to the enactment of the 2017 Act. In December 2016, Spain and the United States enacted tax law changes which resulted in the remeasurement of certain deferred tax liabilities recorded by Arconic.

On December 22, 2017, the 2017 Act was signed into law, making significant changes to the Internal Revenue Code. Changes include, but are not limited to, a corporate tax rate decrease from 35% to 21% effective for tax years beginning after December 31, 2017, the transition of U.S. international taxation from a worldwide tax system to a territorial system, and a one-time transition tax on the non-previously taxed post-1986 foreign earnings and profits of certain U.S.-owned foreign corporations as of December 31, 2017. Also on December 22, 2017, Staff Accounting Bulletin No. 118 ("SAB 118"), Income Tax Accounting Implications of the Tax Cuts and Jobs Act, was issued by the SEC to address the application of U.S. GAAP for financial reporting. SAB 118 permitted the use of provisional amounts based on reasonable estimates in the financial statements. SAB

118 also provided that the tax impact may be considered incomplete in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the 2017 Act.

The Company calculated a reasonable estimate of the impact of the 2017 Act's tax rate reduction and one-time transition tax in its 2017 year end income tax provision in accordance with its understanding of the 2017 Act and guidance available and, as a result, recorded a $272 tax charge in the fourth quarter of 2017, the period in which the legislation was enacted.

In 2018, the Company included a $59 tax charge in income from continuing operations as a result of finalizing its accounting for the 2017 Tax Act in accordance with SAB 118. This charge primarily related to a $16 charge for the one-time transition tax and a $43 charge to update deferred tax balances.

The components of net deferred tax assets and liabilities were as follows:

	2018		2017	
December 31,	**Deferred tax assets**	**Deferred tax liabilities**	**Deferred tax assets**	**Deferred tax liabilities**
Depreciation	$ 38	$ 694	$ 31	$ 693
Employee benefits	836	27	936	23
Loss provisions	94	—	134	14
Deferred income/expense	22	1,102	19	1,144
Tax loss carryforwards	3,159	—	3,305	—
Tax credit carryforwards	579	—	638	—
Other	94	20	24	33
	$ 4,822	$ 1,843	$ 5,087	$ 1,907
Valuation allowance	(2,486)	—	(2,584)	—
	$ 2,336	$ 1,843	$ 2,503	$ 1,907

The following table details the expiration periods of the deferred tax assets presented above:

December 31, 2018	Expires within 10 years	Expires within 11-20 years	No expiration[(1)]	Other[(2)]	Total
Tax loss carryforwards	$ 300	$ 461	$ 2,398	$ —	$ 3,159
Tax credit carryforwards	497	70	12	—	579
Other	—	—	64	1,020	1,084
Valuation allowance	(752)	(287)	(1,390)	(57)	(2,486)
	$ 45	$ 244	$ 1,084	$ 963	$ 2,336

(1) Deferred tax assets with no expiration may still have annual limitations on utilization.

(2) Other represents deferred tax assets whose expiration is dependent upon the reversal of the underlying temporary difference. A substantial amount of Other relates to employee benefits that will become deductible for tax purposes over an extended period of time as contributions are made to employee benefit plans and payments are made to retirees.

The total deferred tax asset (net of valuation allowance) is supported by projections of future taxable income exclusive of reversing temporary differences (24%) and taxable temporary differences that reverse within the carryforward period (76%).

Valuation allowances are recorded to reduce deferred tax assets when it is more likely than not (greater than 50%) that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management considers all potential sources of taxable income, including income available in carryback periods, future reversals of taxable temporary differences, projections of taxable income, and income from tax planning strategies, as well as all available positive and negative evidence. Positive evidence includes factors such as a history of profitable operations, projections of future profitability within the carryforward period, including from tax planning strategies, and Arconic's experience with similar operations. Existing favorable contracts and the ability to sell products into established markets are additional positive evidence. Negative evidence includes items such as cumulative losses, projections of future losses, or carryforward periods that are not long enough to allow for the utilization of a deferred tax asset based on existing projections of income. Deferred tax assets for which no valuation allowance is recorded may not be realized upon changes in facts and circumstances, resulting in a future charge to establish a valuation allowance. Existing valuation allowances are re-examined under the same standards of positive and negative evidence. If it is determined that it is more likely than not that a deferred tax asset will be realized, the appropriate amount of the valuation allowance, if any, is released. Deferred tax assets and liabilities are also re-measured to reflect changes in underlying tax rates due to law changes and the granting and lapse of tax holidays.

In 2018, Arconic made a final accounting policy election to apply a tax law ordering approach when considering the need for a valuation allowance on net operating losses expected to offset GILTI income inclusions. Under this approach, reductions in cash tax savings are not considered as part of the valuation allowance assessment. Instead, future GILTI inclusions are considered a source of taxable income that support the realizability of deferred tax assets.

Arconic's foreign tax credits in the United States have a 10-year carryforward period with expirations ranging from 2019 to 2027 (as of December 31, 2018). Valuation allowances were initially established in prior years on a portion of the foreign tax credit carryforwards, primarily due to insufficient foreign source income to allow for full utilization of the credits within the expiration period. After consideration of all available evidence including potential tax planning strategies, incremental valuation allowances of $46, $9 and $302 were recognized in 2018, 2017 and 2016, respectively. Foreign tax credits of $8, $57, and $128 expired at the end of 2018, 2017, and 2016, respectively, resulting in a corresponding decrease to the valuation allowance. At December 31, 2018, the cumulative amount of the valuation allowance was $417. The need for this valuation allowance will be reassessed on a continuous basis in future periods and, as a result, the allowance may increase or decrease based on changes in facts and circumstances.

Arconic released $10 and $98 of certain U.S. state valuation allowances in 2018 and 2017, respectively. After weighing all available positive and negative evidence, management determined that the underlying net deferred tax assets were more likely than not realizable based on projected taxable income estimates taking into account expected post-separation apportionment data. Valuation allowances of $675 remain against other net state deferred tax assets expected to expire before utilization. The need for valuation allowances against net state deferred tax assets will be reassessed on a continuous basis in future periods and, as a result, the allowance may increase or decrease based on changes in facts and circumstances.

In 2018, Arconic reduced a valuation allowance by $92 as a result of increasing a tax reserve for unrecognized tax benefits in Spain. The valuation allowance reduction was partially offset by a $20 charge with respect to losses no longer supported by reversing temporary differences. Arconic also recorded an additional valuation allowance of $61 and $675 in 2018 and 2017, respectively, which offsets a deferred tax asset recorded for additional losses reported on the Spanish tax return related to the Separation Transaction that are not more likely than not to be realized.

In 2016, Arconic recognized a $1,267 discrete income tax charge for valuation allowances related to the Separation Transaction, including $925 with respect to Alcoa Corporation's net deferred tax assets in the United States, $302 with respect to Arconic's foreign tax credits in the United States, and $42 with respect to certain deferred tax assets in Luxembourg, partially offset by $2 related to the net impact of other smaller items. After weighing all positive and negative evidence, as described above, management determined that the net deferred tax assets of Alcoa Corporation were not more likely than not to be realized due to lack of historical and projected domestic source taxable income. As such, a valuation allowance was recorded immediately prior to separation.

In 2016, Arconic also recorded additional valuation allowances in Australia of $93 related to the Separation Transaction, in Spain of $163 related to a tax law change and in Luxembourg of $280 related to the Separation Transaction as well as a tax law change. These valuation allowances fully offset current year changes in deferred tax asset balances of each respective jurisdiction, resulting in no net impact to tax expense. The need for a valuation allowance will be reassessed on a continuous basis in future periods by each jurisdiction and, as a result, the allowances may increase or decrease based on changes in facts and circumstances.

Arconic also recognized discrete income tax benefits in 2016 related to the release of valuation allowances on certain net deferred tax assets in Russia and Canada of $19 and $20, respectively. After weighing all available evidence, management determined that it was more likely than not that the net income tax benefits associated with the underlying deferred tax assets would be realizable based on historic cumulative income and projected taxable income.

The following table details the changes in the valuation allowance:

December 31,	2018	2017	2016
Balance at beginning of year	$ 2,584	$ 1,940	$ 1,291
Increase to allowance	136	831	772
Release of allowance	(154)	(246)	(209)
Acquisitions and divestitures	—	(1)	(1)
Tax apportionment, tax rate and tax law changes	(14)	(24)	106
Foreign currency translation	(66)	84	(19)
Balance at end of year	$ 2,486	$ 2,584	$ 1,940

As a result of the 2017 Act, the non-previously taxed post-1986 foreign earnings and profits (calculated based on U.S. tax principles) of certain U.S.-owned foreign corporations has been subject to U.S. tax under the one-time transition tax provisions. The 2017 Act also created a new requirement that certain income earned by foreign subsidiaries, GILTI, must be included in the gross income of the U.S. shareholder. The 2017 Act also established the Base Erosion and Anti-Abuse Tax (BEAT). In the first quarter of 2018, Arconic made a final accounting policy election to treat taxes due from future inclusions in U.S. taxable income related to GILTI as a current period expense when incurred. Arconic has estimated a GILTI inclusion for 2018 and recorded tax expense accordingly. Arconic does not anticipate being subject to BEAT for 2018.

Foreign U.S. GAAP earnings that have not otherwise been subject to U.S. tax, will generally be exempt from future U.S. tax under the 2017 Act when distributed. Such distributions, as well as distributions of previously taxed foreign earnings, could potentially be subject to U.S. state tax in certain states, and foreign withholding taxes. Foreign currency gains/losses related to the translation of previously taxed earnings from functional currency to U.S. dollars could also be subject to U.S. tax when distributed. At this time, Arconic has no plans to distribute such earnings in the foreseeable future. If such earnings were to be distributed, Arconic would expect the potential U.S. state tax and withholding tax impacts to be immaterial and the potential deferred tax liability associated with future foreign currency gains to be impracticable to determine.

Arconic and its subsidiaries file income tax returns in the U.S. federal jurisdiction and various states and foreign jurisdictions. With a few minor exceptions, Arconic is no longer subject to income tax examinations by tax authorities for years prior to 2006. All U.S. tax years prior to 2018 have been audited by the Internal Revenue Service. Various state and foreign jurisdiction tax authorities are in the process of examining Arconic’s income tax returns for various tax years through 2017.

A reconciliation of the beginning and ending amount of unrecognized tax benefits (excluding interest and penalties) was as follows:

December 31,	2018	2017	2016
Balance at beginning of year	$ 73	$ 28	$ 18
Additions for tax positions of the current year	—	23	12
Additions for tax positions of prior years	143	27	—
Reductions for tax positions of prior years	(42)	—	—
Settlements with tax authorities	—	—	(1)
Expiration of the statute of limitations	(6)	(5)	(1)
Foreign currency translation	(2)	—	—
Balance at end of year	$ 166	$ 73	$ 28

For all periods presented, a portion of the balance pertains to state tax liabilities, which are presented before any offset for federal tax benefits. The effect of unrecognized tax benefits, if recorded, that would impact the annual effective tax rate for 2018, 2017, and 2016 would be approximately 5%, 15%, and 6%, respectively, of pre-tax book income. Arconic does not anticipate that changes in its unrecognized tax benefits will have a material impact on the Statement of Consolidated Operations during 2019.

It is Arconic’s policy to recognize interest and penalties related to income taxes as a component of the Provision for income taxes on the accompanying Statement of Consolidated Operations. Arconic recognized interest of $22 and $1 for 2018 and 2017, respectively, but did not recognize any interest or penalties in 2016. Due to the expiration of the statute of limitations, settlements with tax authorities, and refunded overpayments, Arconic recognized interest income of $1 and $2 in 2018 and 2017, respectively, but did not recognize any interest income in 2016. As of December 31, 2018, and 2017, the amount accrued for the payment of interest and penalties was $21 and $2, respectively.

I. Preferred and Common Stock

Preferred Stock. Arconic has two classes of preferred stock: Class A Preferred Stock and Class B Serial Preferred Stock. Class A Preferred Stock has 660,000 shares authorized at a par value of $100 per share with an annual $3.75 cumulative dividend preference per share. There were 546,024 shares of Class A Preferred Stock outstanding at December 31, 2018 and 2017. Class B Serial Preferred Stock has 10,000,000 shares authorized at a par value of $1 per share. There were no shares of Class B Serial Preferred Stock outstanding at December 31, 2018 and 2017 (see below).

In September 2014, Arconic completed a public offering under its shelf registration statement for $1,250 of 25 million depositary shares, each of which represents a 1/10th interest in a share of Arconic’s 5.375% Class B Mandatory Convertible Preferred Stock, Series 1, par value $1 per share, liquidation preference $500 per share (the “Mandatory Convertible Preferred Stock”). The 25 million depositary shares are equivalent to 2.5 million shares of Mandatory Convertible Preferred Stock. Each depositary share entitled the holder, through the depositary, to a proportional fractional interest in the rights and preferences of a share of Mandatory Convertible Preferred Stock, including conversion, dividend, liquidation, and voting rights, subject to terms of the deposit agreement. Arconic received $1,213 in net proceeds from the public offering reflecting an underwriting discount. The net proceeds were used, together with the net proceeds of issued debt, to finance the cash portion of the acquisition of Firth Rixson. The underwriting discount was recorded as a decrease to Additional capital. The Mandatory Convertible Preferred Stock constituted a series of Arconic’s Class B Serial Preferred Stock, which ranks senior to Arconic’s common stock and junior to Arconic’s Class A Preferred Stock and existing and future indebtedness. Holders of the Mandatory Convertible Preferred Stock generally had no voting rights.

Dividends on the Mandatory Convertible Preferred Stock were cumulative in nature and paid at the rate of $26.8750 per annum per share in 2016 and 2015, which commenced January 1, 2015 (paid on December 30, 2014).

On October 2, 2017, all outstanding 24,975,978 depositary shares (each depositary share representing a 1/10th interest in a share of the mandatory convertible preferred stock) were converted at a rate of 1.56996 into 39,211,286 common shares; 24,022 depositary shares were previously tendered for early conversion into 31,420 shares of Arconic common stock. No gain or loss was recognized associated with this equity transaction. Dividends on the Mandatory Convertible Preferred Stock were paid at the rate of $20.1563 per share in 2017.

Common Stock. Pursuant to the authorization provided at a special meeting of Arconic common shareholders held on October 5, 2016, shareholders approved a 1-for-3 reverse stock split of Arconic’s outstanding and authorized shares of common stock (the “Reverse Stock Split”). As a result of the Reverse Stock Split, every three shares of issued and outstanding common stock were combined into one issued and outstanding share of common stock. The Reverse Stock Split reduced the number of shares of common stock outstanding from approximately 1.3 billion shares to approximately 0.4 billion shares. The par value of the common stock remained at $1 per share. Accordingly, Common stock and Additional capital in the accompanying Consolidated Balance Sheet at December 31, 2016 reflected a decrease and increase of $877, respectively. The number of authorized shares of common stock was also decreased from 1.8 billion shares to 0.6 billion shares. The Company’s common stock began trading on a reverse stock split-adjusted basis on the NYSE on October 6, 2016.

In August 2016, Arconic retired its outstanding treasury stock consisting of approximately 25 million shares (76 million shares pre-Reverse Stock Split). As a result, Common stock and Additional capital in the accompanying 2016 Consolidated Balance Sheet were decreased by $76 and $2,563, respectively, to reflect the retirement of the treasury shares. As of December 31, 2018, and 2017, there was no outstanding treasury stock.

In July 2015, through the acquisition of RTI International Metals Inc. (RTI), Arconic assumed the obligation to repay two tranches of convertible debt; one tranche was due and settled in cash on December 1, 2015 (principal amount of $115) and the other tranche is due on October 15, 2019 (principal amount of $403), unless earlier converted or purchased by Arconic at the holder’s option under specific conditions. Upon conversion of the 2019 convertible notes, holders will receive, at Arconic’s election, cash, shares of common stock (approximately 14,453,000 shares using the December 31, 2018 conversion rate of 35.9125 shares per $1,000 (not in millions) bond or per-share conversion price of $27.8455), or a combination of cash and shares. On the maturity date, each holder of outstanding notes will be entitled to receive $1,000 (not in millions) in cash for each $1,000 (not in millions) bond, together with accrued and unpaid interest.

At December 31, 2018, 483,270,717 shares were issued and outstanding. Dividends paid in 2018 and 2017 were $0.24 per annum or $0.06 per quarter and $0.36 per annum or $0.09 per quarter in 2016.

As of December 31, 2018, 47 million shares of common stock were reserved for issuance under Arconic’s stock-based compensation plans. As of December 31, 2018, 41 million shares remain available for issuance. Arconic issues new shares to satisfy the exercise of stock options and the conversion of stock awards.

See Note W for further information on common stock repurchases.

Share Activity (number of shares)

	Common stock	
	Treasury	Outstanding
Balance at end of 2015	81,051,103	1,310,160,141
Issued for stock-based compensation plans	(5,219,660)	5,302,128
Treasury stock retirement	(75,831,443)	—
Reverse Stock Split	—	(876,942,489)
Balance at end of 2016	—	438,519,780
Conversion of convertible notes	—	39,242,706
Issued for stock-based compensation plans	—	3,654,051
Balance at end of 2017	—	481,416,537
Issued for stock-based compensation plans	—	1,854,180
Balance at end of 2018	—	483,270,717

Stock-Based Compensation

Arconic has a stock-based compensation plan under which stock options and restricted stock unit awards are granted in January each year to eligible employees. Stock options are granted at the closing market price of Arconic's common stock on the date of grant and typically vest over a three-year service period (1/3 each year) with a ten-year contractual term. In 2018, there were stock options granted that vest over a four-year cliff service period. Restricted stock unit awards typically vest over a three-year service period from the date of grant. As part of Arconic's stock-based compensation plan design, individuals who are retirement-eligible have a six-month requisite service period in the year of grant. Certain of these awards also include performance and market conditions. For the majority of performance stock awards issued in 2018, 2017, and 2016, the final number of shares earned will be based on Arconic's achievement of sales and profitability targets over the respective three-year performance periods. For awards issued in 2018 and 2017, the award will be earned at the end of the three-year performance period. For awards issued in 2016, one-third of the award will be earned each year based on the performance against the pre-established targets for that year. The performance stock awards earned over the three-year period vest at the end of the third year. Additionally, the 2018 and 2017 awards will be scaled by a total shareholder return ("TSR") multiplier, which depends upon relative three-year performance against the TSRs of a group of peer companies.

In 2018, 2017 and 2016, Arconic recognized stock-based compensation expense of $50 ($39 after-tax), $54 ($36 after-tax), and $76 ($51 after-tax), respectively. The expense related to restricted stock unit awards in 2018, 2017 and 2016 was approximately 85%, 85% and 80%, respectively. No stock-based compensation expense was capitalized in any of those years. 2017 stock-based compensation expense was reduced by $13 for certain executive pre-vest cancellations which were recorded in Restructuring and other charges within the Statement of Consolidated Operations. At December 31, 2018, there was $52 (pre-tax) of unrecognized compensation expense related to non-vested stock option grants and non-vested restricted stock unit award grants. This expense is expected to be recognized over a weighted average period of 1.8 years.

Stock-based compensation expense is based on the grant date fair value of the applicable equity grant. For restricted stock unit awards, the fair value was equivalent to the closing market price of Arconic's common stock on the date of grant. The grant date fair value of the 2018 and 2017 performance awards containing a market condition was $20.25 and $21.99, respectively, and was valued using a Monte Carlo model. A Monte Carlo simulation uses assumptions of stock price behavior to estimate the probability of satisfying market conditions and the resulting fair value of the award. The risk-free interest rate (2.7% in 2018 and 1.5% in 2017) was based on a yield curve of interest rates at the time of the grant based on the remaining performance period. Because of limited historical information due to the Separation Transaction, volatility (32.0% in 2018 and 38.0% in 2017) was estimated using implied volatility and the representative price return approach, which uses price returns of comparable companies, was used to develop a correlation assumption. For stock options, the fair value was estimated on the date of grant using a lattice-pricing model, which generated a result of $9.79 ($10.99 for four-year cliff options), $6.26, and $4.78 per option in 2018, 2017, and 2016, respectively. The lattice-pricing model uses a number of assumptions to estimate the fair value of a stock option, including a risk-free interest rate, dividend yield, volatility, exercise behavior, and contractual life. The following paragraph describes in detail the assumptions used to estimate the fair value of stock options granted in 2018 (the assumptions used to estimate the fair value of stock options granted in 2017 and 2016 were not materially different, except as noted below).

The risk-free interest rate (2.5%) was based on a yield curve of interest rates at the time of the grant based on the contractual life of the option. The dividend yield (0.9%) was based on a one-year average. Volatility (34.0% for 2018, 38.1% for 2017, and 44.5% in 2016) was based on comparable companies in 2018 and 2017 (except 2016 historical volatilities were used) and implied volatilities over the term of the option. Arconic utilized historical option forfeiture data to estimate annual pre- and post-vesting forfeitures (6%). Exercise behavior (61%) was based on a weighted average exercise ratio (exercise patterns for grants issued over the number of years in the contractual option term) of an option's intrinsic value resulting from historical employee exercise behavior. Based upon the other assumptions used in the determination of the fair value, the life of an option (6.0 years (7.3 years for four-year cliff options)) was an output of the lattice-pricing model. The activity for stock options and stock awards during 2018 was as follows (options and awards in millions):

	Stock options		Stock awards	
	Number of options	Weighted average exercise price	Number of awards	Weighted average FMV per award
Outstanding, January 1, 2018	11	$ 23.94	7	$ 21.49
Granted	1	29.97	2	26.48
Exercised	(1)	18.95	—	—
Converted	—	—	(1)	32.75
Expired or forfeited	(1)	26.96	(1)	21.10
Performance share adjustment	—	—	—	18.47
Outstanding, December 31, 2018	10	$ 24.95	7	$ 21.13

As of December 31, 2018, the number of stock options outstanding had a weighted average remaining contractual life of 4.8 years and a total intrinsic value of $3. Additionally, 7.8 million of the stock options outstanding were fully vested and exercisable and had a weighted average remaining contractual life of 3.7 years, a weighted average exercise price of $25.49, and a total intrinsic value of $2 as of December 31, 2018. In 2018, 2017, and 2016, the cash received from stock option exercises was $16, $50, and $4 and the total tax benefit realized from these exercises was $2, $4, and $0, respectively. The total intrinsic value of stock options exercised during 2018, 2017 and 2016 was $7, $13, and $1, respectively.

J. Earnings Per Share

Basic earnings per share (EPS) amounts are computed by dividing earnings (loss), after the deduction of preferred stock dividends declared, by the average number of common shares outstanding. Diluted EPS amounts assume the issuance of common stock for all potentially dilutive share equivalents outstanding.

The information used to compute basic and diluted EPS attributable to Arconic common shareholders was as follows (shares in millions):

For the year ended December 31,	2018	2017	2016
Net income (loss) from continuing operations attributable to Arconic	$ 642	$ (74)	$ (1,062)
Less: preferred stock dividends declared	(2)	(53)	(69)
Income (loss) from continuing operations available to Arconic common shareholders	640	(127)	(1,131)
Income from discontinued operations after income taxes and noncontrolling interests[(1)]	—	—	121
Net income (loss) available to Arconic common shareholders—basic	640	(127)	(1,010)
Add: interest expense related to convertible notes	11	—	—
Net income (loss) available to Arconic common shareholders - diluted	$ 651	$ (127)	$ (1,010)
Average shares outstanding - basic	483	451	438
Effect of dilutive securities:			
Stock options	1	—	—
Stock and performance awards	5	—	—
Convertible notes	14	—	—
Average shares outstanding - diluted	503	451	438

(1) Calculated from the Statement of Consolidated Operations as Income from discontinued operations after income taxes less Net income from discontinued operations attributable to noncontrolling interests.

The following shares were excluded from the calculation of average shares outstanding – diluted as their effect was anti-dilutive (shares in millions).

	2018	2017	2016
Mandatory convertible preferred stock	n/a	39	39
Convertible notes	—	14	14
Stock options[1]	9	11	13
Stock awards	—	7	8

(1) The average exercise price of options per share was $26.79, $33.32, and $26.93 for 2018, 2017, and 2016, respectively.

In 2017, had Arconic generated sufficient net income, 30 million, 14 million, 5 million, and 1 million potential shares of common stock related to the mandatory convertible preferred stock, convertible notes, stock awards, and stock options, respectively, would have been included in diluted average shares outstanding. The mandatory convertible preferred stock converted on October 2, 2017 (see Note I).

In 2016, had Arconic generated sufficient net income, 28 million, 10 million, 4 million, and 1 million potential shares of common stock related to the mandatory convertible preferred stock, convertible notes, stock awards, and stock options, respectively, would have been included in diluted average shares outstanding.

K. Accumulated Other Comprehensive Loss

The following table details the activity of the four components that comprise Accumulated other comprehensive loss for both Arconic's shareholders and noncontrolling interests:

	Arconic			Noncontrolling Interests		
	2018	2017	2016	2018	2017	2016
Pension and other postretirement benefits (G)						
Balance at beginning of period	$ (2,230)	$ (2,010)	$ (3,611)	$ —	$ —	$ (56)
Adoption of accounting standard (A)	(369)	—	—	—	—	—
Other comprehensive income (loss):						
Unrecognized net actuarial loss and prior service cost/benefit	70	(466)	(1,112)	—	—	(9)
Tax (expense) benefit	(19)	102	380	—	—	3
Total Other comprehensive income (loss) before reclassifications, net of tax	51	(364)	(732)	—	—	(6)
Amortization of net actuarial loss and prior service cost(1)	262	222	389	—	—	4
Tax expense(2)	(58)	(78)	(136)	—	—	(1)
Total amount reclassified from Accumulated other comprehensive loss, net of tax(8)	204	144	253	—	—	3
Total Other comprehensive income (loss)	255	(220)	(479)	—	—	(3)
Transfer to Alcoa Corporation	—	—	2,080	—	—	59
Balance at end of period	$ (2,344)	$ (2,230)	$ (2,010)	$ —	$ —	$ —
Foreign currency translation						
Balance at beginning of period	$ (437)	$ (689)	$ (2,412)	$ —	$ (2)	$ (780)
Other comprehensive (loss) income(3)	(146)	252	268	—	2	182
Transfer to Alcoa Corporation	—	—	1,455	—	—	596
Balance at end of period	$ (583)	$ (437)	$ (689)	$ —	$ —	$ (2)
Available-for-sale securities						
Balance at beginning of period	$ (2)	$ 132	$ (5)	$ —	$ —	$ —
Other comprehensive (loss) income(4)	(1)	(134)	137	—	—	—
Balance at end of period	$ (3)	$ (2)	$ 132	$ —	$ —	$ —
Cash flow hedges						
Balance at beginning of period	$ 25	$ (1)	$ 597	—	$ —	$ (3)
Adoption of accounting standard (A)	2	—	—	—	—	—
Other comprehensive (loss) income:						
Net change from periodic revaluations	(15)	37	(843)	—	—	36
Tax benefit (expense)	3	(9)	252	—	—	(10)
Total Other comprehensive (loss) income before reclassifications, net of tax	(12)	28	(591)	—	—	26
Net amount reclassified to earnings						
Aluminum contracts(5)	(8)	(2)	1	—	—	—
Energy contracts(6)	—	—	(49)	—	—	(34)
Interest rate contracts(7)	(2)	—	9	—	—	5
Nickel contracts(6)	(4)	(1)	1	—	—	—
Sub-total	(14)	(3)	(38)	—	—	(29)
Tax benefit(2)	3	1	12	—	—	8
Total amount reclassified from Accumulated other comprehensive loss, net of tax(8)	(11)	(2)	(26)	—	—	(21)
Total Other comprehensive (loss) income	(23)	26	(617)	—	—	5
Transfer to Alcoa Corporation	—	—	19	—	—	(2)
Balance at end of period	$ 4	$ 25	$ (1)	$ —	$ —	$ —
Total balance at end of period	$ (2,926)	$ (2,644)	$ (2,568)	$ —	$ —	$ (2)

(1) These amounts were included in the computation of net periodic benefit cost for pension and other postretirement benefits (see Note G).

(2) These amounts were included in Provision for income taxes on the accompanying Statement of Consolidated Operations.

(3) In all periods presented, there were no tax impacts related to rate changes and no amounts were reclassified to earnings.

(4) Realized gains and losses were included in Other expense (income), net, net on the accompanying Statement of Consolidated Operations.

(5) These amounts were included in Sales on the accompanying Statement of Consolidated Operations.

(6) These amounts were included in Cost of goods sold on the accompanying Statement of Consolidated Operations.

(7) These amounts were included in Interest expense on the accompanying Statement of Consolidated Operations.

(8) A positive amount indicates a corresponding charge to earnings and a negative amount indicates a corresponding benefit to earnings. These amounts were reflected on the accompanying Statement of Consolidated Operations in the line items indicated in footnotes 1 through 7.

L. Receivables

Sale of Receivables Program

Arconic has an arrangement with three financial institutions to sell certain customer receivables without recourse on a revolving basis. The sale of such receivables is completed using a bankruptcy remote special purpose entity, which is a consolidated subsidiary of Arconic. This arrangement provides up to a maximum funding of $400 for receivables sold. Arconic maintains a beneficial interest, or a right to collect cash, on the sold receivables that have not been funded (deferred purchase program). On March 30, 2012, Arconic initially sold $304 of customer receivables in exchange for $50 in cash and $254 of deferred purchase program under the arrangement. Arconic has received additional net cash funding of $300 ($2,958 in draws and $2,658 in repayments) since the program's inception, including net cash draws totaling $0 ($600 in draws and $600 in repayments) in 2018 and net cash draws totaling $0 ($600 in draws and $600 in repayments) in 2017.

As of December 31, 2018, and 2017, the deferred purchase program receivable was $234 and $187, respectively, which was included in Other receivables on the accompanying Consolidated Balance Sheet. The deferred purchase program receivable is reduced as collections of the underlying receivables occur; however, as this is a revolving program, the sale of new receivables will result in an increase in the deferred purchase program receivable. The gross amount of receivables sold and total cash collected under this program since its inception was $41,784 and $41,200 respectively. Arconic services the customer receivables for the financial institutions at market rates; therefore, no servicing asset or liability was recorded.

In 2018 and 2017, the gross cash outflows and inflows associated with the deferred purchase program receivable were $6,375 and $6,328 respectively, and $5,471 and $5,367, respectively.

Cash receipts from customer payments on sold receivables (which are cash receipts on the underlying trade receivables that have been previously sold in this program) as well as cash receipts and cash disbursements from draws and repayments under the program are presented as cash receipts from sold receivables within investing activities in the Statement of Consolidated Cash Flows. See Note A for additional information on new accounting guidance that impacts the Company.

Allowance for Doubtful Accounts

The following table details the changes in the allowance for doubtful accounts related to customer receivables and other receivables:

	Customer receivables			Other receivables		
	2018	**2017**	**2016**	**2018**	**2017**	**2016**
Balance at beginning of year	$ 8	$ 13	$ 8	$ 34	$ 32	$ 34
Provision for doubtful accounts	2	1	7	7	9	6
Write off of uncollectible accounts	(2)	(5)	(3)	(2)	(1)	(1)
Recoveries of prior write-offs	—	—	(1)	(3)	(3)	1
Other	(4)	(1)	2	(5)	(3)	(8)
Balance at end of year	$ 4	$ 8	$ 13	$ 31	$ 34	$ 32

M. Inventories

December 31,	2018	2017
Finished goods	$ 668	$ 669
Work-in-process	1,371	1,349
Purchased raw materials	366	381
Operating supplies	87	81
Total inventories	$ 2,492	$ 2,480

At December 31, 2018 and 2017, the portion of inventories valued on a LIFO basis was $1,292 and $1,208, respectively. If valued on an average-cost basis, total inventories would have been $530 and $481 higher at December 31, 2018 and 2017, respectively. During 2018 and 2017, reductions in LIFO inventory quantities caused partial liquidations of the lower cost LIFO inventory base. These liquidations resulted in the recognition of immaterial income amounts in 2018, 2017, and 2016.

In the second quarter of 2018, a charge of $23 was recorded in Cost of goods sold and Inventories to reflect a physical inventory adjustment at one plant in the Engineered Products and Solutions segment. While a portion of this charge relates to prior years, the majority relates to 2018. The out-of-period amounts were not material to any interim or annual periods.

N. Properties, Plants, and Equipment, Net

December 31,	2018	2017
Land and land rights	$ 136	$ 140
Structures:		
Engineered Products and Solutions	796	784
Global Rolled Products	1,068	1,090
Transportation and Construction Solutions	248	268
Other	252	253
	2,364	2,395
Machinery and equipment:		
Engineered Products and Solutions	3,437	3,054
Global Rolled Products	4,629	4,641
Transportation and Construction Solutions	748	777
Other	420	358
	9,234	8,830
	11,734	11,365
Less: accumulated depreciation and amortization	6,769	6,392
	4,965	4,973
Construction work-in-progress	739	621
	$ 5,704	$ 5,594

During the second quarter of 2018, the Company updated its three-year strategic plan and determined that there was a decline in the forecasted financial performance for the disks operations, an asset group within the Arconic Engines business unit. As such, the Company evaluated the recoverability of the long-lived assets by comparing their carrying value of approximately $515 to the estimated undiscounted net cash flows of the disks operations, resulting in an estimated fair value in excess of their carrying value of approximately 13%; thus, there was no impairment. If the disks operations do not achieve the revised forecasted financial performance or if there are changes in any significant assumptions, a material non-cash impairment of long-lived assets may occur in future periods. These significant assumptions include sales growth, cost of raw materials, ramp up of additional production capacity, and working capital. A 1% decrease in the forecasted net cash flows would reduce the undiscounted cash flows by approximately $6. There were no indicators of impairment identified for the disks operations during the third or fourth quarters of 2018 and, as such, the Company did not evaluate the recoverability of its long-lived assets.

O. Goodwill and Other Intangible Assets

The following table details the changes in the carrying amount of goodwill:

	Engineered Products and Solutions	Global Rolled Products	Transportation and Construction Solutions	Total
Balances at December 31, 2016				
Goodwill	$ 4,832	$ 241	$ 128	$ 5,201
Accumulated impairment losses	—	—	(53)	(53)
Goodwill, net	4,832	241	75	5,148
Impairment (A)	(719)	—	—	(719)
Translation and other	92	11	3	106
Balances at December 31, 2017				
Goodwill	4,924	252	131	5,307
Accumulated impairment losses	(719)	—	(53)	(772)
Goodwill, net	4,205	252	78	4,535
Divestitures (T)	(1)	—	—	(1)
Translation and other	(25)	(7)	(2)	(34)
Balances at December 31, 2018				
Goodwill	4,898	245	129	5,272
Accumulated impairment losses	(719)	—	(53)	(772)
Goodwill, net	$ 4,179	$ 245	$ 76	$ 4,500

In 2017, Arconic recognized an impairment of goodwill in the amount of $719 related to the annual impairment review of the Arconic Forgings and Extrusions business. See Goodwill policy in Note A.

Other intangible assets were as follows:

December 31, 2018	Gross carrying amount	Accumulated amortization	Intangibles, net
Computer software	$ 768	$ (657)	$ 111
Patents and licenses	110	(107)	3
Other intangibles	922	(149)	773
Total amortizable intangible assets	1,800	(913)	887
Indefinite-lived trade names and trademarks	32	—	32
Total other intangible assets	$ 1,832	$ (913)	$ 919

December 31, 2017	Gross carrying amount	Accumulated amortization	Intangibles, net
Computer software	$ 789	$ (674)	$ 115
Patents and licenses	110	(107)	3
Other intangibles	953	(116)	837
Total amortizable intangible assets	1,852	(897)	955
Indefinite-lived trade names and trademarks	32	—	32
Total other intangible assets	$ 1,884	$ (897)	$ 987

Computer software consists primarily of software costs associated with an enterprise business solution within Arconic to drive common systems among all businesses.

Amortization expense related to the intangible assets in the tables above for the years ended December 31, 2018, 2017, and 2016 was $81, $71, and $65, respectively, and is expected to be in the range of approximately $63 to $70 annually from 2019 to 2023.

P. Debt

Long-Term Debt.

December 31,	2018	2017
5.72% Notes, due 2019	$ —	$ 500
1.63% Convertible Notes, due 2019	403	403
6.150% Notes, due 2020	1,000	1,000
5.40% Notes, due 2021	1,250	1,250
5.87% Notes, due 2022	627	627
5.125% Notes, due 2024	1,250	1,250
5.90% Notes, due 2027	625	625
6.75% Bonds, due 2028	300	300
5.95% Notes due 2037	625	625
Iowa Finance Authority Loan, due 2042 (4.75%)	250	250
Other[1]	(29)	(23)
	6,301	6,807
Less: amount due within one year	405	1
	$ 5,896	$ 6,806

(1) Includes various financing arrangements related to subsidiaries, unamortized debt discounts related to outstanding notes and bonds listed in the table above, an equity option related to the convertible notes due in 2019, and unamortized debt issuance costs.

The principal amount of long-term debt maturing in each of the next five years is $405 in 2019, $1,000 in 2020, $1,250 in 2021, $627 in 2022, and $0 in 2023.

Public Debt – During the first quarter of 2018, the Company completed the early redemption of its remaining outstanding 5.72% Notes due in 2019, with aggregate principal amount of $500, for $518 in cash including accrued and unpaid interest. As a result, the Company recorded a charge of $19 in Interest expense in the accompanying Statement of Consolidated Operations for 2018 primarily for the premium paid on the early redemption of these notes in excess of their carrying value.

During the second quarter of 2017, the Company announced three separate cash tender offers by the Investment Banks for the purchase of the Company's 6.50% Bonds due 2018 (the "6.50% Bonds"), 6.75% Notes due 2018 (the "6.75% Notes"), and 5.72% Notes due 2019 (the "5.72% Notes"), up to a maximum purchase amount of $1,000 aggregate principal amount of notes, subject to certain conditions. The Investment Banks purchased notes totaling $805 aggregate principal amount, including $150 aggregate principal amount of 6.50% Bonds, $405 aggregate principal amount of 6.75% Notes, and $250 aggregate principal amount of 5.72% Notes.

Also, during the second quarter of 2017, the Company agreed to acquire the notes from the Investment Banks for $409 in cash plus its remaining investment in Alcoa Corporation common stock (12,958,767 shares valued at $35.91 per share) for total consideration of $874 including accrued and unpaid interest. The Company recorded a charge of $58 ($27 in cash) primarily for the premium for the early redemption of the notes, a benefit of $8 for the proceeds of a related interest rate swap agreement, and a charge of $2 for legal fees associated with the transaction in Interest expense, and recorded a gain of $167 in Other income, net in the accompanying Statement of Consolidated Operations for the Debt-for-Equity Exchange.

Finally, during the second quarter of 2017, the Company completed the early redemption of its remaining outstanding 6.50% Bonds, with aggregate principal amount of $100, and its remaining outstanding 6.75% Notes, with aggregate principal amount of $345, for $479 in cash including accrued and unpaid interest. As a result of the early redemption of the 6.50% Bonds and 6.75% Notes, the Company recorded a charge of $24 in Interest expense in the accompanying Statement of Consolidated Operations for the premium paid for the early redemption of these notes in excess of their carrying value.

The Company has the option to redeem certain of its Notes and Bonds in whole or part, at any time at a redemption price equal to the greater of principal amount or the sum of the present values of the remaining scheduled payments, discounted using a defined treasury rate plus a spread, plus in either case accrued and unpaid interest to the redemption date.

Credit Facilities. On July 25, 2014, Arconic entered into a Five-Year Revolving Credit Agreement with a syndicate of lenders and issuers named therein, which provides for a senior unsecured revolving credit facility (the "Credit Facility"). By an Extension Request and Amendment Letter dated as of June 5, 2015, the maturity date of the Credit Facility was extended to July 25, 2020. On September 16, 2016, Arconic entered into Amendment No. 1 to the Five-Year Revolving Credit Agreement to permit the Separation Transaction and to amend certain terms of the Credit Agreement, including the replacement of the existing financial covenant with a leverage ratio and reduction of total commitments available from $4,000 to $3,000. On June 29, 2018, Arconic entered into Amendment No. 2 (“Amendment No. 2”) to amend and restate the Five-Year Revolving Credit Agreement. The Five-Year Revolving Credit Agreement, as so amended and restated, is herein referred to as the “Credit Agreement.”

The Credit Agreement provides a $3,000 Credit Facility, the proceeds of which are to be used to provide working capital or for other general corporate purposes of Arconic. Subject to the terms and conditions of the Credit Agreement, Arconic may from time to time request increases in lender commitments under the Credit Facility, not to exceed $500 in aggregate principal amount, and may also request the issuance of letters of credit, subject to a letter of credit sublimit of $1,000 of the Credit Facility. Pursuant to the Credit Agreement, Arconic shall not permit the ratio of Consolidated Net Debt to Consolidated EBITDA (each as defined in the Credit Agreement) as of the end of each fiscal quarter for the period of the four fiscal quarters most recently ended, to be greater than 4.50 to 1.00, which maximum level will step down successively to 4.00 to 1.00 on December 31, 2018, and to 3.50 to 1.00 on December 31, 2019 and thereafter.

The Credit Agreement includes additional covenants, including, among others, (a) limitations on Arconic’s ability to incur liens securing indebtedness for borrowed money, (b) limitations on Arconic’s ability to consummate a merger, consolidation or sale of all or substantially all of its assets, and (c) limitations on Arconic’s ability to change the nature of its business. As of December 31, 2018, Arconic was in compliance with all such covenants.

The Credit Facility matures on June 29, 2023, unless extended or earlier terminated in accordance with the provisions of the Credit Agreement. Arconic may make two one-year extension requests during the term of the Credit Facility, subject to the lender consent requirements set forth in the Credit Agreement. Under the provisions of the Credit Agreement, Arconic will pay a fee of 0.25% per annum (based on Arconic’s current long-term debt ratings) of the total commitment to maintain the Credit Facility.

The Credit Facility is unsecured and amounts payable under it will rank *pari passu* with all other unsecured, unsubordinated indebtedness of Arconic. Borrowings under the Credit Facility may be denominated in U.S. dollars or euros. Loans will bear interest at a base rate or a rate equal to LIBOR, plus, in each case, an applicable margin based on the credit ratings of Arconic’s outstanding senior unsecured long-term debt. The applicable margin on base rate loans and LIBOR loans will be 0.50% and 1.50% per annum, respectively, based on Arconic’s current long-term debt ratings. Loans may be prepaid without premium or penalty, subject to customary breakage costs.

The obligation of Arconic to pay amounts outstanding under the Credit Facility may be accelerated upon the occurrence of an “Event of Default” as defined in the Credit Agreement. Such Events of Default include, among others, (a) non-payment of obligations; (b) breach of any representation or warranty in any material respect; (c) non-performance of covenants and obligations; (d) with respect to other indebtedness in a principal amount in excess of $100 million, a default thereunder that causes such indebtedness to become due prior to its stated maturity or a default in the payment at maturity of any principal of such indebtedness; (e) the bankruptcy or insolvency of Arconic; and (f) a change in control of Arconic.

There were no amounts outstanding at December 31, 2018 and 2017 and no amounts were borrowed during 2018, 2017, or 2016 under the Credit Facility.

In addition to the Credit Agreement above, Arconic has a number of other credit agreements that provide a combined borrowing capacity of $715 as of December 31, 2018, of which $465 is due to expire in 2019 and $250 is due to expire in 2020. The purpose of any borrowings under these credit arrangements is to provide for working capital requirements and for other general corporate purposes. The covenants contained in all these arrangements are the same as the Credit Agreement. In 2018, 2017, and 2016, Arconic borrowed and repaid $600, $810, and $1,950, respectively, under the respective credit arrangements. The weighted-average interest rate and weighted-average days outstanding of the respective borrowings during 2018, 2017, and 2016 were 3.3%, 2.6%, and 1.9%, respectively, and 46 days, 46 days, and 49 days, respectively.

Short-Term Debt. At December 31, 2018 and 2017, short-term debt was $29 and $38, respectively. These amounts included $29 and $33 at December 31, 2018 and 2017, respectively, related to accounts payable settlement arrangements with certain vendors and third-party intermediaries. These arrangements provide that, at the vendor’s request, the third-party intermediary advances the amount of the scheduled payment to the vendor, less an appropriate discount, before the scheduled payment date and Arconic makes payment to the third-party intermediary on the date stipulated in accordance with the commercial terms negotiated with its vendors. Arconic records imputed interest related to these arrangements in Interest expense on the accompanying Statement of Consolidated Operations.

Commercial Paper. Arconic had no outstanding commercial paper at December 31, 2018 and 2017. In 2018 and 2017, the average outstanding commercial paper was $49 and $67, respectively. Commercial paper matures at various times within one year and had an annual weighted average interest rate of 2.5%, 1.6%, and 1.1% during 2018, 2017, and 2016, respectively.

Q. Other Noncurrent Liabilities and Deferred Credits

December 31,	2018	2017
Environmental remediation (U)	$ 185	$ 253
Income taxes (H)	146	162
Accrued compensation and retirement costs	195	218
Sale-leaseback financing obligation	119	—
Other	94	126
	$ 739	$ 759

The sale-leaseback financing obligation represents the cash received from the sale of the Texarkana, Texas cast house. The transaction has been accounted for as a deferred gain due to continuing involvement. See Note T.

R. Other Financial Instruments

Fair Value. Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair value hierarchy distinguishes between (i) market participant assumptions developed based on market data obtained from independent sources (observable inputs) and (ii) an entity's own assumptions about market participant assumptions developed based on the best information available in the circumstances (unobservable inputs). The fair value hierarchy consists of three broad levels, which gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). The three levels of the fair value hierarchy are described below:

- Level 1 - Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities.
- Level 2 - Inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly or indirectly, including quoted prices for similar assets or liabilities in active markets; quoted prices for identical or similar assets or liabilities in markets that are not active; inputs other than quoted prices that are observable for the asset or liability (e.g., interest rates); and inputs that are derived principally from or corroborated by observable market data by correlation or other means.
- Level 3 - Inputs that are both significant to the fair value measurement and unobservable.

The carrying values of Cash and cash equivalents, Restricted cash, Derivatives, Noncurrent receivables and Short-term debt included in the Consolidated Balance Sheet approximate their fair values. The Company holds exchange-traded fixed income securities which are considered available-for-sale securities that are carried at fair value which is based on quoted market prices which are classified in Level 1 of the fair value hierarchy. The fair value of Long-term debt, less amount due within one year was based on quoted market prices for public debt and on interest rates that are currently available to Arconic for issuance of debt with similar terms and maturities for non-public debt. The fair value amounts for all Long-term debt were classified in Level 2 of the fair value hierarchy.

	2018		2017	
December 31,	Carrying value	Fair value	Carrying value	Fair value
Long-term debt, less amount due within one year	5,896	5,873	6,806	7,443

S. Cash Flow Information

Cash paid for interest and income taxes was as follows:

	2018	2017	2016
Interest, net of amount capitalized	$ 391	$ 508	$ 524
Income taxes, net of amount refunded	$ 74	$ 118	$ 324

As it relates to cash paid for acquisitions, during 2016, Arconic made a $10 cash payment for a working capital adjustment from a prior period acquisition.

During 2016, Arconic sold various securities held by its captive insurance company for $130, and an equity interest in a natural gas pipeline of $145 (Alcoa Corporation), both of which were included in Sales of investments on the accompanying Statement of Consolidated Cash Flows.

In 2016, Arconic received $457 in proceeds from the redemption of certain company-owned life insurance policies, sold its Intalco smelter wharf property (Alcoa Corporation) for $120, and sold the Remmele Medical business (see Note T) for $102. These amounts were included in Proceeds from the sale of assets and businesses on the accompanying Statement of Consolidated Cash Flows.

Noncash Financing and Investing Activities. On October 2, 2017, all outstanding 24,975,978 depositary shares (each depositary share representing a 1/10th interest in a share of the mandatory convertible preferred stock) were converted at a rate of 1.56996 into 39,211,286 common shares; 24,022 depositary shares were previously tendered for early conversion into 31,420 shares of Arconic common stock. No gain or loss was recognized associated with this equity transaction (see Note I).

In the second quarter of 2017, the Company completed a Debt-for-Equity Exchange with the Investment Banks for the remaining portion of Arconic's retained interest in Alcoa Corporation common stock for a portion of the Company's outstanding notes held by the Investment Banks for $465 including accrued and unpaid interest (see Note P).

On October 5, 2016, Arconic completed a 1-for-3 Reverse Stock Split (see Note I). The Reverse Stock Split reduced the number of shares of common stock outstanding from approximately 1.3 billion shares to approximately 0.4 billion shares. The par value of the common stock remained at $1.00 per share. Accordingly, Common stock and Additional capital in the Company's Statement of Changes in Consolidated Equity at December 31, 2016 reflect a decrease and increase of $877, respectively.

In August 2016, Arconic retired its outstanding treasury stock consisting of approximately 76 million shares (see Note I). As a result, Common stock and Additional capital were decreased by $76 and $2,563, respectively, in the Company's Statement of Changes in Consolidated Equity at December 31, 2016, to reflect the retirement of the treasury shares.

T. Acquisitions and Divestitures

2018 Divestitures. On April 2, 2018, Arconic completed the sale of its Latin America extrusions business to a subsidiary of Hydro Extruded Solutions AS for $2, following the settlement of post-closing and other adjustments in December 2018. As a result of entering into the agreement to sell the Latin America extrusions business in December 2017, a charge of $41 was recognized in the fourth quarter of 2017 in Restructuring and other charges in the Statement of Consolidated Operations related to the non-cash impairment of the net book value of the business and an additional charge of $2 related to a post-closing adjustment was recognized in the fourth quarter of 2018. The operating results and assets and liabilities of the business were included in the Transportation and Construction Solutions segment. This business generated sales of $25, $115, and $103 in 2018, 2017, and 2016 respectively, and had 612 employees at the time of the divestiture.

On July 31, 2018, the Company announced that it had initiated a sale process of its Building and Construction Systems (BCS) business, as part of the Company's ongoing strategy and portfolio review that commenced in January 2018. BCS is part of the Transportation and Construction Solutions segment and generated third-party sales of approximately $1,140, $1,070, and $1,010 for 2018, 2017, and 2016, respectively. The sale process continues to progress. The Company's decision regarding whether to sell the business will not be finalized until final binding offers are evaluated at a later stage in the sale process. Until the Company makes that final decision, the BCS business will remain classified as held and in-use in the Consolidated Financial Statements.

On October 31, 2018, the Company sold its Texarkana, Texas rolling mill and cast house, which had a combined net book value of $63, to Ta Chen International, Inc. for $302 in cash, subject to post-closing adjustments, plus additional contingent consideration of up to $50. The contingent consideration relates to the achievement of various milestones within 36 months of the transaction closing date associated with operationalizing the rolling mill equipment. The operating results and assets and liabilities of the business were included in the Global Rolled Products segment. The Texarkana rolling mill facility had previously been idle since late 2009. In early 2016, the Company restarted the Texarkana cast house to meet demand for aluminum slab. As part of the agreement, the Company will continue to produce aluminum slab at the facility for a period of 18 months through a lease back of the cast house building and equipment, after which time, Ta Chen will perform toll processing of metal for the Company for a period of six months. The Company will supply Ta Chen with cold-rolled aluminum coil during this 24-month period.

The sale of the rolling mill and cast house has been accounted for separately. The gain on the sale of the rolling mill of $154, including the fair value of contingent consideration of $5, was recorded in Restructuring and other charges in the Statement of Consolidated Operations in the fourth quarter of 2018. The Company will reevaluate its estimate of the amount of contingent consideration to which it will be entitled at the end of each reporting period and recognize any changes thereto in the Statement of Consolidated Operations. The Company has continuing involvement related to the lease back of the cast house, and, therefore has deferred the gain associated with the cast house in 2018. As a result, the Company continues to treat the cast house building and equipment that it sold to Ta Chen as owned and therefore reflected these assets in its Consolidated Balance Sheet and has been depreciating them over their remaining useful life. Additionally, the Company recorded the cash proceeds associated with the sale of the cast house assets as a noncurrent liability in its Consolidated Balance Sheet which included a deferred gain of $95. The Company will adopt the new lease accounting standard in the first quarter of 2019, under which the

Company's continuing involvement no longer requires deferral of the cast house gain. As such, the deferred gain on the sale of the cast house will be treated as a cumulative effect of an accounting change within retained earnings on January 1, 2019.

On December 31, 2018, as part of the Company’s ongoing strategy and portfolio review, Arconic completed the sale of its Eger, Hungary forgings business to Angstrom Automotive Group LLC for $2, which resulted in a loss of $43 recorded in Restructuring and other charges in the Statement of Consolidated Operations. The operating results and assets and liabilities of the business were included in the Engineered Products and Solutions segment. This business generated sales of $32, $38, and $29 in 2018, 2017, and 2016 respectively, and had 180 employees at the time of the divestiture.

2017 Divestitures. In March 2017, Arconic completed the sale of its Fusina, Italy rolling mill to Slim Aluminium. While owned by Arconic, the operating results and assets and liabilities of the Fusina, Italy rolling mill were included in the Global Rolled Products segment. As part of the transaction, Arconic injected $10 of cash into the business and provided a third-party guarantee with a fair value of $5 related to Slim Aluminium’s environmental remediation. The Company recorded a loss on the sale of $60, which was recorded in Restructuring and other charges on the Statement of Consolidated Operations for 2017. The rolling mill generated sales of approximately $54 and $165 for 2017 and 2016, respectively. At the time of the divestiture, the rolling mill had approximately 312 employees.

2016 Divestitures. In April 2016, Arconic completed the sale of the Remmele Medical business to LISI MEDICAL for $102 in cash ($99 net of transaction costs), which was included in Proceeds from the sale of assets and businesses on the accompanying Statement of Consolidated Cash Flows. This business, which was part of the RTI acquisition in 2015, manufactured precision-machined metal products for customers in the minimally invasive surgical device and implantable device markets. Since this transaction occurred within a year of the completion of the RTI acquisition, no gain was recorded on this transaction as the excess of the proceeds over the carrying value of the net assets of this business was reflected as a purchase price adjustment (decrease to goodwill of $44) to the final allocation of the purchase price related to Arconic’s acquisition of RTI. While owned by Arconic, the operating results and assets and liabilities of this business were included in the Engineered Products and Solutions segment. This business generated sales of approximately $20 from January 1, 2016 through the divestiture date, April 29, 2016, and, at the time of the divestiture, had approximately 330 employees.

2014 Acquisitions. In November 2014, Arconic acquired Firth Rixson. The purchase price included an earn-out agreement that required Arconic to make earn-out payments up to an aggregate maximum amount of $150 through December 31, 2020 upon certain conditions. This earn-out was contingent on the Firth Rixson forging business in Savannah, Georgia achieving certain identified financial targets through December 31, 2020. During the fourth quarter of 2016, management determined that payment of the maximum amount was not probable based on the forecasted financial performance of this location. Therefore, the fair value of this liability was reduced by $56 with a corresponding credit to Other income, net on the accompanying Statement of Consolidated Operations. During the fourth quarter of 2017, management determined that payment of the remaining amount of the contingent liability was not probable based on the forecasted financial performance of this location. Therefore, the fair value of this liability was reduced by $81 to zero at December 31, 2017 with a corresponding credit to Other income, net on the accompanying Statement of Consolidated Operations. The fair value of this liability remains at zero at December 31, 2018 based on the forecasted financial performance of this location.

U. Contingencies and Commitments

Contingencies

Environmental Matters. Arconic participates in environmental assessments and cleanups at more than 100 locations. These include owned or operating facilities and adjoining properties, previously owned or operating facilities and adjoining properties, and waste sites, including Superfund (Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)) sites.

A liability is recorded for environmental remediation when a cleanup program becomes probable and the costs can be reasonably estimated. As assessments and cleanups proceed, the liability is adjusted based on progress made in determining the extent of remedial actions and related costs. The liability can change substantially due to factors such as the nature and extent of contamination, changes in remedial requirements, and technological changes, among others.

Arconic’s remediation reserve balance was $266 at December 31, 2018 and $294 at December 31, 2017 (of which $81 and $41, respectively, was classified as a current liability), and reflects the most probable costs to remediate identified environmental conditions for which costs can be reasonably estimated. In 2018, the Company has seen higher expenditures with the start of construction related to the Grasse River project. Arconic expects that trend to continue for 2019 as reflected by the increase in the portion of the reserve that is considered a current liability. Payments related to remediation expenses applied against the reserve were $32 in 2018 and $26 in 2017 and includes expenditures currently mandated, as well as those not required by any regulatory authority or third party.

Included in annual operating expenses are the recurring costs of managing hazardous substances and environmental programs.

These costs are estimated to be approximately 1% or less of cost of goods sold.

The following discussion provides details regarding the current status of the most significant remediation reserves related to a current Arconic site.

Massena West, NY—Arconic has an ongoing remediation project related to the Grasse River, which is adjacent to Arconic's Massena plant site. Many years ago, it was determined that sediments and fish in the river contain varying levels of polychlorinated biphenyls (PCBs). The project, which was selected by the U.S. Environmental Protection Agency (EPA) in a Record of Decision issued in April 2013, is aimed at capping PCB contaminated sediments with concentration in excess of one part per million in the main channel of the river and dredging PCB contaminated sediments in the near-shore areas where total PCBs exceed one part per million. At December 31, 2018 and December 31, 2017, the reserve balance associated with this matter was $198 and $215, respectively. Arconic is in the planning and design phase of the project, which is expected to be completed early in 2019. Following EPA's approval of the final design, the actual remediation fieldwork is expected to commence and take approximately four years. The majority of the expenditures related to the project are expected to be incurred between 2019 and 2022.

Tax. Pursuant to the Tax Matters Agreement entered into between Arconic and Alcoa Corporation in connection with the separation transaction with Alcoa Corporation, Arconic shares responsibility with Alcoa Corporation, and Alcoa Corporation has agreed to partially indemnify Arconic for 49% of the ultimate liability, with respect to the following matter.

As previously reported, in July 2013, following a Spanish corporate income tax audit covering the 2006 through 2009 tax years, an assessment was received mainly disallowing certain interest deductions claimed by a Spanish consolidated tax group owned by the Company. In August 2013, the Company filed an appeal of this assessment in Spain's Central Tax Administrative Court, which was denied in January 2015. Arconic filed another appeal in Spain's National Court in March 2015 which was denied in July 2018. The National Court's decision requires the assessment for the 2006 through 2009 tax years to be reissued to take into account the outcome of the 2003 to 2005 audit which was closed in 2017. The Company estimates the revised assessment to be $174 (€152), including interest.

The Company has petitioned to the Supreme Court of Spain to review the National Court's decision. If the petition is accepted, the Supreme Court will review the assessment on its merits and render a final decision. In the event the Company is unsuccessful in appealing the assessment to the Supreme Court of Spain, a portion of the assessment may be offset with existing net operating losses and tax credits available to the Spanish consolidated tax group, which would be shared between the Company and Alcoa Corporation as provided for in the Tax Matters Agreement. As a result of the National Court decision, an income tax reserve, including interest, of $60 (€52) was established in 2018. Concurrent with the establishment of the reserve, an indemnification receivable of $29 (€25), representing Alcoa Corporation's 49% share of the liability, was also recorded in 2018.

Additionally, while the tax years 2010 through 2013 are closed to audit, it is possible that the Company may receive assessments for tax years subsequent to 2013. Any potential assessment for an individual tax year is not expected to be material to the Company's consolidated operations.

Reynobond PE. As previously reported, on June 13, 2017, the Grenfell Tower in London, UK caught fire resulting in fatalities, injuries and damage. A French subsidiary of Arconic, Arconic Architectural Products SAS (AAP SAS), supplied a product, Reynobond PE, to its customer, a cladding system fabricator, which used the product as one component of the overall cladding system on Grenfell Tower. The fabricator supplied its portion of the cladding system to the façade installer, who then completed and installed the system under the direction of the general contractor. Neither Arconic nor AAP SAS was involved in the design or installation of the system used at the Grenfell Tower, nor did it have a role in any other aspect of the building's refurbishment or original design. Regulatory investigations into the overall Grenfell Tower matter are being conducted, including a criminal investigation by the London Metro Police, a Public Inquiry by the British government and a consumer protection inquiry by a French public authority. AAP SAS has sought and received core participant status in the Public Inquiry. The Company will no longer sell the PE product for architectural use on buildings.

Howard v. Arconic Inc. et al. As previously reported, a purported class action complaint related to the Grenfell Tower fire was filed on August 11, 2017 in the United States District Court for the Western District of Pennsylvania against Arconic Inc. and Klaus Kleinfeld. A related purported class action complaint was filed in the United States District Court for the Western District of Pennsylvania on August 25, 2017, under the caption *Sullivan v. Arconic Inc. et al.*, against Arconic Inc., two former Arconic executives, several current and former Arconic directors, and banks that acted as underwriters for Arconic's September 18, 2014 preferred stock offering (the "Preferred Offering"). The plaintiff in *Sullivan* had previously filed a purported class action against the same defendants on July 18, 2017 in the Southern District of New York and, on August 25, 2017, voluntarily dismissed that action without prejudice. On February 7, 2018, on motion from certain putative class members, the court consolidated *Howard* and *Sullivan*, closed *Sullivan*, and appointed lead plaintiffs in the consolidated case. On April 9, 2018, the lead plaintiffs in the consolidated purported class action filed a consolidated amended complaint. The consolidated amended complaint alleges that the registration statement for the Preferred Offering contained false and misleading statements and omitted to state material information, including by allegedly failing to disclose material uncertainties and trends resulting from sales of Reynobond PE for unsafe uses and by allegedly expressing a belief that appropriate risk management and compliance programs had been adopted while concealing the risks posed by Reynobond PE sales. The consolidated amended complaint also alleges that between November 4, 2013 and June 23, 2017 Arconic and Kleinfeld made false and misleading statements and failed to disclose material information about the Company's commitment to safety, business and financial prospects, and the risks of the Reynobond PE product, including in Arconic's Form 10-Ks for the fiscal years ended December 31, 2013, 2014, 2015 and 2016, its Form 10-Qs and quarterly financial press releases from the fourth quarter of 2013 through the first quarter of 2017, its 2013, 2014, 2015 and 2016 Annual Reports, and its 2016 Annual Highlights Report. The consolidated amended complaint seeks, among other things, unspecified compensatory damages and an award of attorney and expert fees and expenses. On June 8, 2018, all defendants moved to dismiss the consolidated amended complaint for failure to state a claim. Briefing on that motion is now closed and the parties await a ruling.

Raul v. Albaugh, et al. As previously reported, on June 22, 2018, a derivative complaint was filed nominally on behalf of Arconic by a purported Arconic shareholder against all current members of Arconic's Board of Directors, Klaus Kleinfeld and Ken Giacobbe, naming Arconic as a nominal defendant, in the United States District Court for the District of Delaware. The complaint raises similar allegations as the consolidated amended complaint in *Howard*, as well as allegations that the defendants improperly authorized the sale of Reynobond PE for unsafe uses, and asserts claims under Section 14(a) of the Securities Exchange Act of 1934 and Delaware state law. On July 13, 2018, the parties filed a stipulation agreeing to stay this case until the final resolution of the *Howard* case, the Grenfell Tower public inquiry in London, and the investigation by the London Metropolitan Police Service and on June 23, 2018, the Court approved the stay.

While the Company believes that these cases are without merit and intends to challenge them vigorously, there can be no assurances regarding the ultimate resolution of these matters. Given the preliminary nature of these matters and the uncertainty of litigation, the Company cannot reasonably estimate at this time the likelihood of an unfavorable outcome or the possible loss or range of losses in the event of an unfavorable outcome. The Board of Directors has also received letters, purportedly sent on behalf of shareholders, reciting allegations similar to those made in the federal court lawsuits and demanding that the Board authorize the Company to initiate litigation against members of management, the Board and others. The Board of Directors has appointed a Special Litigation Committee of the Board to review and make recommendations to the Board regarding the appropriate course of action with respect to these shareholder demand letters. The Special Litigation Committee and the Board are continuing to consider the appropriate responses to the shareholder demand letters in view of developments in proceedings concerning the Grenfell Tower fire.

Other. In addition to the matters discussed above, various other lawsuits, claims, and proceedings have been or may be instituted or asserted against Arconic, including those pertaining to environmental, product liability, safety and health, employment, tax and antitrust matters. While the amounts claimed in these other matters may be substantial, the ultimate liability cannot currently be determined because of the considerable uncertainties that exist. Therefore, it is possible that the Company's liquidity or results of operations in a period could be materially affected by one or more of these other matters. However, based on facts currently available, management believes that the disposition of these other matters that are pending or asserted will not have a material adverse effect, individually or in the aggregate, on the results of operations, financial position or cash flows of the Company.

Commitments

Purchase Obligations. Arconic has entered into purchase commitments for raw materials, energy and other goods and services, which total $770 in 2019, $169 in 2020, $27 in 2021, $24 in 2022, $8 in 2023, and $5 thereafter.

Operating Leases. Certain land and buildings, plant equipment, vehicles, and computer equipment are under operating lease agreements. Total expense for all leases was $144 in 2018, $113 in 2017, and $110 in 2016. Under long-term operating leases, minimum annual rentals are $94 in 2019, $74 in 2020, $54 in 2021, $40 in 2022, $30 in 2023, and $87 thereafter.

Guarantees. At December 31, 2018, Arconic had outstanding bank guarantees related to tax matters, outstanding debt, workers' compensation, environmental obligations, energy contracts, and customs duties, among others. The total amount committed under these guarantees, which expire at various dates between 2019 and 2026 was $37 at December 31, 2018.

Pursuant to the Separation and Distribution Agreement between Arconic and Alcoa Corporation, Arconic was required to provide certain guarantees for Alcoa Corporation, which had a combined fair value of $6 and $8 at December 31, 2018 and 2017, respectively, and were included in Other noncurrent liabilities and deferred credits on the accompanying Consolidated Balance Sheet. Arconic was required to provide payment guarantees for Alcoa Corporation issued on behalf of a third party related to project financing for Alcoa Corporation's aluminum complex in Saudi Arabia. During the third quarter of 2018, Arconic was released from this guarantee. Furthermore, Arconic was required to provide guarantees related to two long-term supply agreements for energy for Alcoa Corporation facilities in the event of an Alcoa Corporation payment default. In October 2017, Alcoa Corporation announced that it had terminated one of the two agreements, the electricity contract with Luminant

Generation Company LLC that was tied to its Rockdale Operations, effective as of October 1, 2017. As a result of the termination of the Rockdale electricity contract, Arconic recorded income of $25 in the fourth quarter of 2017 associated with reversing the fair value of the electricity contract guarantee. For the remaining long-term supply agreement, Arconic is required to provide a guarantee up to an estimated present value amount of approximately $1,087 and $1,297 at December 31, 2018 and December 31, 2017, respectively, in the event of an Alcoa Corporation payment default. This guarantee expires in 2047. For this guarantee, subject to its provisions, Arconic is secondarily liable in the event of a payment default by Alcoa Corporation. Arconic currently views the risk of an Alcoa Corporation payment default on its obligations under the contract to be remote.

In December 2016, Arconic entered into a one-year claims purchase agreement with a bank covering claims up to $245 related to the Saudi Arabian joint venture and two long-term energy supply agreements. The majority of the premium was paid by Alcoa Corporation. The agreement matured in December 2017 and was not renewed in 2018 due to the decline in exposure to guarantee claims including a substantial reduction in the guarantees related to the Saudi Arabian joint venture and also the elimination of the guarantee related to the Rockdale energy contract. In December 2018, Arconic entered into a one-year insurance policy with a limit of $80 relating to the remaining long-term energy supply agreement. The premium is expected to be paid by Alcoa Corporation. The decision to enter into a claims purchase agreement or insurance policy will be made on an annual basis going forward.

Letters of Credit. Arconic has outstanding letters of credit, primarily related to workers' compensation, environmental obligations and leasing obligations. The total amount committed under these letters of credit, which automatically renew or expire at various dates, mostly in 2019, was $136 at December 31, 2018.

Pursuant to the Separation and Distribution Agreement, Arconic was required to retain letters of credit of $54 that had previously been provided related to both Arconic and Alcoa Corporation workers' compensation claims which occurred prior to November 1, 2016. Alcoa Corporation workers' compensation claims and letter of credit fees paid by Arconic are being proportionally billed to and are being fully reimbursed by Alcoa Corporation.

Surety Bonds. Arconic has outstanding surety bonds primarily related to tax matters, contract performance, workers' compensation, environmental-related matters, and customs duties. The total amount committed under these surety bonds, which expire at various dates, primarily in 2019, was $50 at December 31, 2018.

Pursuant to the Separation and Distribution Agreement, Arconic was required to provide surety bonds related to Alcoa Corporation workers' compensation claims which occurred prior to November 1, 2016 and, as a result, Arconic has $25 in outstanding surety bonds relating to these liabilities. Alcoa Corporation workers' compensation claims and surety bond fees paid by Arconic are being proportionately billed to and are being fully reimbursed by Alcoa Corporation.

V. Separation Transaction and Discontinued Operations

On November 1, 2016, Arconic completed the Separation Transaction. Alcoa Inc., which was re-named Arconic Inc., continues to own the Global Rolled Products (except for the Warrick, IN rolling operations and the equity interest in the rolling mill at the joint venture in Saudi Arabia), Engineered Products and Solutions, and Transportation and Construction Solutions segments. Alcoa Corporation includes the Alumina and Primary Metals segments and the aforementioned Warrick, IN rolling operations and equity interest in the rolling mill at the joint venture in Saudi Arabia, both of which were formally part of the Global Rolled Products segment.

Arconic completed the Separation Transaction by distribution on November 1, 2016 of 80.1% of the outstanding common stock of Alcoa Corporation to the Company's shareholders of record (the "Distribution") as of the close of business on October 20, 2016 (the "Record Date"). Arconic retained 19.9% of the Alcoa Corporation common stock (36,311,767 shares). In the Distribution, each Company shareholder received one share of Alcoa Corporation common stock for every three shares of Arconic common stock held as of the close of business on the Record Date. Shareholders received cash in lieu of fractional shares of Alcoa Corporation common stock. The Company had recorded the retained interest as a cost method investment in Investment in common stock of Alcoa Corporation in the December 2016 Consolidated Balance Sheet. The fair value of Arconic's retained interest in Alcoa Corporation was $1,020 at December 31, 2016 and was based on the closing stock price of Alcoa Corporation as of December 31, 2016 multiplied by the number of shares of Alcoa Corporation common stock owned by the Company at that date.

In February 2017, Arconic sold 23,353,000 of its shares of Alcoa Corporation common stock at $38.03 per share, which resulted in cash proceeds of $888 which were recorded in Sales of investments within Investing Activities in the accompanying Statement of Consolidated Cash Flows, and a gain of $351 which was recorded in Other expense (income), net in the accompanying Statement of Consolidated Operations. In April and May 2017, the Company acquired a portion of its outstanding notes held by two investment banks (the "Investment Banks") in exchange for cash and the Company's remaining 12,958,767 Alcoa Corporation shares (valued at $35.91 per share) (the "Debt-for-Equity Exchange") (See Note P). A gain of $167 on the Debt-for-Equity Exchange was recorded in Other expense (income), net in the accompanying Statement of Consolidated Operations. As of May 4, 2017, the Company no longer maintained a retained interest in Alcoa Corporation common stock.

On October 31, 2016, Arconic entered into several agreements with Alcoa Corporation that govern the relationship of the parties following the completion of the Separation Transaction. These agreements include the following: Separation and Distribution Agreement, Transition Services Agreement, Tax Matters Agreement, Employee Matters Agreement, Alcoa Corporation to Arconic Inc. Patent, Know-How, and Trade Secret License Agreement, Arconic Inc. to Alcoa Corporation Patent, Know-How, and Trade Secret License Agreement, Alcoa Corporation to Arconic Inc. Trademark License Agreement, Toll Processing and Services Agreement (the “Toll Processing Agreement”), Master Agreement for the Supply of Primary Aluminum, Massena Lease and Operations Agreement, Fusina Lease and Operations Agreement, and Stockholder and Registration Rights Agreement.

Effective November 1, 2016, Arconic entered into a Toll Processing Agreement with Alcoa Corporation for the tolling of metal for the Warrick, IN rolling mill which became a part of Alcoa Corporation upon completion of the Separation Transaction. As part of this arrangement, Arconic provided a toll processing service to Alcoa Corporation to produce can sheet products at its facility in Tennessee through the end date of the contract, December 31, 2018. Alcoa Corporation supplied all required raw materials to Arconic and Arconic processed the raw materials into finished can sheet coils ready for shipment to the end customer. Tolling revenues for 2018, 2017, and the two-month period ended December 31, 2016 and accounts receivable at December 31, 2018, December 31, 2017, and December 31, 2016 were not material to the consolidated results of operations and financial position for the years ended December 31, 2018, December 31, 2017, and December 31, 2016.

As part of the Separation Transaction, Arconic was required to provide maximum potential future payment guarantees for Alcoa Corporation issued on behalf of a third party, guarantees related to two long-term Alcoa Corporation energy supply agreements, guarantees related to certain Alcoa Corporation environmental liabilities and energy supply contracts, letters of credit and surety bonds related to Alcoa Corporation workers’ compensation claims which occurred prior to November 1, 2016, and letters of credit for certain Alcoa Corporation equipment leases and energy contracts (see Note U).

As part of the Separation Transaction, Arconic had recorded a receivable in the December 2016 Consolidated Balance Sheet for the net after-tax proceeds from Alcoa Corporation’s sale of the Yadkin Hydroelectric Project. The transaction closed and the Company received proceeds of $238 in the first quarter of 2017 and the remaining $5 in the second quarter of 2017. The $243 proceeds were included in Other within Investing Activities in the Statement of Consolidated Cash Flows.

The results of operations of Alcoa Corporation were presented as discontinued operations in the Statement of Consolidated Operations as summarized below (the amounts presented in the table below have not been recast to reflect the adoption of new guidance issued by the FASB related to the presentation of net periodic pension cost and net periodic postretirement benefit cost as detailed in Note A):

	Ten months ended October 31, 2016
Sales	$ 6,752
Cost of goods sold (exclusive of expenses below)	5,655
Selling, general administrative, and other expenses	164
Research and development	28
Provision for depreciation, depletion and amortization	593
Restructuring and other charges	102
Interest expense	28
Other (income) expenses, net	(75)
Income from discontinued operations before income taxes	257
Provision for income taxes	73
Income from discontinued operations after income taxes	184
Less: Net income from discontinued operations attributable to noncontrolling interests	63
Net income from discontinued operations	$ 121

During 2017 and 2016, Arconic recognized $18 ($12 after-tax) and $193 ($158 after-tax), respectively, in Selling, general administrative, and other expenses on the accompanying Statement of Consolidated Operations for costs related to the Separation Transaction. In addition, Arconic also incurred capital expenditures and debt issuance costs of $110 during 2016 related to the Separation Transaction. None of the aforementioned costs and expenses related to the Separation Transaction were reclassified into discontinued operations.

On November 1, 2016, management evaluated the net assets of Alcoa Corporation for potential impairment and determined that no impairment charge was required.

The cash flows related to Alcoa Corporation have not been segregated and are included in the Statement of Consolidated Cash Flows for 2016. The following table presents depreciation, depletion and amortization, restructuring and other charges, and purchases of property, plant and equipment of the discontinued operations related to Alcoa Corporation:

For the year ended December 31,	**2016**
Depreciation, depletion and amortization	$ 593
Restructuring and other charges	$ 102
Capital expenditures	$ 298

W. Subsequent Events

Management evaluated all activity of Arconic and concluded that no subsequent events have occurred that would require recognition in the Consolidated Financial Statements or disclosure in the Notes to the Consolidated Financial Statements, except as noted below:

On January 22, 2019, the Company announced that its Board of Directors (the Board) had determined to no longer pursue a potential sale of Arconic as part of its strategy and portfolio review.

On February 6, 2019, the Company announced that the Board appointed John C. Plant, current Chairman of the Board, as Chairman and Chief Executive Officer of the Company, effective February 6, 2019, to succeed Chip Blankenship, who ceased to serve as Chief Executive Officer of the Company and resigned as a member of the Board, in each case as of that date. In addition, the Company announced that the Board appointed Elmer L. Doty, current member of the Board, as President and Chief Operating Officer, a newly created position, effective February 6, 2019. Mr. Doty will remain a member of the Board. The Company also announced that Arthur D. Collins, Jr., current member of the Board, has been appointed interim Lead Independent Director of the Company, effective February 6, 2019.

On February 8, 2019, the Company announced the following key initiatives as part of its ongoing strategy and portfolio review: plans to reduce operating costs, designed to maximize the impact in 2019; the planned separation of its portfolio into Engineered Products and Forgings (EP&F) and Global Rolled Products (GRP), with a spin-off of one of the businesses; the potential sale of businesses that do not best fit into EP&F or GRP; execute its previously authorized $500 share repurchase program in the first half of 2019; the Board authorized an additional $500 of share repurchases, effective through the end of 2020; and plans to reduce its quarterly common stock dividend from $0.06 to $0.02 per share.

On February 19, 2019, the Company entered into an accelerated share repurchase (“ASR”) agreement with JPMorgan Chase Bank to repurchase $700 of its common stock, pursuant to the share repurchase program previously authorized by the Board. Under the ASR agreement, Arconic will receive initial delivery of approximately 32 million shares on February 21, 2019. The final number of shares to be repurchased will be based on the volume-weighted average price of Arconic’s common stock during the term of the transaction, less a discount. The ASR agreement is expected to be completed during the first half of 2019.

The Company will evaluate its organizational structure in conjunction with the planned separation of its portfolio and changes to its reportable segments are expected in the first half of 2019.

Supplemental Financial Information (unaudited)

Quarterly Data
(in millions, except per-share amounts)

	First	Second	Third	Fourth(2)	Year
2018					
Sales	$ 3,445	$ 3,573	$ 3,524	$ 3,472	$ 14,014
Net income	$ 143	$ 120	$ 161	$ 218	$ 642
Earnings per share attributable to Arconic common shareholders(1):					
Basic					
Net income per share—basic	$ 0.30	$ 0.25	$ 0.33	$ 0.45	$ 1.33
Diluted					
Net income per share—diluted	$ 0.29	$ 0.24	$ 0.32	$ 0.44	$ 1.30
2017					
Sales	$ 3,192	$ 3,261	$ 3,236	$ 3,271	$ 12,960
Net income (loss)	$ 322	$ 212	$ 119	$ (727)	$ (74)
Earnings (loss) per share attributable to Arconic common shareholders(1):					
Basic					
Net income (loss) per share—basic	$ 0.69	$ 0.44	$ 0.23	$ (1.51)	$ (0.28)
Diluted					
Net income (loss) per share—basic	$ 0.65	$ 0.43	$ 0.22	$ (1.51)	$ (0.28)

(1) Per share amounts are calculated independently for each period presented; therefore, the sum of the quarterly per share amounts may not equal the per share amounts for the year.

(2) In the fourth quarter of 2018, Arconic recorded a gain of $119 ($154 pre-tax) on the sale of the Texarkana rolling mill, offset by pension plan settlement charges of $72 ($92 pre-tax) associated with significant lump sum payments made to participants and a loss of $39 ($43 pre-tax) on the sale of the Eger, Hungary forgings business. Additionally, Arconic recorded discrete tax items primarily comprised of a benefit related to certain prior year foreign investment losses no longer recapturable. In the fourth quarter of 2017, Arconic recorded an impairment of goodwill related to the forgings and extrusions business of $719 ($719 pre-tax); a provisional charge of $272 associated with the revaluation of U.S. net deferred tax assets due to a decrease in the U.S. corporate tax rate from 35% to 21%, as well as a one-time transition tax on the non-previously taxed earnings and profits of certain U.S.-owned foreign corporations as of December 31, 2017; a favorable adjustment to the Firth Rixson earn-out liability of $81 ($81 pre-tax); and a favorable adjustment to a separation-related guarantee liability of $16 ($25 pre-tax).

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

None.

Item 9A. Controls and Procedures.

(a) Evaluation of Disclosure Controls and Procedures

Arconic's Chief Executive Officer and Chief Financial Officer have evaluated the Company's disclosure controls and procedures, as defined in Rules 13a-15(e) and 15d-15(e) of the Securities Exchange Act of 1934, as of the end of the period covered by this report, and they have concluded that these controls and procedures are effective.

(b) Management's Annual Report on Internal Control over Financial Reporting

Management's Report on Internal Control over Financial Reporting is included in Part II, Item 8 of this Form 10-K beginning on page 51.

(c) Attestation Report of the Registered Public Accounting Firm

The effectiveness of Arconic's internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report, which is included in Part II, Item 8 of this Form 10-K on page 52.

(d) Changes in Internal Control over Financial Reporting

There have been no changes in internal control over financial reporting during the fourth quarter of 2018, that have materially affected, or are reasonably likely to materially affect, the Company's internal control over financial reporting.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by Item 401 of Regulation S-K regarding directors is contained under the caption "Item 1 Election of Directors" of the Proxy Statement and is incorporated by reference. The information required by Item 401 of Regulation S-K regarding executive officers is set forth in Part I, Item 1 of this report under "Executive Officers of the Registrant."

The information required by Item 405 of Regulation S-K is contained under the caption "Section 16(a) Beneficial Ownership Reporting Compliance" of the Proxy Statement and is incorporated by reference.

The Company's Code of Ethics for the CEO, CFO and Other Financial Professionals is publicly available on the Company's Internet website at http://www.arconic.com under the section "Investors—Corporate Governance." The remaining information required by Item 406 of Regulation S-K is contained under the captions "Corporate Governance" and "Corporate Governance—Business Conduct Policies and Code of Ethics" of the Proxy Statement and is incorporated by reference.

The information required by Items 407(c)(3), (d)(4) and (d)(5) of Regulation S-K is included under the captions "Item 1 Election of Directors—Nominating Board Candidates—Procedures and Director Qualifications" and "Corporate Governance—Committees of the Board—Audit Committee" of the Proxy Statement and is incorporated by reference.

Item 11. Executive Compensation.

The information required by Item 402 of Regulation S-K is contained under the captions "Director Compensation", "Executive Compensation" and "Corporate Governance—Recovery of Incentive Compensation" of the Proxy Statement. Such information is incorporated by reference.

The information required by Items 407(e)(4) and (e)(5) of Regulation S-K is contained under the captions "Corporate Governance—Compensation Committee Interlocks and Insider Participation" and "Item 3 Advisory Approval of Executive Compensation—Compensation Committee Report" of the Proxy Statement. Such information (other than the Compensation Committee Report, which shall not be deemed to be "filed") is incorporated by reference.

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

The information required by Item 201(d) of Regulation S-K relating to securities authorized for issuance under equity compensation plans is contained under the caption "Equity Compensation Plan Information" of the Proxy Statement and is incorporated by reference.

The information required by Item 403 of Regulation S-K is contained under the captions "Arconic Stock Ownership— Stock Ownership of Certain Beneficial Owners" and "— Stock Ownership of Directors and Executive Officers" of the Proxy Statement and is incorporated by reference.

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

The information required by Item 404 of Regulation S-K is contained under the captions "Executive Compensation" (excluding the information under the caption "Compensation Committee Report") and "Corporate Governance— Related Person Transactions" of the Proxy Statement and is incorporated by reference.

The information required by Item 407(a) of Regulation S-K regarding director independence is contained under the captions "Item 1 Election of Directors" and "Corporate Governance" of the Proxy Statement and is incorporated by reference.

Item 14. Principal Accounting Fees and Services.

The information required by Item 9(e) of Schedule 14A is contained under the captions "Item 2 Ratification of Appointment of Independent Registered Public Accounting Firm—Report of the Audit Committee" and "— Audit and Non-Audit Fees" of the Proxy Statement and in Attachment A (Pre-Approval Policies and Procedures for Audit and Non-Audit Services) thereto and is incorporated by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a) The consolidated financial statements and exhibits listed below are filed as part of this report.

(1) The Company's consolidated financial statements, the notes thereto and the report of the Independent Registered Public Accounting Firm are on pages 53 through 102 of this report.

(2) Financial statement schedules have been omitted because they are not applicable, not required, or the required information is included in the consolidated financial statements or notes thereto.

(3) Exhibits.

Exhibit Number	Description*
2(a)	Share Purchase Agreement, dated as of June 25, 2014, by and among Alcoa Inc., Alcoa IH Limited, FR Acquisition Corporation (US), Inc., FR Acquisitions Corporation (Europe) Limited, FR Acquisition Finance Subco (Luxembourg), S.à.r.l. and Oak Hill Capital Partners III, L.P. and Oak Hill Capital Management Partners III, L.P., collectively in their capacity as the Seller Representative, incorporated by reference to exhibit 2.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated June 27, 2014.
2(b)	Separation and Distribution Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(c)	Tax Matters Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2.3 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(d)	Employee Matters Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2.4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(d)(1)	Amendment No. 1, dated December 13, 2016, to Employee Matters Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2(e)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
2(e)	Alcoa Corporation to Arconic Inc. Patent, Know-How, and Trade Secret License Agreement, dated as of October 31, 2016, by and between Alcoa USA Corp. and Arconic Inc., incorporated by reference to exhibit 2.5 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(f)	Arconic Inc. to Alcoa Corporation Patent, Know-How, and Trade Secret License Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa USA Corp., incorporated by reference to exhibit 2.6 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(g)	Amended and Restated Alcoa Corporation to Arconic Inc. Trademark License Agreement, dated as of June 25, 2017, by and between Alcoa USA Corp. and Arconic Inc., incorporated by reference to exhibit 2 to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2017.
2(h)	Master Agreement for the Supply of Primary Aluminum, dated as of October 31, 2016, by and between Alcoa Corporation and its affiliates and Arconic Inc., incorporated by reference to exhibit 2.9 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.

2(i)	Massena Lease and Operations Agreement, dated as of October 31, 2016, by and between Arconic Inc. and Alcoa Corporation, incorporated by reference to exhibit 2.10 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 4, 2016.
2(j)	Agreement and Plan of Merger, dated October 12, 2017, by and between Arconic Inc., a Pennsylvania corporation, and Arconic Inc., a Delaware corporation, incorporated by reference to exhibit 2.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
3(a)	Certificate of Incorporation of Arconic Inc., a Delaware corporation, incorporated by reference to exhibit 3.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
3(b)	Bylaws of Arconic Inc., a Delaware corporation, incorporated by reference to exhibit 3.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
4(a)	Form of Certificate for Shares of Common Stock of Arconic Inc., a Delaware corporation, incorporated by reference to exhibit 4.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
4(b)	Bylaws. See exhibit 3(b) above.
4(c)	Form of Indenture, dated as of September 30, 1993, between Alcoa Inc. and The Bank of New York Trust Company, N.A., as successor to J. P. Morgan Trust Company, National Association (formerly Chase Manhattan Trust Company, National Association), as successor Trustee to PNC Bank, National Association, as Trustee (undated form of Indenture incorporated by reference to exhibit 4(a) to Registration Statement No. 33-49997 on Form S-3).
4(c)(1)	First Supplemental Indenture, dated as of January 25, 2007, between Alcoa Inc. and The Bank of New York Trust Company, N.A., as successor to J.P. Morgan Trust Company, National Association (formerly Chase Manhattan Trust Company, National Association), as successor Trustee to PNC Bank, National Association, as Trustee, incorporated by reference to exhibit 99.4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 25, 2007.
4(c)(2)	Second Supplemental Indenture, dated as of July 15, 2008, between Alcoa Inc. and The Bank of New York Mellon Trust Company, N.A., as successor in interest to J. P. Morgan Trust Company, National Association (formerly Chase Manhattan Trust Company, National Association, as successor to PNC Bank, National Association), as Trustee, incorporated by reference to exhibit 4(c) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 15, 2008.
4(c)(3)	Fourth Supplemental Indenture, dated as of December 31, 2017, between Arconic Inc., a Pennsylvania corporation, Arconic Inc., a Delaware corporation, and The Bank of New York Mellon Trust Company, N.A., as trustee, incorporated by reference to exhibit 4.3 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
4(d)	Form of 6.75% Bonds Due 2028, incorporated by reference to exhibit 4(d) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
4(e)	Form of 5.90% Notes Due 2027, incorporated by reference to exhibit 4(e) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2008.
4(f)	Form of 5.95% Notes Due 2037, incorporated by reference to exhibit 4(f) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2008.
4(g)	Form of 5.87% Notes Due 2022, incorporated by reference to exhibit 4.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated February 21, 2007.

4(h)	Form of 6.150% Notes Due 2020, incorporated by reference to exhibit 4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated August 3, 2010.
4(i)	Form of 5.40% Notes Due 2021, incorporated by reference to exhibit 4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated April 21, 2011.
4(j)	Form of 5.125% Notes Due 2024, incorporated by reference to exhibit 4.5 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated September 22, 2014.
4(k)	Indenture, dated as of December 14, 2010, between RTI International Metals, Inc. and The Bank of New York Trust Company, N.A., as Trustee, incorporated by reference to exhibit 4(m) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2015.
4(k)(1)	Third Supplemental Indenture, dated as of April 17, 2013, between RTI International Metals, Inc. and The Bank of New York Trust Company, N.A., as Trustee, incorporated by reference to exhibit 4(n) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2015.
4(k)(2)	Fourth Supplemental Indenture, dated as of July 23, 2015, between RTI International Metals, Inc. and The Bank of New York Trust Company, N.A., as Trustee, incorporated by reference to exhibit 4.1 on Form 8-K (Commission file number 1-3610) dated July 23, 2015.
4(k)(3)	Fifth Supplemental Indenture, dated as of November 30, 2017, between RTI International Metals, Inc. and The Bank of New York Trust Company, N.A., as Trustee, incorporated by reference to exhibit 4.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated December 4, 2017.
4(k)(4)	Sixth Supplemental Indenture, dated as of December 31, 2017, between Arconic Inc., a Pennsylvania corporation, Arconic Inc., a Delaware corporation, and The Bank of New York Mellon Trust Company, N.A., as Trustee, incorporated by reference to exhibit 4.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
4(k)(5)	Form of 1.625% Convertible Senior Notes Due 2019. See exhibit 4(k)(1) above.
4(l)	Arconic Bargaining Retirement Savings Plan (formerly known as the Alcoa Retirement Savings Plan for Bargaining Employees), as Amended and Restated effective January 1, 2015, incorporated by reference to exhibit 4(p) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2015.
4(m)	Arconic Hourly Non-Bargaining Retirement Savings Plan (formerly known as the Alcoa Retirement Savings Plan for Hourly Non-Bargaining Employees), as Amended and Restated effective January 1, 2015, incorporated by reference to exhibit 4(q) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2015.
4(n)	Arconic Fastener Systems and Rings Retirement Savings Plan (formerly known as the Alcoa Retirement Savings Plan for Fastener Systems Employees), as Amended and Restated effective January 1, 2015, incorporated by reference to exhibit 4(r) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2015.
4(o)	Arconic Salaried Retirement Savings Plan (formerly known as the Alcoa Retirement Savings Plan for Salaried Employees), as Amended and Restated effective January 1, 2015, incorporated by reference to exhibit 4(s) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2015.
4(p)	Arconic Retirement Savings Plan for ATEP Bargaining Employees, effective January 1, 2017, incorporated by reference to exhibit 4 to Post-Effective Amendment, dated December 30, 2016, to Registration Statement No. 333-32516 on Form S-8.

Table of Contents

10(a)	Earnout Agreement, dated as of June 25, 2014, by and among Alcoa Inc., FR Acquisition Finance Subco (Luxembourg), S.à.r.l. and Oak Hill Capital Partners III, L.P. and Oak Hill Capital Management Partners III, L.P., collectively in their capacity as the Seller Representative, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated June 27, 2014.
10(b)	Five-Year Revolving Credit Agreement, dated as of July 25, 2014, among Alcoa Inc., the Lenders and Issuers named therein, Citibank, N.A., as Administrative Agent for the Lenders and Issuers, and JPMorgan Chase Bank, N.A., as Syndication Agent, incorporated by reference to exhibit 10.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 31, 2014.
10(b)(1)	Extension Request and Amendment Letter, dated as of June 5, 2015, among Alcoa Inc., each lender and issuer party thereto, and Citibank, N.A., as Administrative Agent, effective July 7, 2015, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 13, 2015.
10(b)(2)	Amendment No. 1, dated September 16, 2016, to the Five-Year Revolving Credit Agreement dated as of July 25, 2014, among Arconic Inc., the lenders and issuers named therein, Citibank, N.A., as administrative agent, and JPMorgan Chase Bank, N.A. as syndication agent, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated September 19, 2016.
10(b)(3)	Assumption Agreement, dated as of December 31, 2017, by Arconic Inc., a Delaware corporation, in favor of and for the benefit of the Lenders and Citibank, N.A., as administrative agent, incorporated by reference to exhibit 4.4 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 4, 2018.
10(b)(4)	Amendment No. 2, dated as of June 29, 2018, to the Company's Five-Year Revolving Credit Agreement dated as of July 25, 2014, by and among the Company, a syndicate of lenders and issuers named therein, Citibank, N.A., as administrative agent for the lenders and issuers, and JPMorgan Chase Bank, N.A., as syndication agent, incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K dated July 2, 2018.
10(c)	Plea Agreement dated January 8, 2014, between the United States of America and Alcoa World Alumina LLC, incorporated by reference to exhibit 10(l) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2013.
10(d)	Agreement, dated February 1, 2016, by and between Elliott Associates, L.P., Elliott International, L.P., Elliott International Capital Advisors Inc. and Alcoa Inc., incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated February 1, 2016.
10(e)	Settlement Agreement, dated as of May 22, 2017, by and among Elliott Associates, L.P., Elliott International, L.P., Elliott International Capital Advisors Inc. and Arconic Inc., incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 22, 2017 (reporting an event on May 21, 2017).
10(f)	Letter Agreement, by and among Arconic Inc. and Elliott Associates, L.P., Elliott International, L.P. and Elliott International Capital Advisors Inc., dated as of December 19, 2017, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated December 19, 2017.
10(g)	Registration Rights Agreement, by and among Arconic Inc. and Elliott Associates, L.P., Elliott International, L.P. and Elliott International Capital Advisors Inc., dated as of December 19, 2017, incorporated by reference to exhibit 10.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated December 19, 2017.

10(g)(1)	Amendment to Registration Rights Agreement, by and among Arconic Inc. and Elliott Associates, L.P., Elliott International, L.P. and Elliott International Capital Advisors Inc., dated as of February 2, 2018, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated February 6, 2018.
10(h)	Alcoa Internal Revenue Code Section 162(m) Compliant Annual Cash Incentive Compensation Plan, as Amended and Restated, incorporated by reference to Exhibit 10(b) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 11, 2016.
10(i)	2004 Summary Description of the Alcoa Incentive Compensation Plan, incorporated by reference to exhibit 10(g) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2004.
10(i)(1)	Incentive Compensation Plan of Alcoa Inc., as revised and restated effective November 8, 2007, incorporated by reference to exhibit 10(k)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2007.
10(i)(2)	Amendment to Incentive Compensation Plan of Alcoa Inc., effective December 18, 2009, incorporated by reference to exhibit 10(n)(2) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2009.
10(j)	Arconic Employees' Excess Benefits Plan C (formerly referred to as the Alcoa Inc. Employees' Excess Benefits Plan, Plan C), as amended and restated effective August 1, 2016, incorporated by reference to exhibit 10(j) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(j)(1)	First Amendment to Arconic Employees' Excess Benefits Plan C (as amended and restated effective August 1, 2016), effective January 1, 2018, incorporated by reference to exhibit 10(l)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(j)(2)	Second Amendment to Arconic Employees' Excess Benefits Plan C (as amended and restated effective August 1, 2016), effective January 1, 2018, incorporated by reference to exhibit 10(l)(2) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(j)(3)	Third Amendment to Arconic Employees' Excess Benefits Plan C (as amended and restated effective August 1, 2016), incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 8, 2018.
10(k)	Deferred Fee Plan for Directors, as amended effective July 9, 1999, incorporated by reference to exhibit 10(g)(1) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 1999.
10(l)	Amended and Restated Deferred Fee Plan for Directors, effective November 1, 2016, incorporated by reference to exhibit 10(c) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2016.
10(m)	Non-Employee Director Compensation Policy, effective February 6, 2019.
10(n)	Fee Continuation Plan for Non-Employee Directors, incorporated by reference to exhibit 10(k) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 1989.
10(n)(1)	Amendment to Fee Continuation Plan for Non-Employee Directors, effective November 10, 1995, incorporated by reference to exhibit 10(i)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 1995.

10(n)(2)	Second Amendment to the Fee Continuation Plan for Non-Employee Directors, effective September 15, 2006, incorporated by reference to exhibit 10.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated September 20, 2006.
10(o)	Arconic Deferred Compensation Plan, as amended and restated effective August 1, 2016, incorporated by reference to exhibit 10(p) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(o)(1)	First Amendment to the Arconic Deferred Compensation Plan (as amended and restated effective August 1, 2016), effective January 1, 2018, incorporated by reference to exhibit 10(r)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(p)	Summary of the Executive Split Dollar Life Insurance Plan, dated November 1990, incorporated by reference to exhibit 10(m) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 1990.
10(q)	Amended and Restated Dividend Equivalent Compensation Plan, effective January 1, 1997, incorporated by reference to exhibit 10(h) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2004.
10(r)	Form of Indemnity Agreement between the Company and individual directors or officers, incorporated by reference to exhibit 10(j) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 1987.)
10(s)	Form of Indemnification Agreement between the Company and individual directors or officers, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated January 25, 2018.
10(t)	Amended and Restated 2009 Alcoa Stock Incentive Plan, dated February 15, 2011, incorporated by reference to exhibit 10(z)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2010.
10(u)	Arconic Supplemental Pension Plan for Senior Executives (formerly referred to as the Alcoa Supplemental Pension Plan for Senior Executives), as amended and restated effective August 1, 2016, incorporated by reference to exhibit 10(v) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(u)(1)	First Amendment to Arconic Supplemental Pension Plan for Senior Executives (as amended and restated effective August 1, 2016), effective January 1, 2018, incorporated by reference to exhibit 10(x)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(u)(2)	Second Amendment to Arconic Supplemental Pension Plan for Senior Executives (as amended and restated effective August 1, 2016), effective January 1, 2018, incorporated by reference to exhibit 10(x)(2) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(v)	Deferred Fee Estate Enhancement Plan for Directors, effective July 10, 1998, incorporated by reference to exhibit 10(r) to the Company's Annual Report on Form 10-K (Commission file number 1- 3610) for the year ended December 31, 1998.
10(w)	Arconic Inc. Change in Control Severance Plan, as amended and restated effective February 1, 2018, incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated February 6, 2018.

10(x)	Letter Agreement, dated August 14, 2007, between Alcoa Inc. and Klaus Kleinfeld, incorporated by reference to exhibit 10(b) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2007.
10(y)	Executive Severance Agreement, as amended and restated effective December 8, 2008, between Alcoa Inc. and Klaus Kleinfeld, incorporated by reference to exhibit 10(gg) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2008.
10(y)(1)	Letter Agreement between Arconic Inc. and Klaus Kleinfeld, dated February 27, 2017, incorporated by reference to exhibit 10(y)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(z)	Separation Agreement between Arconic Inc. and Klaus Kleinfeld, dated July 31, 2017, incorporated by reference to exhibit 10(c) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2017.
10(aa)	Form of Executive Severance Agreement between the Company and new officers entered into after July 22, 2010, incorporated by reference to exhibit 10(a) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2010.
10(bb)	Arconic Inc. Executive Severance Plan, as effective February 27, 2017, incorporated by reference to exhibit 10(aa) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(cc)	Letter Agreement, by and between Alcoa Inc. and Katherine H. Ramundo, dated as of July 28, 2016, incorporated by reference to exhibit 10(ff) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(dd)	Letter Agreement, from Arconic Inc. to Katherine H. Ramundo, dated as of May 31, 2018, incorporated by reference to exhibit 10(c) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2018.
10(ee)	Letter Agreement between Arconic Inc. and David P. Hess, dated May 17, 2017, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 22, 2017 (reporting an event on May 17, 2017).
10(ff)	Letter Agreement, by and between Arconic Inc. and Charles P. Blankenship, dated as of October 19, 2017, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated October 23, 2017
10(gg)	Letter Agreement, by and between Arconic Inc. and Mark J. Krakowiak, dated as of January 20, 2018, incorporated by reference to exhibit 10(ii) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(hh)	Letter Agreement, from Arconic Inc. to Ken Giacobbe, dated as of February 14, 2019.
10(ii)	Arconic Global Pension Plan, as amended and restated effective August 1, 2016, incorporated by reference to exhibit 10(bb) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(jj)	Global Expatriate Employee Policy (pre-January 1, 2003), incorporated by reference to exhibit 10(uu) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2005.

10(kk)	Arconic Inc. Legal Fee Reimbursement Plan, effective as of April 30, 2018, incorporated by reference to exhibit 10(b) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2018.
10(ll)	Summary Description of Equity Choice Program for Performance Equity Award Participants, dated November 2005, incorporated by reference to exhibit 10.6 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated November 16, 2005.
10(mm)	2013 Arconic Stock Incentive Plan, as Amended and Restated, incorporated by reference to exhibit 10.1 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 22, 2018.
10(mm)(1)	Terms and Conditions (Australian Addendum) to the 2013 Arconic Stock Incentive Plan, effective May 3, 2013, incorporated by reference to exhibit 10(d) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 8, 2013.
10(nn)	RTI International Metals, Inc. 2004 Stock Plan, incorporated by reference to exhibit 4(b) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 23, 2015.
10(oo)	RTI International Metals, Inc. 2014 Stock and Incentive Plan, incorporated by reference to exhibit 4(a) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated July 23, 2015.
10(oo)(1)	First Amendment to the RTI International Metals, Inc. 2014 Stock and Incentive Plan, as amended and assumed by Arconic Inc., dated February 1, 2018, incorporated by reference to exhibit 10(oo)(1) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(pp)	Form of Award Agreement for Stock Options, effective May 8, 2009, incorporated by reference to exhibit 10.2 to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 13, 2009.
10(qq)	Form of Award Agreement for Stock Options, effective January 1, 2010, incorporated by reference to exhibit 10(ddd) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2009.
10(rr)	Terms and Conditions for Stock Options, effective January 1, 2011, incorporated by reference to exhibit 10(c) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2011.
10(ss)	Terms and Conditions for Stock Option Awards, effective May 3, 2013, incorporated by reference to exhibit 10(b) to the Company's Current Report on Form 8-K (Commission file number 1-3610) dated May 8, 2013.
10(tt)	Terms and Conditions for Stock Option Awards under the 2013 Arconic Stock Incentive Plan, effective July 22, 2016, incorporated by reference to Exhibit 10(d) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2016.
10(uu)	Global Stock Option Award Agreement, effective January 19, 2018, incorporated by reference to exhibit 10(uu) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(vv)	Form of Stock Option Award Agreement, incorporated by reference to exhibit 10(f) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2018.
10(ww)	Terms and Conditions for Restricted Share Units, effective May 3, 2013, incorporated by reference to exhibit 10(c) to the Company's Current Report on Form 8-K (Commission file number 1- 3610) dated May 8, 2013.

10(xx)	Terms and Conditions for Restricted Share Units under the 2013 Arconic Stock Incentive Plan, effective July 22, 2016, incorporated by reference to Exhibit 10(c) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2016.
10(yy)	Terms and Conditions for Restricted Share Units for Annual Director Awards under the 2013 Arconic Stock Incentive Plan, effective November 30, 2016, incorporated by reference to exhibit 10(vv) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(zz)	Terms and Conditions for Restricted Share Units for Annual Director Awards under the 2013 Arconic Stock Incentive Plan, as Amended and Restated, effective December 5, 2017, incorporated by reference to exhibit 10(a) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended March 31, 2018.
10(aaa)	Terms and Conditions for Deferred Fee Restricted Share Units for Director Awards under the 2013 Arconic Stock Incentive Plan, effective November 30, 2016, incorporated by reference to exhibit 10(ww) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(bbb)	Terms and Conditions for Restricted Share Units issued on or after January 13, 2017, under the 2013 Arconic Stock Incentive Plan, effective January 13, 2017, incorporated by reference to exhibit 10(xx) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2016.
10(ccc)	Terms and Conditions for Restricted Share Units - Interim CEO (David P. Hess) Award, effective October 23, 2017, incorporated by reference to exhibit 10(ccc) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(ddd)	Terms and Conditions for Restricted Share Units - Non-Executive Chairman (John C. Plant) Director Award, effective October 23, 2017, incorporated by reference to exhibit 10(ddd) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(eee)	Terms and Conditions for Restricted Share Units - Non-Executive Chairman (John C. Plant) Director Award, effective October 23, 2018, incorporated by reference to exhibit 10(a) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended September 30, 2018.
10(fff)	Global Restricted Share Unit Award Agreement, effective January 19, 2018, incorporated by reference to exhibit 10(eee) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(ggg)	Terms and Conditions for Restricted Share Units issued on or after January 19, 2018, under the 2013 Arconic Stock Incentive Plan, effective January 19, 2018, incorporated by reference to exhibit 10(fff) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(hhh)	Form of Restricted Share Unit Award Agreement, incorporated by reference to exhibit 10(g) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2018.
10(iii)	Terms and Conditions for Special Retention Awards under the 2013 Arconic Stock Incentive Plan, effective January 1, 2015, incorporated by reference to exhibit 10(a) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2015.
10(jjj)	Terms and Conditions for Special Retention Awards under the 2013 Arconic Stock Incentive Plan, effective July 22, 2016, incorporated by reference to exhibit 10(e) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2016.

10(kkk)	Global Special Retention Award Agreement, effective January 19, 2018, incorporated by reference to exhibit 10(kkk) to the Company's Annual Report on Form 10-K (Commission file number 1-3610) for the year ended December 31, 2017.
10(lll)	Special Retention Award Agreement - Katherine H. Ramundo, effective May 16, 2018, incorporated by reference to exhibit 10(d) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2018.
10(mmm)	Special Retention Award Agreement - Paul Myron, effective May 16, 2018, incorporated by reference to exhibit 10(e) to the Company's Quarterly Report on Form 10-Q (Commission file number 1-3610) for the quarter ended June 30, 2018.
10(nnn)	Special Retention Award Agreement - Ken Giacobbe, effective February 12, 2019.
21	Subsidiaries of the Registrant.
23	Consent of Independent Registered Public Accounting Firm.
24	Power of Attorney for certain directors.
31	Certifications pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32	Certification pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101. INS	XBRL Instance Document.
101. SCH	XBRL Taxonomy Extension Schema Document.
101. CAL	XBRL Taxonomy Extension Calculation Linkbase Document.
101. DEF	XBRL Taxonomy Extension Definition Linkbase Document.
101. LAB	XBRL Taxonomy Extension Label Linkbase Document.
101. PRE	XBRL Taxonomy Extension Presentation Linkbase Document.

* Exhibit Nos. 10(h) through 10(nnn) are management contracts or compensatory plans required to be filed as Exhibits to this Form 10-K.

Amendments and modifications to other Exhibits previously filed have been omitted when in the opinion of the registrant such Exhibits as amended or modified are no longer material or, in certain instances, are no longer required to be filed as Exhibits.

No other instruments defining the rights of holders of long-term debt of the registrant or its subsidiaries have been filed as Exhibits because no such instruments met the threshold materiality requirements under Regulation S-K. The registrant agrees, however, to furnish a copy of any such instruments to the Commission upon request.

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.

ARCONIC INC.

February 21, 2019	By	/s/ Paul Myron
		Paul Myron
		Vice President and Controller (Also signing as Principal Accounting Officer)

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.

Signature	Title	Date
/s/ John C. Plant	Chairman and Chief Executive Officer	February 21, 2019
John C. Plant	(Principal Executive Officer and Director)	
/s/ Ken Giacobbe		February 21, 2019
Ken Giacobbe	Executive Vice President and Chief Financial Officer (Principal Financial Officer)	

James F. Albaugh, Amy E. Alving, Christopher L. Ayers, Arthur D. Collins, Jr., Elmer L. Doty, Rajiv L. Gupta, David P. Hess, Sean O. Mahoney, David J. Miller, E. Stanley O'Neal, and Ulrich R. Schmidt, each as a Director, on February 21, 2019, by Paul Myron, their Attorney-in-Fact.*

*By	/s/ Paul Myron
	Paul Myron
	Attorney-in-Fact

ARCONIC

Exhibit 10(hh)

February 14, 2019

Ken Giacobbe
1007 Amy Place
Gibson, PA 15044

Dear Ken:

I am pleased to confirm that you were issued 60,000 restricted stock units (RSUs) as a special retention award valued at $1,075,200 (based on the Arconic closing stock price of $17.92) on the grant date of February 12, 2019. The award, which will vest on February 12, 2020, will be subject to your continued employment through the vesting date. (Please refer to the terms and conditions of the Special Retention Award Agreement.) This award is a demonstration of our continuing commitment to you. The enclosed Fact Sheet outlines the terms and conditions of the grant.

We look forward to your continued contributions toward our success.

Sincerely,

/s/ John Plant

John Plant

Enclosure – Fact Sheet

ARCONIC INC.
SPECIAL RETENTION AWARD AGREEMENT
KEN GIACOBBE
Grant Date: February 12, 2019

The terms and conditions of this Global Special Retention Award Agreement, including Appendices A and B attached hereto, (the "Award Agreement") are authorized by the Compensation and Benefits Committee of the Board of Directors. The special retention award ("Special Retention Award") is granted to the Participant under the 2013 Arconic Stock Incentive Plan, as amended and restated and as may be further amended from time to time (the "Plan").

Terms that are defined in the Plan have the same meanings in the Award Agreement.

NOTE: To avoid cancellation of the Special Retention Award, the Participant must affirmatively accept the Award and the terms of this Award Agreement within 6 months of the grant date, as set forth in paragraph 30 of the Award Agreement.

General Terms and Conditions

1. The Special Retention Awards are subject to the provisions of the Plan and the provisions of the Award Agreement. If the Plan and the Award Agreement are inconsistent, the provisions of the Plan will govern. Interpretations of the Plan and the Award Agreement by the Committee are binding on the Participant and the Company. A Special Retention Award is an undertaking by the Company to issue the number of Shares indicated in the notice of the Special Retention Award on the date the Special Retention Award vests, subject to the fulfillment of certain conditions, except to the extent otherwise provided in the Plan or herein.

Vesting and Payment

2. The Special Retention Award vests on February 12, 2020, and will be paid to the Participant in Shares on the vesting date or within 90 days thereafter.

3. As a condition to a Special Retention Award vesting, a Participant must remain an active employee of the Company or a Subsidiary through the date of vesting. Except as provided in paragraph 5, if a Participant's employment with the Company (including its Subsidiaries) is terminated prior to the vesting date of the Special Retention Award, the Special Retention Award is forfeited and is automatically canceled.

4. Special Retention Awards will be paid by the issuance to the Participant of Shares covered by the Special Retention Award. Prior to issuance of the Shares, the Participant has no voting rights. Dividend equivalents will accrue on Special Retention Awards, unless the Committee determines that no dividend equivalents may be accrued or paid. Dividend equivalents that accrue on Special Retention Awards will be equal to the common stock dividend per Share payable on the Company's common stock multiplied by the number of Shares covered by the Special Retention Award. Notwithstanding any provision herein to the contrary, no dividends or dividend equivalents will be paid on Special Retention Awards that have not vested.

5. The following are exceptions to the vesting rules:

- Involuntary Termination without Cause: An unvested Special Retention Award held by a Participant who is involuntarily terminated without Cause (as defined below) from employment with the Company or a Subsidiary during the vesting period is not forfeited in whole but only in part upon termination of employment. The portion of the Special Retention Award that is not forfeited vests on the original stated vesting date set forth in paragraph 2 and is calculated based on a proportionate share of the time during the vesting period that the Participant remained actively employed with the Company or a Subsidiary, with the remaining portion being automatically forfeited. The proportionate share is computed on the basis of the actual number of days actively employed after the date of grant over a total vesting period of 586 days (calculated based on a 360-day year). For example, a Participant who is involuntarily terminated without Cause from employment with the Company (or a Subsidiary) after one-third of the vesting period will receive one-third of the Shares upon vesting, with the remaining two-thirds of the Shares being automatically forfeited upon termination.

For this purpose, if the Participant participates in the Arconic Inc. Change in Control Severance Plan, "Cause" shall have the meaning set forth in such plan. If the Participant does not participate in the Arconic Inc. Change in Control Severance Plan, "Cause" means (i) the willful and continued failure by the Participant to substantially perform the Participant's duties with the Employer that has not been cured within 30 days after a written demand for substantial performance is delivered to the Participant by the Board or the Participant's direct supervisor, which demand specifically identifies the manner in which the Participant has not substantially performed the Participant's duties, (ii) the willful engaging by the Participant in conduct which is demonstrably and materially injurious to the Company or a Subsidiary, monetarily or otherwise; (iii) the Participant's fraud or acts of dishonesty relating to the Company or any of its Subsidiaries, or (iv) the Participant's conviction of any misdemeanor relating to the affairs of the Company or any of its Subsidiaries or indictment for any felony. For purposes of clauses (i) and (ii) of this definition, no act, or failure to act, on the Participant's part shall be deemed "willful" unless done, or omitted to be done, by the Participant not in good faith and without reasonable belief that the Participant's act, or failure to act, was in the best interest of the Company.

- Death or Disability: An unvested Special Retention Award held by a Participant, who dies while an employee or who is permanently and totally disabled while an employee, is not forfeited but vests on the original stated vesting date set forth in paragraph 2.

  A Participant is deemed to be permanently and totally disabled if the Participant is unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment which can be expected to result in death or which has lasted or can be expected to last for a continuous period of not less than 12 months. A Participant shall not be considered to be permanently and totally disabled unless the Participant furnishes proof of the existence thereof in such form and manner, and at such times, as the Company may require. In the event of a dispute, the determination whether a Participant is permanently and totally disabled will be made by the Committee or its delegate.

- Change in Control: A Special Retention Award vests if a Replacement Award is not provided following certain Change in Control events, as described in the Plan. If the Change in Control qualifies as a "change in control event" within the meaning of Treas. Reg. § 1.409-3(i)(5), the vested Special Retention Award will be paid to the Participant within 30 days following the Change in Control. If the Change in Control does not so qualify, the vested Special Retention Award will be paid to the Participant on the original stated vesting date set forth in paragraph 2.

- Termination Following Change in Control: As further described in the Plan, if a Replacement Award is provided following a Change in Control, but within 24 months of such Change in Control the Participant's employment is terminated without Cause (as defined in the Arconic Inc. Change in Control Severance Plan) or by the Participant for Good Reason (as defined in the Arconic Inc. Change in Control Severance Plan), the Replacement Award will vest and will be paid to the Participant on the original stated vested date set forth in paragraph 2.

Taxes

6. All taxes required to be withheld under applicable tax laws in connection with a Special Retention Award must be paid by the Participant at the appropriate time under applicable tax laws. The Company may satisfy applicable tax

withholding obligations by any of the means set forth in Section 15(l) of the Plan, but will generally withhold from the Shares to be issued upon payment of the Special Retention Award that number of Shares with a fair market value on the vesting date equal to the taxes required to be withheld at the minimum required rates or, to the extent permitted under applicable accounting principles, at up to the maximum individual tax rate for the applicable tax jurisdiction, which include, for Participants subject to taxation in the United States, applicable income taxes, federal and state unemployment compensation taxes and FICA/FUTA taxes. Notwithstanding the foregoing, if the Participant is subject to the short-swing profit rules of Section 16(b) of the Securities Exchange Act of 1934, as amended, the Company will withhold Shares from the Shares to be issued upon payment of the Special Retention Award, as described herein, and will not use the other means set forth in the Plan unless pursuant to an election by the Participant or in the event that withholding in Shares is problematic under applicable tax or securities law or has materially adverse accounting consequences. Further, notwithstanding anything herein to the contrary, the Company may cause a portion of the Special Retention Award to vest prior to the stated vesting date set forth in paragraph 2 in order to satisfy any Tax-Related Items that arise prior to the date of settlement of the Special Retention Award; provided that to the extent necessary to avoid a prohibited distribution under Section 409A of the Code, the portion of the Special Retention Award so accelerated and settled shall be with respect to a number of Shares with a value that does not exceed the liability for such Tax-Related Items.

Beneficiaries

7. If permitted by the Company, Participants will be entitled to designate one or more beneficiaries to receive all Special Retention Awards that have not yet vested at the time of death of the Participant. All beneficiary designations will be on beneficiary designation forms approved for the Plan. Copies of the form are available from the Communications Center on Merrill Lynch's OnLine® website www.benefits.ml.com.

8. Beneficiary designations on an approved form will be effective at the time received by the Communications Center on Merrill Lynch's OnLine® website www.benefits.ml.com. A Participant may revoke a beneficiary designation at any time by written notice to the Communications Center on Merrill Lynch's OnLine® website www.benefits.ml.com or by filing a new designation form. Any designation form previously filed by a Participant will be automatically revoked and superseded by a later-filed form.

9. A Participant will be entitled to designate any number of beneficiaries on the form, and the beneficiaries may be natural or corporate persons.

10. The failure of any Participant to obtain any recommended signature on the form will not prohibit the Company from treating such designation as valid and effective. No beneficiary will acquire any beneficial or other interest in any Special Retention Award prior to the death of the Participant who designated such beneficiary.

11. Unless the Participant indicates on the form that a named beneficiary is to receive Special Retention Awards only upon the prior death of another named beneficiary, all beneficiaries designated on the form will be entitled to share equally in the Special Retention Awards upon vesting. Unless otherwise indicated, all such beneficiaries will have an equal, undivided interest in all such Special Retention Awards.

12. Should a beneficiary die after the Participant but before the Special Retention Award is paid, such beneficiary's rights and interest in the Special Retention Award will be transferable by the beneficiary's last will and testament or by the laws of descent and distribution. A named beneficiary who predeceases the Participant will obtain no rights or interest in a Special Retention Award, nor will any person claiming on behalf of such individual. Unless otherwise specifically indicated by the Participant on the beneficiary designation form, beneficiaries designated by class (such as "children," "grandchildren" etc.) will be deemed to refer to the members of the class living at the time of the Participant's death, and all members of the class will be deemed to take "per capita."

13. If a Participant does not designate a beneficiary or if the Company does not permit a beneficiary designation, the Special Retention Award that has not yet vested or been paid at the time of death of the Participant will vest and be paid to the Participant's legal heirs pursuant to the Participant's last will and testament or by the laws of descent and distribution.

Adjustments

14. In the event of an Equity Restructuring, the Committee will equitably adjust the Special Retention Award as it deems appropriate to reflect the Equity Restructuring, which may include (i) adjusting the number and type of securities subject to the Special Retention Award; and (ii) adjusting the terms and conditions of the Special Retention Award. The adjustments provided under this paragraph 14 will be nondiscretionary and final and binding on all interested parties, including the affected Participant and the Company; provided that the Committee will determine whether an adjustment is equitable.

Repayment/Forfeiture

15. Notwithstanding anything to the contrary herein, pursuant to Section 15(e) of the Plan the Committee has full power and authority, to the extent permitted by governing law, to determine that the Special Retention Award will be canceled or suspended at any time prior to a Change in Control: (i) if the Participant, without the consent of the Committee, while employed by the Company or a Subsidiary or after termination of such employment, becomes associated with, employed by, renders services to or owns any interest (other than an interest of up to 5% in a publicly traded company or any other nonsubstantial interest, as determined by the Committee) in any business that is in competition with the Company or any Subsidiary; (ii) in the event of the Participant's willful engagement in conduct which is injurious to the Company or any Subsidiary, monetarily or otherwise; (iii) in the event of an Executive Officer's misconduct described in Section 15(f) of the Plan; or (iv) in order to comply with applicable laws as described in Section 15(h) of the Plan.

Further, as an additional condition of receiving the Special Retention Award, the Participant agrees that the Special Retention Award and any benefits or proceeds the Participant may receive hereunder shall be subject to forfeiture and/or repayment to the Company to the extent required (i) under the terms of any recoupment or "clawback" policy adopted by the Company to comply with applicable laws or with the Company's Corporate Governance Guidelines or other similar requirements, as such policy may be amended from time to time (and such requirements shall be deemed incorporated into the Award Agreement without the Participant's consent) or (ii) to comply with any requirements imposed under applicable laws and/or the rules and regulations of the securities exchange or inter-dealer quotation system on which the Shares are listed or quoted, including, without limitation, pursuant to Section 954 of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010. Further, if the Participant receives any amount in excess of what the Participant should have received under the terms of the Special Retention Award for any reason (including without limitation by reason of a financial restatement, mistake in calculations or administrative error), all as determined by the Committee, then the Participant shall be required to promptly repay any such excess amount to the Company.

Miscellaneous Provisions

16. *Stock Exchange Requirements; Applicable Laws*. Notwithstanding anything to the contrary in the Award Agreement, no Shares issuable upon vesting of the Special Retention Awards, and no certificate representing all or any part of such Shares, shall be issued or delivered if, in the opinion of counsel to the Company, such issuance or delivery would cause the Company to be in violation of, or to incur liability under, any securities law, or any rule, regulation or procedure of any U.S. national securities exchange upon which any securities of the Company are listed, or any listing agreement with any such securities exchange, or any other requirement of law or of any administrative or regulatory body having jurisdiction over the Company or a Subsidiary.

17. *Non-Transferability.* The Special Retention Award is non-transferable and may not be assigned, alienated, pledged, attached, sold or otherwise transferred or encumbered by the Participant other than by will or the laws of descent and distribution and any such purported assignment, alienation, pledge, attachment, sale, transfer or encumbrance shall be void and unenforceable against the Company; provided, that, the designation of a beneficiary shall not constitute an assignment, alienation, pledge, attachment, sale, transfer or encumbrance.

18. *Shareholder Rights*. No person or entity shall be entitled to vote, receive dividends or be deemed for any purpose the holder of any Shares until the Special Retention Award shall have vested and been paid in the form of Shares in accordance with the provisions of the Award Agreement.

19. *Notices*. Any notice required or permitted under the Award Agreement shall be in writing and shall be deemed sufficient when delivered personally or sent by confirmed email, telegram, or fax or five days after being deposited in the mail, as certified or registered mail, with postage prepaid, and addressed to the Company at the Company's principal corporate offices or to the Participant at the address maintained for the Participant in the Company's records or, in either case, as subsequently modified by written notice to the other party.

20. *Severability and Judicial Modification*. If any provision of the Award Agreement is held to be invalid or unenforceable under the applicable laws of any country, state, province, territory or other political subdivision or the Company elects not to enforce such restriction, the remaining provisions shall remain in full force and effect and the invalid or unenforceable provision shall be modified only to the extent necessary to render that provision valid and enforceable to the fullest extent permitted by law. If the invalid or unenforceable provision cannot be, or is not, modified, that provision shall be severed from the Award Agreement and all other provisions shall remain valid and enforceable.

21. *Successors*. The Award Agreement shall be binding upon and inure to the benefit of the Company and its successors and assigns, on the one hand, and the Participant and his or her heirs, beneficiaries, legatees and personal representatives, on the other hand.

22. *Appendices*. Notwithstanding any provisions in the Award Agreement, for Participants residing and/or working outside the United States, the Special Retention Award shall be subject to the additional terms and conditions set forth in Appendix A to the Award Agreement and to any special terms and conditions for the Participant's country set forth in Appendix B to the Award Agreement. Moreover, if the Participant relocates outside the United States or relocates between the countries included in Appendix B, the additional terms and conditions set forth in Appendix A and the special terms and conditions for such country set forth in Appendix B will apply to the Participant, to the extent the Company determines that the application of such terms and conditions is necessary or advisable for legal or administrative reasons. The Appendices constitute part of the Award Agreement.

23. *Imposition of Other Requirements*. The Company reserves the right to impose other requirements on the Participant's participation in the Plan, on the Special Retention Award and on any Shares acquired under the Plan, to the extent the Company determines it is necessary or advisable for legal or administrative reasons, and to require the Participant to sign any additional agreements or undertakings that may be necessary to accomplish the foregoing.

24. *Compliance with Code Section 409A*. It is intended that the Special Retention Award granted pursuant to the Award Agreement be compliant with Section 409A of the Code and the Award Agreement shall be interpreted, construed and operated to reflect this intent. Notwithstanding the foregoing, the Award Agreement and the Plan may be amended at any time, without the consent of any party, to the extent necessary or desirable to satisfy any of the requirements under Section 409A of the Code, but the Company shall not be under any obligation to make any such amendment. Further, the Company and its Subsidiaries do not make any representation to the Participant that the Special Retention Award granted pursuant to the Award Agreement satisfies the requirements of Section 409A of the Code, and the Company and its Subsidiaries will have no liability or other obligation to indemnify or hold harmless the Participant or any other party for any tax, additional tax, interest or penalties that the Participant or any other party may incur in the event that any provision of the Award Agreement or any amendment or modification thereof or any other action taken with respect thereto, is deemed to violate any of the requirements of Section 409A of the Code.

25. *Waiver*. A waiver by the Company of breach of any provision of the Award Agreement shall not operate or be construed as a waiver of any other provision of the Award Agreement, or of any subsequent breach by the Participant or any other Participant.

26. *No Advice Regarding Award*. The Company is not providing any tax, legal or financial advice, nor is the Company making any recommendations regarding the Participant's participation in the Plan, or the Participant's acquisition or sale of the underlying Shares. The Participant is hereby advised to consult with the Participant's own personal tax, legal and financial advisors regarding the Participant's participation in the Plan before taking any action related to the Plan.

27. *Governing Law and Venue*. As stated in the Plan, the Special Retention Award and the provisions of the Award Agreement and all determinations made and actions taken thereunder, to the extent not otherwise governed by the laws

of the United States, shall be governed by the laws of the State of New York, United States of America, without reference to principles of conflict of laws, and construed accordingly. The jurisdiction and venue for any disputes arising under, or any actions brought to enforce (or otherwise relating to), the Special Retention Award will be exclusively in the courts in the State of New York, County of New York, including the Federal Courts located therein (should Federal jurisdiction exist).

28. *Electronic Delivery and Acceptance*. The Company may, in its sole discretion, decide to deliver any documents related to current or future participation in the Plan by electronic means. The Participant hereby consents to receive such documents by electronic delivery and agrees to participate in the Plan through an on-line or electronic system established and maintained by the Company or a third party designated by the Company.

29. *Entire Agreement*. The Award Agreement and the Plan embody the entire understanding and agreement of the parties with respect to the subject matter hereof, and no promise, condition, representation or warranty, express or implied, not stated or incorporated by reference herein, shall bind either party hereto.

Acceptance of Award

30. As permitted by Section 15(c) of the Plan, receipt of this Special Retention Award is subject to the Participant's acceptance of the Award and the terms of this Award Agreement and the Plan through Merrill Lynch's OnLine® website www.benefits.ml.com and/or through such other procedures as may be required by the Company (Participant's "Acceptance"). **To avoid forfeiture of the Award, the Participant must provide such Acceptance within 6 months of the grant date of the Award.** The date as of which the Participant's Special Retention Award shall be forfeited, if the Participant has not provided such Acceptance, will generally be set forth in the Participant's account at Merrill Lynch's OnLine® website. If the Participant does not provide Acceptance within this 6 month period, the Award will be cancelled in accordance with any administrative procedures adopted under the Plan.

APPENDIX A
TO THE ARCONIC INC.
2013 Stock Incentive Plan
Global Special Retention Award Agreement
For Non-U.S. Participants

This Appendix A contains additional (or, if so indicated, different) terms and conditions that govern the Special Retention Awards if the Participant resides and/or works outside of the United States. Capitalized terms used but not defined herein shall have the same meanings assigned to them in the Plan and the Global Special Retention Award Agreement (the "Award Agreement").

A. *Termination*. This provision supplements paragraph 3 of the Award Agreement.

The Company will determine when the Participant is no longer providing services for purposes of the Special Retention Awards (including whether the Participant may still be considered to be providing services while on a leave of absence).

B. *Responsibility for Taxes*. This provision replaces paragraph 6 of the Award Agreement (except if the Participant is subject to the short-swing profit rules of Section 16(b) of the Securities Exchange Act of 1934, as amended).

The Participant acknowledges that, regardless of any action taken by the Company or, if different, the Subsidiary that employs the Participant (the "Employer"), the ultimate liability for all income tax, social insurance, payroll tax, fringe benefits tax, payment on account or other tax-related items related to the Participant's participation in the Plan and legally applicable to the Participant ("Tax-Related Items") is and remains the Participant's responsibility and may exceed the amount actually withheld by the Company or the Employer. The Participant further acknowledges that the Company and/or the Employer (a) make no representations or undertakings regarding the treatment of any Tax-Related Items in connection with any aspect of these Special Retention Awards, including, but not limited to, the grant, vesting or settlement of Special Retention Awards, the subsequent sale of Shares acquired pursuant to the Special Retention Award and the receipt of any dividends or dividend equivalents; and (b) do not commit to and are under no obligation to structure the terms of the Special Retention Awards or any aspect of the Special Retention Awards to reduce or eliminate the Participant's liability for Tax-Related Items or achieve any particular tax result. The Participant shall not make any claim against the Company, the Employer or any other Subsidiary, or their respective board, officers or employees related to Tax-Related Items arising from this Award. Furthermore, if the Participant has become subject to tax in more than one jurisdiction, the Participant acknowledges that the Company and/or the Employer (or former employer, as applicable) may be required to withhold or account for Tax-Related Items in more than one jurisdiction.

Prior to any relevant taxable or tax withholding event, as applicable, the Participant will pay or make adequate arrangements satisfactory to the Company and/or the Employer to satisfy all Tax-Related Items. In this regard, the Participant authorizes the Company and/or the Employer, or their respective agents, at their discretion, to satisfy their withholding obligations with regard to all Tax-Related Items by: (i) requiring a cash payment from the Participant; (ii) withholding from the Participant's wages or other cash compensation paid to the Participant by the Company and/or the Employer, (iii) withholding from the proceeds of the sale of Shares acquired pursuant to the Special Retention Awards, either through a voluntary sale or through a mandatory sale arranged by the Company (on the Participant's behalf pursuant to this authorization without further consent); and/or (iv) withholding from the Shares subject to Special Retention Awards.

Depending on the withholding method, the Company may withhold or account for Tax-Related Items by considering applicable minimum statutory withholding rates or other applicable withholding rates, including maximum applicable rates, in which case the Participant may receive a refund of any over-withheld amount in cash (with no entitlement to the Share equivalent) or, if not refunded, the Participant may seek a refund from the local tax authorities. If the obligation for Tax-Related Items is satisfied by withholding in Shares, the Participant is deemed, for tax purposes, to have been issued the full number of Shares subject to the vested Special Retention Awards, notwithstanding that a number of the Shares is held back solely for the purpose of paying the Tax-Related Items.

Finally, the Participant shall pay to the Company and/or the Employer any amount of Tax-Related Items that the Company and/or the Employer may be required to withhold or account for as a result of the Participant's participation in the Plan that cannot be satisfied by the means previously described. The Company may refuse to issue or deliver the Shares or the proceeds of the sale of Shares if the Participant fails to comply with his or her obligations in connection with the Tax-Related Items.

C. *Nature of Award.* In accepting the Special Retention Awards, the Participant acknowledges, understands and agrees that:

a. the Plan is established voluntarily by the Company, is discretionary in nature and may be modified, amended, suspended, or terminated by the Company at any time, to the extent permitted by the Plan;

b. this Special Retention Award is exceptional, voluntary and occasional and does not create any contractual or other right to receive future Special Retention Awards, or benefits in lieu of Special Retention Awards, even if Special Retention Awards have been granted in the past;

c. all decisions with respect to future Special Retention Awards or other Awards, if any, will be at the sole discretion of the Company;

d. this Special Retention Award and the Participant's participation in the Plan shall not create a right to, or be interpreted as forming an employment or service contract with the Company and shall not interfere with the ability of the Employer to terminate the Participant's employment contract (if any) at any time;

e. the Participant's participation in the Plan is voluntary;

f. this Special Retention Award and the Shares acquired under the Plan, and the income from and value of same, are not intended to replace any pension rights or compensation;

g. this Special Retention Award and the Shares acquired under the Plan, and the income from and value of same, are not part of normal or expected compensation or salary for any purposes, including, without limitation, calculating any severance, resignation, termination, redundancy, dismissal, end-of-service payments, bonuses, long-service awards, pension or retirement or welfare benefits or similar payments;

h. the future value of the Shares subject to the Special Retention Award is unknown, indeterminable and cannot be predicted with certainty;

i. unless otherwise agreed with the Company, Special Retention Awards and the Shares acquired under the Plan, and the income from and value of same, are not granted as consideration for, or in connection with, the service the Participant may provide as a director of any Subsidiary;

j. no claim or entitlement to compensation or damages shall arise from forfeiture of any portion of this Special Retention Award resulting from termination of the Participant's employment and/or service relationship (for any reason whatsoever and regardless of whether later found to be invalid or in breach of applicable laws in the jurisdiction where the Participant is employed or the terms of the Participant's employment agreement, if any);

k. unless otherwise provided in the Plan or by the Company in its discretion, this Special Retention Award and the benefits under the Plan evidenced by the Award Agreement do not create any entitlement to have this Special Retention Award or any such benefits transferred to, or assumed by, another company nor to be exchanged, cashed out or substituted for, in connection with any corporate transaction affecting the Shares; and

l. neither the Company, the Employer nor any other Subsidiary shall be liable for any foreign exchange rate fluctuation between the Participant's local currency and the United States Dollar that may affect the value of the Special Retention Awards or of any amounts due to the Participant pursuant to the Special Retention Awards or the subsequent sale of any Shares acquired under the Plan.

D. Data Privacy. The Participant hereby explicitly and unambiguously consents to the collection, use and transfer, in electronic or other form, of the Participant's personal data as described in the Award Agreement and any other grant materials by and among, as applicable, the Company, the Employer and any other Subsidiary for the exclusive purpose of implementing, administering and managing the Participant's participation in the Plan.

The Participant understands that the Company and the Employer may hold certain personal information about the Participant, including, but not limited to, the Participant's name, home address and telephone number, email address, date of birth, social insurance number, passport or other identification number, salary, nationality, job title, any shares of stock or directorships held in the Company, details of all Special Retention Awards or any other entitlement to shares of stock awarded, canceled, exercised, vested, unvested or outstanding in the Participant's favor ("Data"), for the exclusive purpose of implementing, administering and managing the Plan.

The Participant understands that Data may be transferred to Merrill Lynch, which is assisting the Company with the implementation, administration and management of the Plan. The Participant understands that the recipients of Data may be located in the United States or elsewhere, and that the recipients' country (e.g., the United States) may have different data privacy laws and protections than the Participant's country. The Participant understands that the Participant may request a list with the names and addresses of any potential recipients of Data by contacting the Participant's local human resources representative. The Participant authorizes the Company, Merrill Lynch and any other possible recipients which may assist the Company (presently or in the future) with implementing, administering and managing the Plan to receive, possess, use, retain and transfer Data, in electronic or other form, for the sole purpose of implementing, administering and managing the Participant's participation in the Plan. The Participant understands that Data will be held only as long as is necessary to implement, administer and manage the Participant's participation in the Plan. The Participant understands that the Participant may, at any time, view Data, request additional information about the storage and processing of Data, require any necessary amendments to Data or refuse or withdraw the consents herein, in any case without cost, by contacting in writing the Participant's local human resources representative. Further, the Participant understands that the Participant is providing the consents herein on a purely voluntary basis. If the Participant does not consent, or if the Participant later seeks to revoke the Participant's consent, the Participant's employment and career with the Employer will not be affected; the only consequence of refusing or withdrawing the Participant's consent is that the Company would not be able to grant this Special Retention Award or other Awards to the Participant or administer or maintain such Awards. Therefore, the Participant understands that refusing or withdrawing the Participant's consent may affect the Participant's ability to participate in the Plan. For more information on the consequences of the Participant's refusal to consent or withdrawal of consent, the Participant understands that the Participant may contact the Participant's local human resources representative.

Finally, upon request of the Company or the Employer, the Participant agrees to provide an executed data privacy consent form (or any other agreements or consents) that the Company and/or the Employer may deem necessary to obtain from the Participant for the purpose of administering the Participant's participation in the Plan in compliance with the data privacy laws in the Participant's country, either now or in the future. The Participant understands and agrees that he or she will not be able to participate in the Plan if the Participant fails to provide such consent or agreement as requested by the Company and/or the Employer.

E. *Language*. The Participant acknowledges that he or she is sufficiently proficient in English to understand the terms and conditions of the Award Agreement. Furthermore, if the Participant has received the Award Agreement, or any other document related to this Special Retention Award and/or the Plan translated into a language other than English and if the meaning of the translated version is different than the English version, the English version will control.

F. *Insider Trading Restrictions/Market Abuse Laws*. The Participant acknowledges that, depending on his or her country, the broker's country, or the country in which the Shares are listed, the Participant may be subject to insider trading restrictions and/or market abuse laws in applicable jurisdictions, which may affect his or her ability to accept, acquire, sell, or attempt to sell or otherwise dispose of Shares or rights to Shares (*e.g.*, Special Retention Awards) or rights linked to the value of Shares, during such times as the Participant is considered to have "inside information" regarding the Company (as defined by applicable laws or regulations in the applicable jurisdictions, including the United States and the Participant's country). Local insider trading laws and regulations may prohibit the cancellation or amendment of orders the Participant placed before possessing inside information. Furthermore, the Participant may be prohibited from (i) disclosing the inside information to any third party, including fellow employees (other than on a "need to know" basis) and (ii) "tipping" third parties or causing them to otherwise buy or sell securities. Any restrictions under these laws or regulations are separate from and in addition to any restrictions that may be imposed under any applicable Company insider trading policy. The Participant acknowledges that it is his or her responsibility to comply with any applicable restrictions, and the Participant should consult his or her personal advisor on this matter.

G. *Foreign Asset/Account Reporting Requirements, Exchange Controls and Tax Requirements*. The Participant acknowledges that his or her country may have certain foreign asset and/or account reporting requirements and exchange controls which may affect his or her ability to acquire or hold Shares under the Plan or cash received from participating in the Plan (including from any dividends received or sale proceeds arising from the sale of Shares) in a brokerage or bank account outside his or her country. The Participant understands that he or she may be required to report such accounts, assets or transactions to the tax or other authorities in his or her country. The Participant also may be required to repatriate sale proceeds or other funds received as a result of the Participant's participation in the Plan to his or her country through a designated bank or broker and/or within a certain time after receipt. The Participant acknowledges that it is his or her responsibility to be compliant with all such requirements, and that the Participant should consult his or her personal legal and tax advisors, as applicable, to ensure the Participant's compliance.

APPENDIX B
TO THE ARCONIC INC.
2013 Stock Incentive Plan
Global Special Retention Award Agreement
For Non-U.S. Participants

Capitalized terms used but not defined in this Appendix B have the meanings set forth in the Plan and the Global Special Retention Award Agreement (the "Award Agreement").

Terms and Conditions

This Appendix B includes special terms and conditions that govern Special Retention Awards if the Participant resides and/or works in one of the countries listed below.

If the Participant is a citizen or resident of a country other than the country in which the Participant is currently residing and/or working, or if the Participant transfers to another country after the grant of Special Retention Awards or is considered a resident of another country for local law purposes, the Committee shall, in its discretion, determine to what extent the special terms and conditions contained herein shall be applicable to the Participant.

Notifications

This Appendix B also includes information regarding exchange controls, tax and certain other issues of which the Participant should be aware with respect to participation in the Plan. The information is based on the securities, exchange control, tax and other laws in effect in the respective countries as of December 2017. Such laws are often complex and change frequently. As a result, the Company strongly recommends that the Participant not rely on the information in this Appendix B as the only source of information relating to the consequences of participation in the Plan because the information may be out of date at the time the Participant sells Shares acquired under the Plan.

In addition, the information contained herein is general in nature and may not apply to the Participant's particular situation and the Company is not in a position to assure the Participant of any particular result. Accordingly, the Participant should seek appropriate professional advice as to how the relevant laws in the Participant's country may apply to his or her situation.

Finally, if the Participant is a citizen or resident of a country other than the country in which the Participant currently works and/or resides, or if the Participant transfers to another country after the grant of the Special Retention Award, or is considered a resident of another country for local law purposes, the information contained herein may not be applicable to the Participant in the same manner.

Australia

Terms and Conditions

Australia Offer Document.

The grant of Special Retention Awards is intended to comply with the provisions of the Corporations Act, 2001, Australian Securities & Investments Commission ("ASIC") Regulatory Guide 49 and ASIC Class Order 14/1000. Additional details are set forth in the Offer Document for Australian resident employees, which is being provided to the Participant with the Award Agreement.

Notifications

Exchange Control Information.

Exchange control reporting is required for cash transactions exceeding A$10,000 and for international fund transfers. If an Australian bank is assisting with the transaction, the bank will file the report on the Participant's behalf.

Tax Information.

The Plan is a plan to which Subdivision 83A-C of the Income Tax Assessment Act 1997 (Cth) applies (subject to conditions in the Act).

Austria

Notifications

Exchange Control Information.

If the Participant holds Shares obtained through the Plan outside of Austria, the Participant must submit a report to the Austrian National Bank. An exemption applies if the value of the Shares as of any given quarter does not meet or exceed €30,000,000 or as of December 31 does not meet or exceed €5,000,000. If the former threshold is exceeded, quarterly obligations are imposed, whereas if the latter threshold is exceeded, annual reports must be given. If quarterly reporting is required, the reports must be filed by the fifteenth day of the month following the last day of the respective quarter. The annual reporting date is December 31 and the deadline for filing the annual report is January 31 of the following year.

When Shares are sold or cash dividends or dividend equivalent payments are received, there may be exchange control obligations if the cash received is held outside Austria. If the transaction volume of all the Participant's accounts abroad meets or exceeds €10,000,000, the movements and balances of all accounts must be reported monthly, as of the last day of the month, on or before the fifteenth of the following month.

Belgium

Notifications

Foreign Asset/Account Reporting Information.

If the Participant is a Belgian resident, the Participant is required to report any bank accounts opened and maintained outside of Belgium (*e.g.*, brokerage accounts opened in connection with the Plan) on his or her annual tax return. In a separate report, the Participant is required to provide the National Bank of Belgium with certain details regarding such foreign accounts (including the account number, bank name and country in which any such account was opened). This report, as well as additional information on how to complete it, can be found on the website of the National Bank of Belgium, www.nbb.be, under *Kredietcentrales / Centrales des crédits* caption. The Participant should consult with his or her personal tax advisor to determine his or her personal reporting obligations.

Stock Exchange Tax.

From January 1, 2017, a stock exchange tax applies to transactions executed through a non-Belgian financial intermediary. The stock exchange tax likely will apply when the Shares are sold. The Participant should consult with his or her personal tax advisor to determine his or her obligations with respect to the stock exchange tax.

Brazil

Terms and Conditions

Compliance with Law.

By accepting the Special Retention Award, the Participant acknowledges that he or she agrees to comply with applicable Brazilian laws and to pay any and all applicable taxes associated with the vesting of Special Retention Awards, the sale of the Shares acquired under the Plan and the receipt of any dividends.

<u>Acknowledgement of Nature of the Grant</u>. This provision supplements paragraph C "Nature of Award" of Appendix A.

By accepting the Special Retention Awards, the Participant agrees that he or she is making an investment decision, the Shares will be issued to the Participant only if the vesting conditions are met and any necessary services are rendered by the Participant over the vesting period, and the value of the underlying Shares is not fixed and may increase or decrease in value over the vesting period without compensation to the Participant.

Notifications

<u>Exchange Control Information</u>.

If the Participant is a resident of or domiciled in Brazil, he or she will be required to submit an annual declaration of assets and rights held outside of Brazil to the Central Bank of Brazil if the aggregate value of the assets and rights is equal to or greater than US$100,000. If such amount exceeds US$100,000,000, the declaration must be submitted quarterly. Assets and rights that must be reported include Shares acquired under the Plan.

<u>Tax on Financial Transactions (IOF)</u>.

Repatriation of funds (*e.g.*, sale proceeds) into Brazil and the conversion of USD into BRL associated with such fund transfers may be subject to the Tax on Financial Transactions. It is the Participant's responsibility to comply with any applicable Tax on Financial Transactions arising from the Participant's participation in the Plan. The Participant should consult with his or her personal tax advisor for additional details.

Canada

Terms and Conditions

<u>Award Settled Only in Shares</u>.

Notwithstanding any discretion in the Plan, the Special Retention Award shall be settled in Shares only. The Participant is not entitled to receive a cash payment pursuant to the Award.

<u>Termination of Service</u>. The following provision replaces paragraph A "Termination" of Appendix A.

For purposes of the Special Retention Award, the Participant's employment relationship will be considered terminated (regardless of the reason for such termination and whether or not later found to be invalid or in breach of Canadian laws or the terms of the Participant's employment agreement, if any) effective as of the date that is the earlier of (i) the date of the Participant's termination, (ii) the date the Participant receives notice of termination, or (iii) the date the Participant is no longer actively providing service and will not be extended by any notice period (*e.g.*, active service would not include any contractual notice period or any period of "garden leave" or similar period mandated under Canadian laws or the terms of the Participant's employment agreement, if any). Unless otherwise expressly provided in the Award Agreement or determined by the Company, the Participant's right to vest in the Special Retention Awards, if any, will terminate on such date. The Committee shall have the exclusive discretion to determine when the Participant is no longer actively providing service for purposes of the Special Retention Award (including whether the Participant may still be considered to be providing services while on a leave of absence).

The Following Provisions Apply for Participants Resident in Quebec:

Consent to Receive Information in English.

The Participant acknowledges that it is the express wish of the parties that the Award Agreement, as well as all documents, notices and legal proceedings entered into, given or instituted pursuant hereto or relating directly or indirectly hereto, be written in English.

Les parties reconnaissent avoir exigé la rédaction en anglais de Conditions d'attribution, ainsi que de tous documents, avis et procédures judiciaires, exécutés, donnés ou intentés en vertu de, ou liés directement ou indirectement à, la présente convention.

Authorization to Release and Transfer Necessary Personal Information. The following provision supplements paragraph D "Data Privacy" of Appendix A.

The Participant hereby authorizes the Company and the Company's representatives to discuss with and obtain all relevant information from all personnel, professional or not, involved in the administration and operation of the Plan. The Participant further authorizes the Company, any Subsidiary and the administrator of the Plan to disclose and discuss the Plan with their advisors. The Participant further authorizes the Company and any Subsidiary to record such information and to keep such information in the Participant's Employee file.

Notifications

Securities Law Information.

The Participant acknowledges that he or she is permitted to sell the Shares acquired under the Plan through the designated broker appointed by the Company, provided the sale of the Shares takes place outside of Canada through facilities of a stock exchange on which the Shares are listed (*i.e.*, the NYSE).

Foreign Asset/Account Reporting Information.

Canadian residents are required to report to the tax authorities certain foreign property (including the Special Retention Awards) on form T1135 (Foreign Income Verification Statement) if the total cost of the foreign property exceeds C$100,000 at any time in the year. The form must be filed by April 30 of the following year. Special Retention Awards must be reported—generally at a nil cost—if the C$100,000 cost threshold is exceeded because of other foreign property the Participant holds. If Shares are acquired, their cost generally is the adjusted cost base ("ACB") of the Shares. The ACB would normally equal the fair market value of the Shares at vesting, but if the Participant owns other Shares, this ACB may have to be averaged with the ACB of the other Shares. The Participant should consult with his or her personal legal advisor to ensure compliance with applicable reporting obligations.

China

Terms and Conditions

The following terms and conditions will apply to Participants who are subject to exchange control restrictions and regulations in the People's Republic of China ("the PRC"), including the requirements imposed by the State Administration of Foreign Exchange ("SAFE"), as determined by the Company in its sole discretion:

Termination of Employment.

Due to exchange control laws in the PRC, the Participant agrees that the Company reserves the right to require the sale of any Shares acquired at vesting of the Special Retention Awards upon the termination of the Participant's employment for any reason. If the Company, in its discretion, does not exercise its right to require the automatic sale of Shares issuable upon vesting of the Special Retention Awards, as described in the preceding sentence, the Participant understands and agrees that any Shares acquired by the Participant under the Plan must be sold no later than six (6) months after termination of the Participant's employment, or within any other such time frame as permitted by the Company or required by SAFE. The Participant understands that any Shares acquired under the Plan that have not been sold within six (6) months of the Participant's termination of employment will be automatically sold by a designated broker at the Company's discretion, pursuant to this authorization by the Participant.

The Participant agrees that the Company is authorized to instruct its designated broker to assist with the mandatory sale of such Shares (on the Participant's behalf, pursuant to this authorization) and the Participant expressly authorizes the Company's designated broker to complete the sale of such Shares. The Participant also agrees to sign any agreements, forms, and/or consents that may be reasonably requested by the Company (or the designated broker) to effectuate the sale of the Shares (including, without limitation, as to the transfers of the proceeds and other exchange control matters noted below) and shall otherwise cooperate with the Company with respect to such matters, provided that the Participant shall not be permitted to exercise any influence over how, when or whether the sales occur. The Participant acknowledges that the Company's designated broker is under no obligation to arrange for the sale of the Shares at any particular price. Due to fluctuations in the Share price and/or applicable exchange rates between vesting and (if later) the date on which the Shares are sold, the amount of proceeds ultimately distributed to the Participant may be more or less than the market value of the Shares upon vesting (which is the amount relevant to determining the Participant's liability for Tax-Related Items). The Participant understands and agrees that the Company is not responsible for the amount of any loss the Participant may incur and the Company assumes no liability for any fluctuations in the Share price and/or any applicable exchange rate.

Upon the sale of the Shares, the Company agrees to pay the cash proceeds from the sale (less any Tax-Related Items, brokerage fees and commissions) to the Participant in accordance with the applicable exchange control laws and regulations, including but not limited to the restrictions set forth in this Appendix B for China below under "Exchange Control Restrictions."

<u>Exchange Control Restrictions</u>.

The Participant understands and agrees that, pursuant to local exchange control requirements, the Participant will be required to immediately repatriate any cash payments or proceeds obtained with respect to participation in the Plan to the PRC. The Participant further understands that such repatriation of any cash payments or proceeds may need to be effectuated through a special exchange control account established by the Company or any Subsidiary, and the Participant hereby consents and agrees that any payment or proceeds may be transferred to such special account prior to being delivered to the Participant.

Any payment or proceeds may be paid to the Participant in U.S. dollars or local currency at the Company's discretion. If the payments or proceeds are paid to the Participant in U.S. dollars, the Participant will be required to set up a U.S. dollar bank account in the PRC (if the Participant does not already have one) so that the payments or proceeds may be deposited into this account. If the payments or proceeds are paid to the Participant in local currency, the Company is under no obligation to secure any particular currency exchange rate and the Company may face delays in converting the payments or proceeds to local currency due to exchange control restrictions. The Participant agrees to bear any currency exchange rate fluctuation risk between the time the cash proceeds are received and the time the cash proceeds are distributed to the Participant through the special account described above.

The Participant further agrees to comply with any other requirements that may be imposed by the Company in the future to facilitate compliance with exchange control requirements in the PRC.

Notifications

<u>Exchange Control Information.</u>

PRC residents may be required to report to SAFE all details of their foreign financial assets and liabilities, as well as details of any economic transactions conducted with non-PRC residents.

France

Terms and Conditions

Language Consent.

By accepting the grant of Special Retention Awards and the Award Agreement, which provides for the terms and conditions of your Special Retention Awards, the Participant confirms having read and understood the documents relating to this Award (the Plan and the Award Agreement, including this Appendix) which were provided to the Participant in English. The Participant accepts the terms of those documents accordingly.

En acceptant l'Attribution d'Actions Attribuées et ce Contrat d'Attribution qui contient les termes et conditions des Actions Attribuées, le Participant confirme avoir lu et compris les documents relatifs à cette attribution (le Plan et le Contrat d'Attribution, ainsi que les Annexes) qui ont été transmis au Participant en langue anglaise. Le Participant accepte ainsi les conditions et termes de ces documents.

Notifications

Tax Information.

The Special Retention Awards are not intended to be French tax-qualified awards.

Foreign Asset/Account Reporting Information.

French residents are required to report all foreign accounts (whether open, current or closed) to the French tax authorities when filing their annual tax returns. The Participant should consult with his or her personal advisor to ensure compliance with applicable reporting obligations.

Germany

Notifications

Exchange Control Information.

If the Participant receives cross-border payments in excess of €12,500 in connection with the sale of securities (including Shares acquired under the Plan) or the receipt of any dividends or dividend equivalent payments, such payment must be reported monthly to the German Federal Bank (*Bundesbank*). The Participant is responsible for the reporting obligation and should file the report electronically by the fifth day of the month following the month in which the payment is made. A copy of the report ("*Allgemeines Meldeportal Statistik*") can be accessed via Bundesbank's website (www.bundesbank.de) and is available in both German and English.

Hungary

There are no country-specific provisions.

India

Notifications

Exchange Control Information.

Indian residents are required to repatriate to India all proceeds received from the sale of Shares within 90 days of receipt and any dividends or dividend equivalent payments within 180 days of receipt, or within such other period of time as may be required under applicable regulations. The Participant must maintain the foreign inward remittance certificate received from the bank where the foreign currency is deposited in the event that the Reserve Bank of India or the Company requests proof of repatriation. It is the Participant's responsibility to comply with applicable exchange control laws in India.

Foreign Asset/Account Reporting Information.

The Participant is required to declare any foreign bank accounts and any foreign financial assets (including Shares held outside India) in the Participant's annual tax return. The Participant is responsible for complying with this reporting obligation and should confer with his or her personal tax advisor in this regard.

Japan

Notifications

Foreign Asset/Account Reporting Information.

The Participant will be required to report details of any assets held outside of Japan as of December 31 (including any Shares acquired under the Plan) to the extent such assets have a total net fair market value exceeding ¥50,000,000. Such report will be due by March 15 of the following year. The Participant should consult with his or her personal tax advisor as to whether the reporting obligation applies to the Participant and whether the Participant will be required to report details of any outstanding Special Retention Awards, Shares or cash held by the Participant in the report.

Korea

Notifications

Exchange Control Information.

Exchange control laws require Korean residents who realized US$500,000 or more from the sale of Shares or the receipt of dividends in a single transaction before July 18, 2017 to repatriate the proceeds back to Korea within three years of the sale/receipt.

Foreign Asset/Account Reporting Information.

If the Participant is a Korean resident, the Participant must declare all of his or her foreign financial accounts (including any brokerage account) to the Korean tax authority and file a report with respect to such accounts if the value of such accounts exceeds KRW 1 billion (or an equivalent amount in foreign currency). The Participant should consult with his or her personal tax advisor as to whether the reporting obligation applies.

Mexico

Terms and Conditions

Policy Statement.

The Special Retention Award is a unilateral and discretionary award and, therefore, the Company reserves the absolute right to amend it and discontinue it at any time without any liability.

The Company, with offices at *390 Park Avenue, New York City, New York, 10022 U.S.A.*, is solely responsible for the administration of the Plan, and participation in the Plan and the Award of the Special Retention Award does not, in any way, establish an employment relationship between the Participant and the Company since the Participant is participating in the Plan on a wholly commercial basis and the sole employer is a Mexican Subsidiary, nor does it establish any rights between the Participant and the Employer.

Plan Document Acknowledgment.

By accepting the Special Retention Awards, the Participant acknowledges that he or she has received copies of the Plan, has reviewed the Plan and the Award Agreement in their entirety, and fully understands and accepts all provisions of the Plan and the Award Agreement, including the Appendices.

In addition, the Participant expressly approves that: (i) participation in the Plan does not constitute an acquired right; (ii) the Plan and participation in the Plan is offered by the Company on a wholly discretionary basis; (iii) participation in the Plan is voluntary; and (iv) neither the Company nor any Subsidiary is responsible for any decrease in the value of the Shares acquired upon vesting of the Special Retention Awards.

Finally, the Participant hereby declares that he or she does not reserve any action or right to bring any claim against the Company for any compensation or damages as a result of his or her participation in the Plan and therefore grant a full and broad release to the Employer, the Company and its other Subsidiaries with respect to any claim that may arise under the Plan.

Spanish Translation

Declaración de Política.

El Otorgamiento de Unidades de Acciones Restringidas es un otorgamiento unilateral y discrecional y, por lo tanto, la Compañía se reserva el derecho absoluto de modificar y discontinuar el Plan en cualquier tiempo, sin responsabilidad alguna.

La Compañía, con oficinas registradas ubicadas en 390 Park Avenue, New York, New York 10022 U.S.A., es únicamente responsable de la administración del Plan, y la participación en el Plan y el Otorgamiento de Unidades de Acciones Restringidas no establecen, de forma alguna, una relación de trabajo entre el Participante y la Compañía, ya que el Participante está participando en el Plan sobre una base comercial y el único patrón es una Afiliada Mexicana y tampoco establece ningún derecho entre usted y el Patrón.

Reconocimiento del Documento del Plan.

Al aceptar el Otorgamiento de las Unidades de Acciones Restringidas, el Participante reconoce que ha recibido copias del Plan, ha revisado el Plan y los Términos del Otorgamiento en su totalidad y que entiende y acepta completamente todas las disposiciones contenidas en el Plan y en los Términos del Otorgamiento, incluyendo los Apéndices.

Adicionalmente, el Participante aprueba expresamente que (i) la participación en el Plan no constituye un derecho adquirido; (ii) el Plan y la participación en el Plan se ofrecen por la Compañía de forma enteramente discrecional; (iii) la participación en el Plan es voluntaria; y (iv) la Compañía, cualquier Filial y el Patrón no son responsables por cualquier disminución en el valor de las Acciones adquiridas al momento de tener derecho en relación con las Unidades de Acciones Restringidas.

Finalmente, el Participante declara que no se reserva ninguna acción o derecho para interponer una reclamación o demanda en contra de la Compañía por compensación, daño o perjuicio alguno como resultado de su participación en el Plan y, por lo tanto, otorga el más amplio y total finiquito al Patrón, la Compañía y sus Filiales en relación con cualquier reclamación demanda que pudiera surgir de conformidad con el Plan.

Netherlands

There are no country-specific provisions.

Russia

Terms and Conditions

U.S. Transaction.

The Participant understands that the grant of the Special Retention Award is a right to receive Shares if certain conditions are met and that the offer is made by the Company in the United States. Upon vesting of the Special Retention Award, any Shares to be issued to the Participant shall be delivered to the Participant through a brokerage account in the United States.

Notifications

Exchange Control Information.

Under current exchange control regulations, within a reasonably short time after the sale of Shares acquired upon vesting of the Special Retention Award or the receipt of dividend equivalent payments, the Participant is required to repatriate such funds received in connection with the Plan to the Participant's bank account in Russia prior to using those proceeds for any purpose including reinvestments. Such proceeds must be initially credited to the Participant through a foreign currency account at an authorized bank in Russia. After the proceeds are initially received in Russia, they may be further remitted to foreign banks in accordance with Russian exchange control laws. The Participant is strongly encouraged to contact the Participant's personal advisor to confirm the applicable Russian exchange control rules because significant penalties may apply in the case of non-compliance and because exchange control requirements may change.

Securities Law Information.

The Participant is not permitted to sell Shares directly to other Russian legal entities or residents.

The grant of the Special Retention Awards and the distribution of the Plan and all other materials the Participant may receive regarding participation in the Plan do not constitute an offering or the advertising of securities in Russia. The issuance of Shares pursuant to the Plan has not and will not be registered in Russia and, therefore, the Shares may not be used for an offering or public circulation in Russia. In no event will Shares be delivered to the Participant in Russia; all Shares acquired under the Plan will be maintained on the Participant's behalf in the United States.

Data Privacy Acknowledgement.

The Participant hereby acknowledges that he or she has read and understands the terms regarding collection, processing and transfer of Data contained in Appendix A to the Award Agreement and by participating in the Plan, the Participant agrees to such terms. In this regard, upon request of the Company or the Employer, the Participant agrees to provide an executed data privacy consent form to the Company or the Employer (or any other agreements or consents that may be required by the Company or the Employer) that the Company and/or the Employer may deem necessary to obtain under the data privacy laws of Russia, either now or in the future.

Labor Law Information.

If the Participant continues to hold Shares after involuntary termination, the Participant may not be eligible to receive unemployment benefits in Russia.

Anti-Corruption Legislation Information.

Individuals holding public office in Russia, as well as their spouses and dependent children, may be prohibited from opening or maintaining a foreign brokerage or bank account and holding any securities, whether acquired directly or indirectly, in a foreign company (including Shares acquired under the Plan). The Participant is strongly advised to consult with his or her personal legal advisor to determine whether the restriction applies to the Participant.

Spain

Terms and Conditions

No Entitlement for Claims or Compensation. The following provisions supplement paragraph A "Termination" of Appendix A.

By accepting the Special Retention Award, the Participant consents to participation in the Plan and acknowledges that Participant has received a copy of the Plan.

The Participant understands and agrees that, as a condition of the grant of the Special Retention Award, if the Participant's employment terminates, unless otherwise provided in the Award Agreement or by the Company, any unvested Special Retention Awards shall be forfeited without entitlement to the underlying Shares or to any amount as indemnification in the event of a termination, including, but not limited to: resignation, disciplinary dismissal adjudged to be with cause, disciplinary dismissal adjudged or recognized to be without cause, individual or collective layoff on objective grounds, whether adjudged to be with cause or adjudged or recognized to be without cause, material modification of the terms of employment under Article 41 of the Workers' Statute, relocation under Article 40 of the Workers' Statute, Article 50 of the Workers' Statute, unilateral withdrawal by the Employer, and under Article 10.3 of Royal Decree 1382/1985.

The Participant understands that the Company has unilaterally, gratuitously and in its sole discretion decided to grant Special Retention Awards under the Plan to individuals who may be Employees of the Company or a Subsidiary. The decision is limited and entered into based upon the express assumption and condition that any Special Retention Awards will not economically or otherwise bind the Company or any Subsidiary, including the Employer, on an ongoing basis, other than as expressly set forth in the Award Agreement. Consequently, the Participant understands that the Special Retention Awards are granted on the assumption and condition that the Special Retention Awards shall not become part of any employment or service agreement (whether with the Company or any Subsidiary, including the Employer) and shall not be considered a mandatory benefit, salary for any purpose (including severance compensation) or any other right whatsoever. Furthermore, the Participant understands and freely accepts that there is no guarantee that any benefit whatsoever shall arise from the grant of Special Retention Awards, which is gratuitous and discretionary, since the future value of the Special Retention Awards and the underlying Shares is unknown and unpredictable. The Participant also understands that the grant of Special Retention Awards would not be made but for the assumptions and conditions set forth hereinabove; thus, the Participant understands, acknowledges and freely accepts that, should any or all of the assumptions be mistaken or any of the conditions not be met for any reason, the Special Retention Award and any right to the underlying Shares shall be null and void.

Notifications

Securities Law Information.

No "offer of securities to the public", as defined under Spanish law, has taken place or will take place in the Spanish territory with respect to the Special Retention Award. No public offering prospectus has been nor will be registered with the Comisión Nacional del Mercado de Valores (Spanish Securities Exchange Commission) ("CNMV"). Neither the Plan nor the Award Agreement constitute a public offering prospectus and they have not been, nor will they be, registered with the CNMV.

Exchange Control Information.

It is the Participant's responsibility to comply with exchange control regulations in Spain. The Participant must declare the acquisition of Shares for statistical purposes to the Spanish Direccion General de Comercio e Inversiones (the "DGCI") of the Ministry of Economy and Competitiveness. In addition, the Participant must also file a

Form D-6 with the Directorate of Foreign Transaction each January in which the Shares are owned. The sale of Shares also must be declared on Form D-6 filed with the DGCI in January, unless the sale proceeds exceed the applicable threshold (currently €1,502,530), in which case, the filing is due within one month after the sale.

Foreign Asset/Account Reporting Information.

The Participant is required to declare electronically to the Bank of Spain any securities accounts (including brokerage accounts held abroad), as well as the Shares held in such accounts if the value of the transactions during the prior tax year or the balances in such accounts as of December 31 of the prior tax year exceed €1,000,000.

Further, to the extent that the Participant holds Shares and/or has bank accounts outside Spain with a value in excess of €50,000 (for each type of asset) as of December 31, the Participant will be required to report information on such assets on his or her tax return (tax form 720) for such year. After such Shares and/or accounts are initially reported, the reporting obligation will apply for subsequent years only if the value of any previously-reported Shares or accounts increases by more than €20,000 or if the Participant sells or otherwise disposes of any previously-reported Shares or accounts.

Switzerland

Notifications

Securities Law Information.

The grant of the Special Retention Award under the Plan is considered a private offering in Switzerland and is, therefore, not subject to registration in Switzerland. Neither this document nor any other material related to the Special Retention Award constitutes a prospectus as such term is understood pursuant to Article 652a of the Swiss Code of Obligations, and neither this document nor any other materials related to the Special Retention Award may be publicly distributed or otherwise made publicly available in Switzerland. Neither this document nor any other offering or marketing materials relating to the Special Retention Awards have been or will be filed with, approved or supervised by any Swiss regulatory authority (in particular, the Swiss Financial Market Supervisory Authority (FINMA)).

United Kingdom

Terms and Conditions

Responsibility for Taxes. The following supplements paragraph B "Responsibility for Taxes" of Appendix A:

Without limitation to paragraph B "Responsibility for Taxes" of Appendix A, the Participant agrees that the Participant is liable for all Tax-Related Items and hereby covenants to pay all such Tax-Related Items as and when requested by the Company or the Employer or by Her Majesty's Revenue & Customs ("HMRC") (or any other tax authority or any other relevant authority). The Participant also agrees to indemnify and keep indemnified the Company and the Employer against any Tax-Related Items that they are required to pay or withhold or have paid or will have to pay to HMRC (or any other tax authority or any other relevant authority) on the Participant's behalf.

Notwithstanding the foregoing, if the Participant is a Director or executive officer of the Company (within the meaning of Section 13(k) of the U.S. Securities Exchange Act of 1934), the Participant may not be able to indemnify the Company or the Employer for the amount of any income tax not collected from or paid by the Participant, as it may be considered a loan. In this case, the amount of any uncollected income tax may constitute a benefit to the Participant on which additional income tax and employee National Insurance contributions ("NICs") may be payable. The Participant agrees to report and pay any income tax due on this additional benefit directly to HMRC under the self-assessment regime and to pay the Employer for the value of the employee NICs due on this additional benefit, which the Company or the Employer may recover from the Participant by any of the means referred to in the Award Agreement, including the Appendices.

Exhibit 10(m)

ARCONIC INC.

NON-EMPLOYEE DIRECTOR COMPENSATION POLICY

Effective February 6, 2019

1. General. This Non-Employee Director Compensation Policy (the "Policy"), sets forth the cash and equity-based compensation that has been approved by the Board of Directors (the "Board") of Arconic Inc., a Delaware corporation, (the "Company") as payable to eligible non-employee members of the Board ("Non-Employee Directors"), as of February 6, 2019 or such other date stated herein. The cash and equity-based compensation described in this Policy shall be paid or be made, as applicable, automatically and without further action of the Board, to each Non-Employee Director who may be eligible to receive such compensation. This Policy shall remain in effect until it is revised or rescinded by further action of the Board. The terms and conditions of this Policy shall supersede any prior cash or equity compensation arrangements between the Company and its Non-Employee Directors.

2. Cash Compensation.

(a) Annual Retainers. Each Non-Employee Director shall be eligible to receive an annual cash retainer of $120,000 for service on the Board. In addition, a Non-Employee Director shall receive the following additional annual retainers, as applicable:

Non-Employee Director Position	Additional Annual Cash Retainer Fee
Lead Director	$40,000
Audit Committee Chair Fee (includes Audit Committee Member Fee)	$27,500
Audit Committee Member Fee	$11,000
Compensation and Benefits Committee Chair Fee	$20,000
Other Committee Chair Fee	$16,500

(b) Payment of Retainers. The annual retainers described in Section 2(a) shall be earned on a quarterly basis based on a calendar quarter and shall be paid by the Company in arrears not later than the third business day following the end of each calendar quarter (if not deferred by the Non-Employee Director in accordance with subsection (d) hereof). In the event a Non-Employee Director does not serve as a Non-Employee Director, or in the applicable positions described in Section 2(a), for an entire calendar quarter, the retainer paid to such Non-Employee Director shall be prorated for the portion of such calendar quarter actually served as a Non-Employee Director, or in such positions, as applicable.

(c) Exceptional Meeting Fees. A fee of $1,500 shall be paid to a Non-Employee Director for each Board or committee meeting attended by such Non-Employee Director in excess of the number of regular Board or committee meetings scheduled by the Board for the applicable calendar year. Such exceptional meeting fees shall be paid by the Company in arrears not later than the third business day following the end of the calendar quarter in which any such exceptional meeting occurs (if not deferred by the Non-Employee Director in accordance with subsection (d) hereof).

(d) Deferral of Retainers. Non-Employee Directors may elect to defer payment of all or a portion of the annual retainers described in Section 2(a) and the exceptional meeting fees described in Section 2(c) into specified investment funds and/or into vested restricted share units for shares of the Company's common stock, which deferral will be made pursuant to the terms of the Company's Amended and Restated Deferred Fee Plan for Directors or its successor plan (the "Deferred Fee Plan"). Unless otherwise determined by the Board, any restricted share units will be granted under the 2013 Arconic Stock Incentive Plan or its successor plan (the "Equity Plan"), on the date on which such retainer(s) would otherwise have been paid in cash. The extent to which a Non-Employee Director may defer annual retainer payments into vested restricted share units will therefore be subject to any limit on awards granted to a Non-Employee Director set forth in the Equity Plan.

3. Equity Compensation. Non-Employee Directors shall be granted the equity awards described below. The awards described below in paragraphs 3(a) and 3(b) shall be granted under and shall be subject to the terms and provisions of the Equity Plan and shall be granted subject to an award agreement in substantially the same form approved by the Board prior to or as of the grant date, setting forth the terms of the award (the "Award Terms"), consistent with the Equity Plan. For purposes of this Section 3, the number of shares subject to any restricted share unit award will be determined by dividing the grant date dollar value specified under subsection (a) or (b) hereof by the Fair Market Value (as defined in the Equity Plan) of a share of the Company's common stock on the date of grant.

(a) Annual Equity Award. A person who is a Non-Employee Director immediately following each annual meeting of the Company's stockholders and who will continue to serve as a Non-Employee Director following such annual meeting shall be automatically granted on the second market trading day following the date of each such annual meeting a restricted share unit award with a grant date value equal to $150,000 (the "Annual Equity Award"). The Annual Equity Award shall vest on the earlier of the first anniversary date of the grant date or the date of the Company's next subsequent annual meeting of stockholders following the grant date.

(b) Pro-Rated Annual Equity Award. On the fifth market trading day following a person's initial appointment as a Non-Employee Director, and provided such person has not otherwise received an Annual Equity Award for the relevant year under Section 3(a), the Non-Employee Director shall be automatically granted a restricted share unit award with a grant date value equal to $150,000, in each case multiplied by a fraction, the numerator of which is 365 less the number of days that have elapsed since the date of the Company's last annual meeting of stockholders and the Non-Employee Director's date of initial appointment, and the denominator of which is 365 (the "Pro-Rated Award"). The Pro-Rated Award shall vest on the date of the Company's next subsequent annual meeting of stockholders following the date of the Non-Employee Director's appointment to the Board.

(c) Special Vesting of Equity Awards. Notwithstanding Sections 3(a) or (b) above and as shall be further set forth in the Award Terms: (i) unvested equity awards shall vest in full upon the death of a Non-Employee

Director or upon a Change in Control where a Replacement Award is not provided or the Non-Employee Director’s service is terminated (where Change in Control and Replacement Award are as defined in the Equity Plan); and (ii) unvested equity awards shall vest on a pro-rata basis in the event of a Non-Employee Director's termination of service for any other reason.

(d) Deferral of Equity Award. Payment of the Annual Equity Award or any Pro-Rated Award will be deferred until the Non-Employee Director's separation from service, in accordance with the terms of the Deferred Fee Plan, unless otherwise required by applicable laws.

4. Stock Ownership Guideline. Within a period of six years from the date of a person's initial appointment as a Non-Employee Director, each Non-Employee Director is required to attain ownership of at least $750,000 in the Company's common stock and must maintain such ownership until retirement from the Board.

5. Director Compensation Limit. As further set forth in the Equity Plan, the sum of the grant date value of all equity awards granted and all cash compensation paid by the Company to a Non-Employee Director as compensation for services as a Non-Employee Director shall not exceed $750,000 during any calendar year. For avoidance of doubt, compensation shall count towards this limit for the fiscal year in which it is granted or earned, and not later when distributed, in the event it is deferred.

6. Policy Subject to Amendment, Modification and Termination. This Policy may be amended, modified or terminated by the Board in the future at its sole discretion, provided that no such action that would materially and adversely impact the rights with respect to annual retainers payable in the fiscal quarter during which a Non-Employee Director is then performing services shall be effective without the consent of the affected Non-Employee Director.

Exhibit 21

SUBSIDIARIES OF THE REGISTRANT
(As of December 31, 2018)

Name	State or Country of Organization
Arconic Domestic LLC	Delaware
Arconic Securities LLC	Delaware
Howmet International Inc.	Delaware
Howmet Holdings Corporation	Delaware
Howmet Corporation	Delaware
Arconic International Holding Company LLC	Delaware
Arconic Luxembourg S.à r.l.	Luxembourg
Arconic Inversiones España S.L.	Spain
Arconic Inversiones Internacionales S.L.	Spain
Arconic-Köfém Kft	Hungary
Arconic Global Treasury Services S.a.r.l.	Luxembourg
Alumax LLC	Delaware
Alumax Mill Products, Inc.	Delaware
Cordant Technologies Holding Company	Delaware
Arconic Global Fasteners & Rings, Inc.	Delaware
Huck International Inc.	Delaware
FR Acquisition Corporation (US), Inc.	Delaware
JFB Firth Rixson Inc.	Delaware

The names of particular subsidiaries have been omitted because, considered in the aggregate as a single subsidiary, they would not constitute, as of the end of the year covered by this report, a “significant subsidiary” as that term is defined in Regulation S-X under the Securities Exchange Act of 1934.

Exhibit 23

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statement on Form S-8 (Nos. 333-32516, 333-106411, 333-128445, 333-146330, 333-153369, 333-155668, 333-159123, 333-168428, 333-170801, 333-182899, 333-189882, 333-203275, 333-209772, 333-212246 and 333-229727) of Arconic Inc. of our report dated February 21, 2019 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP
Pittsburgh, Pennsylvania
February 21, 2019

Exhibit 24

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that each of the undersigned Directors of Arconic Inc. (the "Company") hereby constitutes and appoints KEN GIACOBBE, PETER HONG, W. PAUL MYRON and KATHERINE H. RAMUNDO, or any of them, his or her true and lawful attorneys-in-fact and agents, with full power of substitution, to do any and all acts and things and to execute any and all instruments that said attorneys-in-fact and agents, or any of them, may deem necessary or advisable or may be required:

(1) To enable the Company to comply with the Securities Exchange Act of 1934, as amended (the "1934 Act"), and any rules, regulations or requirements of the Securities and Exchange Commission (the "Commission") in respect thereof, in connection with the filing under the 1934 Act of the Company's Annual Report on Form 10-K for the year ended December 31, 2018 (the "2018 Annual Report"), including specifically, but without limiting the generality of the foregoing, power and authority to sign the name of each of the undersigned in the capacity of Director of the Company to the 2018 Annual Report to be filed with the Commission and to any instruments or documents filed as part of or in connection with the 2018 Annual Report, including any amendments or supplements thereto;

(2) To enable the Company to comply with the Securities Act of 1933, as amended (the "1933 Act"), and any rules, regulations or requirements of the Commission in respect thereof, in connection with the registration under the 1933 Act during 2019 of the offer and sale or delivery of shares of common stock of the Company to be issued under the 2013 Arconic Stock Incentive Plan, as such plan may be amended and/or restated from time to time (including any amendments thereto or restatements thereof, the "2013 Plan"), the 2009 Alcoa Stock Incentive Plan (the "2009 Plan"), the RTI International Metals, Inc. 2014 Stock and Incentive Plan, as amended (the "RTI 2014 Plan") and the RTI International Metals, Inc. 2004 Stock Plan, as amended (the "RTI 2004 Plan"), including specifically, but without limiting the generality of the foregoing, power and authority to sign the name of each of the undersigned in the capacity of Director of the Company to any registration statement on Form S-8, or on such other form as may be appropriate, to be filed with the Commission in respect of said shares and the 2013 Plan, the 2009 Plan, the RTI 2014 Plan or the RTI 2004 Plan, or any of them, to any and all pre-effective amendments, post-effective amendments and supplements to any such registration statement, and to any instruments or documents filed as part of or in connection with any such registration statement or any such amendments or supplements thereto; and

(3) To enable the Company to comply with the 1933 Act, and any rules, regulations or requirements of the Commission in respect thereof, in connection with the registration under the 1933 Act during 2019 of the offer and sale or delivery of shares of common stock of the Company, including specifically, but without limiting the generality of the foregoing, power and authority to sign the name of each of the undersigned in the capacity of Director of the Company to any registration statement on Form S-8, or on such other form as may be appropriate, to be filed with the Commission in respect of said shares, to any and all pre-effective amendments, post-effective amendments and supplements to any such registration statement, and to any instruments or documents filed as part of or in connection with any such registration statement or any such amendments or supplements thereto; and

(4) To enable the Company to comply with the 1933 Act, and any rules, regulations or requirements of the Commission in respect thereof, in connection with the registration under the 1933 Act during 2019 of the offer and sale or delivery of shares of common stock of the Company to be issued under the Company's employee retirement savings plans (together with interests in such plans), including, without limitation, the Arconic Bargaining Retirement Savings Plan, the Arconic Salaried Retirement Savings Plan, the Arconic Hourly Non-Bargaining Retirement Savings Plan, the Arconic Fastener Systems and Rings Retirement Savings Plan, the Arconic Retirement Savings Plan for ATEP Bargaining Employees, and employee retirement or other savings plans sponsored by the Company or its subsidiaries or entities acquired by the Company from time to time (the "Plans"), including specifically, but without limiting the generality of the foregoing, power and authority to sign the name of each of the undersigned in the capacity of Director of the Company to any registration statement on Form S-8, or on such other form as may be appropriate, to be filed with the Commission in respect of said shares and the Plans (or interests in such Plans), or any of them, to any and all pre-effective amendments, post-effective amendments and supplements to any such registration statement, and to any instruments or documents filed as part of or in connection with any such registration statement or any such amendments or supplements thereto; and

(5) To enable the Company to comply with the 1933 Act, and any rules, regulations or requirements of the Commission in respect thereof, in connection with the registration under the 1933 Act on an unallocated basis of the Company's securities, including debt securities, preferred stock, common stock and hybrid securities (including convertible or exchangeable securities); warrants to purchase debt or equity securities of the Company; stock purchase contracts and stock purchase units; and trust preferred securities of a trust or similar vehicle and related guarantees

thereof by the Company, including specifically, but without limiting the generality of the foregoing, power and authority (i) to sign the name of each of the undersigned in the capacity of Director of the Company to one or more registration statements on Form S-3 or such other form as such attorneys-in-fact, or any of them, may deem necessary or desirable (including any registration statement filed pursuant to Rule 462 under the 1933 Act), and to any and all amendments and post-effective amendments and supplements to any such registration statements, and to any and all instruments or documents filed as part of or in connection with any such registration statements or amendments or supplements thereto, and (ii) to file the same with all exhibits thereto with the Commission; and

granting unto each of said attorneys-in-fact and agents full power and authority to do and perform each and every act and thing requisite and necessary to be done, as fully to all intents and purposes as the undersigned might or could do in person, and each of the undersigned hereby ratifies and confirms all that said attorneys-in-fact and agents, or any of them, shall do or cause to be done by virtue hereof.

This power of attorney will be governed by and construed in accordance with the laws of the State of Delaware. The execution of this power of attorney is not intended to, and does not, revoke any prior powers of attorney. This power of attorney may be signed in any number of counterparts, each of which shall constitute an original and all of which, taken together, shall constitute one power of attorney.

IN WITNESS WHEREOF, each of the undersigned has subscribed these presents this 13th day of February 2019.

/s/ James F. Albaugh	/s/ Amy E. Alving
James F. Albaugh	Amy E. Alving
/s/ Christopher L. Ayers	/s/ Arthur D. Collins, Jr.
Christopher L. Ayers	Arthur D. Collins, Jr.
/s/ Elmer L. Doty	/s/ Rajiv L. Gupta
Elmer L. Doty	Rajiv L. Gupta
/s/ David P. Hess	/s/ Sean O. Mahoney
David P. Hess	Sean O. Mahoney
/s/ David J. Miller	/s/ E. Stanley O’Neal
David J. Miller	E. Stanley O’Neal
/s/ Ulrich R. Schmidt	
Ulrich R. Schmidt	

Exhibit 31

Certifications

I, John C. Plant, certify that:

1. I have reviewed this annual report on Form 10-K of Arconic Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 21, 2019

/s/ John C. Plant

Name: John C. Plant

Title: Chairman and Chief Executive Officer

I, Ken Giacobbe, certify that:

1. I have reviewed this annual report on Form 10-K of Arconic Inc.;

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

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

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

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

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

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

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

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

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

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

Date: February 21, 2019

/s/ Ken Giacobbe

Name: Ken Giacobbe

Title: Executive Vice President and Chief Financial Officer

Exhibit 32

Certification
Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002

Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (subsections (a) and (b) of Section 1350, Chapter 63 of Title 18, United States Code), each of the undersigned officers of Arconic Inc., a Delaware corporation (the "Company"), does hereby certify that:

The Annual Report on Form 10-K for the period ended December 31, 2018 (the "Form 10-K") of the Company fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934 and information contained in the Form 10-K fairly presents, in all material respects, the financial condition and results of operations of the Company.

Dated:	February 21, 2019	/s/ John C. Plant	
		Name:	John C. Plant
		Title:	Chairman and Chief Executive Officer

Dated:	February 21, 2019	/s/ Ken Giacobbe	
		Name:	Ken Giacobbe
		Title:	Executive Vice President and Chief Financial Officer

A signed original of this written statement required by Section 906, or other document authenticating, acknowledging, or otherwise adopting the signature that appears in typed form within the electronic version of this written statement required by Section 906, has been provided to the Company and will be retained by the Company and furnished to the Securities and Exchange Commission or its staff upon request.

The foregoing certification is being furnished to the Securities and Exchange Commission as an exhibit to the Form 10-K and shall not be considered filed as part of the Form 10-K.