

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

FORM 10-K

(Mark One)

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

For The Fiscal Year Ended December 31, 2019
OR

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

Commission File Number 1-37816

ALCOA CORPORATION

(Exact Name of Registrant as Specified in Charter)

Delaware

(State or Other Jurisdiction
of Incorporation or Organization)

81-1789115

(I.R.S. Employer
Identification No.)

**201 Isabella Street, Suite 500,
Pittsburgh, Pennsylvania**
(Address of Principal Executive Offices)

15212-5858
(Zip Code)

Registrant's telephone number, including area code: **412-315-2900**

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

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

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

None
(Title of Class)

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

Yes No

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

Yes No

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

Yes No

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

Yes No

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

Large accelerated filer 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 Registrant's voting stock held by non-affiliates at June 28, 2019 was approximately \$4.3 billion, based on the closing price per share of Common Stock on June 28, 2019 of \$23.41 as reported on the New York Stock Exchange.

As of February 14, 2020, there was 185,915,242 shares of the registrant's common stock, par value \$0.01 per share, 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 2020 Annual Meeting of Stockholders to be filed pursuant to Regulation 14A.

TABLE OF CONTENTS

	<u>Page(s)</u>
<u>Part I</u>	
Item 1. Business	1
Item 1A. Risk Factors	17
Item 1B. Unresolved Staff Comments	29
Item 2. Properties	29
Item 3. Legal Proceedings	29
Item 4. Mine Safety Disclosures	30
<u>Part II</u>	
Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities	31
Item 6. Selected Financial Data	33
Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations	34
Item 7A. Quantitative and Qualitative Disclosures About Market Risk	49
Item 8. Financial Statements and Supplementary Data	50
Item 8A. Supplemental Financial Information	112
Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure	113
Item 9A. Controls and Procedures	113
Item 9B. Other Information	113
<u>Part III</u>	
Item 10. Directors, Executive Officers and Corporate Governance	114
Item 11. Executive Compensation	114
Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters	114
Item 13. Certain Relationships and Related Transactions, and Director Independence	114
Item 14. Principal Accounting Fees and Services	114
<u>Part IV</u>	
Item 15. Exhibits, Financial Statement Schedules	115
Item 16. Form 10-K Summary	118
Signatures	119

Note on Incorporation by Reference

In this Form 10-K, selected items of information and data are incorporated by reference to portions of Alcoa Corporation’s Definitive Proxy Statement for its 2020 Annual Meeting of Stockholders (Proxy Statement), which will be filed with the Securities and Exchange Commission within 120 days after the end of Alcoa Corporation’s fiscal year ended December 31, 2019. Unless otherwise provided herein, any reference in this Form 10-K to disclosures in the Proxy Statement shall constitute incorporation by reference of only that specific disclosure into this Form 10-K.

Forward-Looking Statements

This report contains 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,” “intends,” “may,” “outlook,” “plans,” “projects,” “seeks,” “sees,” “should,” “targets,” “will,” “would,” or other words of similar meaning. All statements by Alcoa Corporation that reflect expectations, assumptions or projections about the future, other than statements of historical fact, are forward-looking statements, including, without limitation, forecasts concerning global demand growth for bauxite, alumina, and aluminum, and supply/demand balances; statements, projections or forecasts of future financial results or operating performance; statements about strategies, outlook, and business and financial prospects; and statements about return of capital. These statements reflect beliefs and assumptions that are based on Alcoa Corporation’s perception of historical trends, current conditions, and expected future developments, as well as other factors that management believes are appropriate in the circumstances. Forward-looking statements are not guarantees of future performance and are subject to known and unknown risks, uncertainties, and changes in circumstances that are difficult to predict. Although Alcoa Corporation believes that 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. Such risks and uncertainties include, but are not limited to: (a) material adverse changes in aluminum industry conditions, including global supply and demand conditions and fluctuations in London Metal Exchange-based prices and premiums, as applicable, for primary aluminum and other products, and fluctuations in indexed-based and spot prices for alumina; (b) deterioration in global economic and financial market conditions generally and which may also affect Alcoa Corporation’s ability to obtain credit or financing upon acceptable terms; (c) unfavorable changes in the markets served by Alcoa Corporation; (d) the impact of changes in foreign currency exchange and tax rates on costs and results; (e) increases

in energy costs or uncertainty of energy supply; (f) declines in the discount rates used to measure pension liabilities and other postretirement benefits or lower-than-expected investment returns on pension assets, or unfavorable changes in laws or regulations that govern pension plan funding or other postretirement benefits; (g) the inability to achieve improvement in profitability and margins, cost savings, cash generation, revenue growth, fiscal discipline, or strengthening of competitiveness and operations anticipated from operational and productivity improvements, cash sustainability, technology advancements, and other initiatives; (h) the inability to realize expected benefits, in each case as planned and by targeted completion dates, from acquisitions, divestitures, facility closures, curtailments, restarts, expansions, or joint ventures; (i) political, economic, trade, legal, and regulatory risks in the countries in which Alcoa Corporation operates or sells products; (j) labor disputes and/or work stoppages; (k) the outcome of contingencies, including legal proceedings, government or regulatory investigations, and environmental remediation; (l) the impact of cyberattacks and potential information technology or data security breaches; and (m) the other risk factors discussed in Part I Item 1A of this Form 10-K and other reports filed by Alcoa Corporation with the U.S. Securities and Exchange Commission, including those described in this report.

Alcoa Corporation disclaims any obligation to update publicly any forward-looking statements, whether in response to new information, future events or otherwise, except as required by applicable law. Market projections are subject to the risks described above and other risks in the market.

PART I

Item 1. Business.

(dollars in millions, except per-share amounts, average realized prices, and average cost amounts; metric tons in thousands (kmt))

The Company

Alcoa Corporation, a Delaware corporation, became an independent, publicly traded company on November 1, 2016, following its separation from its former parent company, Alcoa Inc. (ParentCo or Arconic). “Regular-way” trading of Alcoa Corporation’s common stock began with the opening of the New York Stock Exchange (NYSE) on November 1, 2016 under the ticker symbol “AA.” Alcoa Corporation’s common stock has a par value of \$0.01 per share. Alcoa Corporation’s principal executive office is located in Pittsburgh, Pennsylvania. In this report, unless the context otherwise requires, the terms “Alcoa,” the “Company,” “we,” “us,” and “our” refer to Alcoa Corporation and all subsidiaries consolidated for the purposes of its financial statements.

On September 28, 2015, ParentCo announced its intention to separate ParentCo into two standalone, publicly traded companies (the Separation Transaction). Alcoa Upstream Corporation was formed in Delaware in March 2016 for the purpose of holding ParentCo’s Bauxite, Alumina, Aluminum, Cast Products and Energy businesses, as well as ParentCo’s rolling mill operations in Warrick, Indiana, and ParentCo’s 25.1% interest in the Ma’aden Rolling Company in the Kingdom of Saudi Arabia (Saudi Arabia) and was renamed Alcoa Corporation in connection with the Separation Transaction.

Alcoa Corporation entered into certain agreements with Arconic to implement the legal and structural separation between the two companies to govern the relationship between Alcoa Corporation and Arconic after the completion of the Separation Transaction and allocate between Alcoa Corporation and Arconic various assets, liabilities and obligations, including, among other things, employee benefits, environmental liabilities, intellectual property, and tax-related assets and liabilities. These agreements included a Separation and Distribution Agreement, a Tax Matters Agreement, an Employee Matters Agreement, a Transition Services Agreement, and certain Patent, Know-How, Trade Secret License, and Trademark License Agreements.

Alcoa is a global industry leader in bauxite, alumina, and aluminum products. The Company is built on a foundation of strong values and operating excellence dating back over 130 years to the world-changing discovery that made aluminum an affordable and vital part of modern life. Since developing the aluminum industry, and throughout our history, our talented Alcoans have followed on with breakthrough innovations and best practices that have led to efficiency, safety, sustainability, and stronger communities wherever we operate.

Alcoa is a global company with direct and indirect ownership of 30 operating locations across nine countries. The Company’s operations consist of three reportable business segments: Bauxite, Alumina, and Aluminum. The Bauxite and Alumina segments primarily consist of a series of affiliated operating entities held in Alcoa World Alumina and Chemicals, a global, unincorporated joint venture between Alcoa and Alumina Limited (described below). The Aluminum segment consists of the Company’s aluminum smelting, casting, and rolling businesses, along with the majority of the energy production business.

Aluminum, as an element, is abundant in the Earth’s crust, but a multi-step process is required to make aluminum metal. Aluminum metal is produced by refining alumina oxide from bauxite into alumina, which is then smelted into aluminum and can be cast and rolled into many shapes and forms. Aluminum is a commodity traded on the London Metal Exchange (LME) and priced daily. Alumina, an intermediary product, is subject to market pricing against the Alumina Price Index (API). As a result, the prices of both aluminum and alumina are subject to significant volatility and, therefore, influence the operating results of Alcoa.

Joint Ventures

Alcoa World Alumina and Chemicals (AWAC)

AWAC is an unincorporated global joint venture between Alcoa Corporation and Alumina Limited, a company incorporated under the laws of the Commonwealth of Australia and listed on the Australian Securities Exchange. AWAC consists of a number of affiliated entities that own, operate or have an interest in bauxite mines and alumina refineries, as well as certain aluminum smelters, in seven countries. Alcoa Corporation owns 60% and Alumina Limited owns 40% of these entities, directly or indirectly, with such entities being consolidated by Alcoa Corporation for financial reporting purposes. The scope of AWAC generally includes the mining of bauxite and other aluminous ores; the refining, production, and sale of non-metallurgical alumina and other alumina-based chemicals; and certain primary aluminum smelting and other facilities.

Alcoa provides the operating management for AWAC, which is subject to direction provided by the Strategic Council of AWAC. The Strategic Council consists of five members, three of whom are appointed by Alcoa (of which one is the Chair),

and two of whom are appointed by Alumina Limited (of which one is the Deputy Chair). Matters are decided by a majority vote with certain matters requiring approval by at least 80% of the members, including: changes to the scope of AWAC; changes in the dividend policy; equity calls in aggregate greater than \$1,000 in any year; sales of all or a majority of the AWAC assets; loans from AWAC companies to Alcoa or Alumina Limited; certain acquisitions, divestitures, expansions, curtailments or closures; certain related-party transactions; financial derivatives, hedges or swap transactions; a decision by AWAC companies to file for insolvency; and changes to pricing formula in certain offtake agreements which may be entered into between AWAC companies and Alcoa or Alumina Limited.

AWAC Operations

AWAC entities' assets include the following interests:

- 100% of the bauxite mining, alumina refining, and aluminum smelting operations of Alcoa's affiliate, Alcoa of Australia Limited (AofA);
- 100% of the Juruti bauxite deposit and mine in Brazil;
- 45% interest in Halco (Mining) Inc., a bauxite consortium that owns a 51% interest in Compagnie des Bauxites de Guinée, a bauxite mine in Guinea;
- 9.62% interest in the bauxite mining operations in Brazil of Mineração Rio Do Norte, a Brazilian company;
- 100% interest in various assets formerly used for mining and refining in the Republic of Suriname (Suriname);
- 25.1% interest in the mine and refinery in Ras Al Khair, Saudi Arabia;
- 100% of the refinery and alumina-based chemicals assets at San Ciprián, Spain;
- 100% of the refinery assets at Point Comfort, Texas, United States;
- 39.96% interest in the São Luís refinery in Brazil;
- 55% interest in the Portland, Australia smelter that AWAC manages on behalf of the joint venture partners; and
- 100% of Alcoa Steamship Company Inc., a company that procures ocean freight and commercial shipping services for Alcoa in the ordinary course of business.

Exclusivity

Under the terms of their joint venture agreements, Alcoa and Alumina Limited have agreed that, subject to certain exceptions, AWAC is their exclusive vehicle for their investments, operations or participation in the bauxite and alumina business, and they will not compete with AWAC in those businesses. In the event of a change of control of either Alcoa or Alumina Limited, this exclusivity and non-compete restriction will terminate, and the partners will then have opportunities to unilaterally pursue bauxite or alumina projects outside of or within AWAC, subject to certain conditions provided in the Amended and Restated Charter of the Strategic Council.

Equity Calls

The cash flow of AWAC and borrowings are the preferred sources of funding for the needs of AWAC. An equity call can be made on 30 days' notice, subject to certain limitations, in the event the aggregate annual capital budget of AWAC requires an equity contribution from Alcoa and Alumina Limited.

Dividend Policy

AWAC will generally be required to distribute at least 50% of the prior calendar quarter's net income of each AWAC company, and certain AWAC companies will also be required to pay a distribution every three months equal to the amount of available cash above specified thresholds and subject to the forecast cash needs of the company.

Leveraging Policy

Debt of AWAC is subject to a limit of 30% of total capital (defined as the sum of debt (net of cash) plus any minority interest plus shareholder equity). The AWAC joint venture has raised a limited amount of debt to fund growth projects as permitted under Alcoa's revolving credit line, and in accordance with the joint venture partnership agreements.

Saudi Arabia Joint Venture

In December 2009, Alcoa entered into a joint venture with the Saudi Arabian Mining Company (Ma'aden), which was formed by the government of Saudi Arabia to develop its mineral resources and create a fully integrated aluminum complex

in the Kingdom of Saudi Arabia. Ma'aden is listed on the Saudi Stock Exchange (Tadawul). The complex includes a bauxite mine with a capacity of 4 million dry metric tons per year; an alumina refinery with a capacity of 1.8 million metric tons per year (mtpy); an aluminum smelter with a capacity of ingot, slab and billet of 740,000 mtpy; and a rolling mill with a capacity of 380,000 mtpy.

The joint venture was originally comprised of three entities: the Ma'aden Bauxite and Alumina Company (MBAC), the Ma'aden Aluminium Company (MAC), and the Ma'aden Rolling Company (MRC). Ma'aden owns a 74.9% interest in the MBAC and MAC joint venture. Alcoa owns a 25.1% interest in MAC, which holds the smelter; AWAC holds a 25.1% interest in MBAC, which holds the mine and refinery. In June 2019, the joint venture agreement was amended transferring Alcoa's 25.1% interest in MRC to Ma'aden, amongst other things. See Note C to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K. The refinery and smelter are located within the Ras Al Khair industrial zone on the east coast of the Kingdom of Saudi Arabia.

Ma'aden and Alcoa Corporation have put and call options, respectively, whereby Ma'aden can require Alcoa Corporation to purchase from Ma'aden, or Alcoa Corporation can require Ma'aden to sell to Alcoa Corporation, a 14.9% interest in MBAC and MAC at the then fair market value. These options, if exercised, must be exercised for the full 14.9% interest in both entities. The amended joint venture agreement defines October 1, 2021 as the date after which Ma'aden and Alcoa Corporation can exercise their put and call options, respectively. The amended joint venture agreement further outlines that these options are exercisable for a period of six-months after October 1, 2021.

The amended joint venture agreement also defines October 1, 2021 as the date after which Alcoa Corporation is permitted to sell all of its shares in both MBAC and MAC collectively, for which Ma'aden has a right of first refusal. Prior to this date, Ma'aden and Alcoa Corporation may not sell, transfer, or otherwise dispose of, pledge, or encumber any interests in the joint venture. Under the amended joint venture agreement, upon the occurrence of an unremedied event of default by Alcoa Corporation, Ma'aden may purchase, or, upon the occurrence of an unremedied event of default by Ma'aden, Alcoa Corporation may sell, its interest in the joint venture for consideration that varies depending on the time of the default.

Others

The Company is party to several other joint ventures and consortia. See details within each business segment discussion below.

The Aluminerie de Bécancour Inc. (ABI) smelter is a joint venture between Alcoa and Rio Tinto Alcan Inc. (Rio Tinto) located in Bécancour, Québec. Alcoa owns 74.95% of the joint venture through the equity investment in Pechiney Reynolds Quebec, Inc., which owns a 50.1% share of the smelter, and two wholly-owned Canadian subsidiaries, which own 49.9% of the smelter. Rio Tinto owns the remaining 25.05% interest in the joint venture.

Compagnie des Bauxites de Guinée (CBG) is a joint venture between Boké Investment Company (51%) and the Government of Guinea (49%) for the operation of a bauxite mine in the Boké region of Guinea. Boké Investment Company is owned 100% by Halco (Mining) Inc.; AWA LLC holds a 45% interest in Halco.

Mineração Rio do Norte S.A. (MRN) is a joint venture between Alcoa Alumínio (8.58%), AWA Brasil (4.62%) and AWA LLC (5%), each a subsidiary of Alcoa, and affiliates of Rio Tinto (12%), Companhia Brasileira de Alumínio (10%), Vale S.A. (Vale) (40%), South32 (14.8%), and Norsk Hydro (5%) for the operation of a bauxite mine in Porto Trombetas in the state of Pará in Brazil.

Alumar is a joint venture for the operation of a refinery, smelter, and casthouse in Brazil. The refinery is owned by AWA Brasil (39.96%), Rio Tinto (10%), Alcoa Alumínio (14.04%), and South32 (36%). AWA Brasil is part of the AWAC group of companies and is ultimately owned 60% by Alcoa and 40% by Alumina Limited. With respect to Rio Tinto and South32, the named company or an affiliate thereof holds the interest. The smelter and casthouse are owned by Alcoa Alumínio (60%) and South32 (40%).

Elysis™ Limited Partnership (Elysis™) is a joint venture between the wholly-owned subsidiaries of Alcoa (48.235%) and Rio Tinto (48.235%), respectively, and Investissement Québec (3.53%), a company wholly-owned by the Government of Québec. The purpose of Elysis™ is to advance larger scale development and commercialization of its patent-protected technology that produces oxygen and eliminates all direct greenhouse gas emissions from the traditional aluminum smelting process.

Strathcona calciner is a joint venture between affiliates of Alcoa and Rio Tinto. The calciner purchases green coke from the petroleum industry and converts it into calcined coke. The calcined coke is then used as a raw material in an aluminum smelter. Alcoa owns 39% of the joint venture, and Rio Tinto owns the remaining 61% of the joint venture.

Hydropower

Machadinho Hydro Power Plant (HPP) is a consortium located on the Pelotas River in southern Brazil in which the Company has a 25.8% ownership interest through Alcoa Alumínio. The remaining ownership interests are held by unrelated third parties.

Barra Grande HPP is a joint venture located on the Pelotas River in southern Brazil in which the Company has a 42.2% ownership interest through Alcoa Alumínio. The remaining ownership interests are held by unrelated third parties.

Estreito HPP is a consortium between Alcoa Alumínio, through Estreito Energia S.A. (25.5%) and unrelated third parties located on the Tocantins River, northern Brazil.

Serra do Facão HPP is a joint venture between Alcoa Alumínio (34.9%) and unrelated third parties located on the Sao Marcos River, central Brazil.

Manicouagan Power Limited Partnership (Manicouagan) is a joint venture between affiliates of Alcoa and Hydro-Québec. Manicouagan owns and operates the 335 megawatt McCormick hydroelectric project, which is located on the Manicouagan River in the Province of Québec. Manicouagan supplies approximately one-quarter of the electricity requirements of Alcoa's Baie-Comeau, Québec, smelter. Alcoa owns 40% of the joint venture.

Bauxite

This segment consists of the Company's global bauxite mining operations. Bauxite is the principal raw material used to produce alumina and contains various aluminum hydroxide minerals, the most important of which are gibbsite and boehmite. Bauxite is refined using the Bayer process, the principal industrial chemical process for refining bauxite to produce alumina, a compound of aluminum and oxygen that is the raw material used by smelters to produce aluminum metal. Bauxite is Alcoa's basic raw material input for its alumina refining process. The Company obtains bauxite from its own resources and from those belonging to AWAC, located in the countries listed in the table below, as well as pursuant to both long-term and short-term contracts and mining leases. Tons of bauxite are reported on a zero-moisture basis as dry metric tons (dmt) unless otherwise stated.

Alcoa processes most of the bauxite that it mines into alumina and sells the remainder to third parties. In 2019, Alcoa-operated mines produced 41 million dmt and mines operated by partnerships in which Alcoa and AWAC have equity interests produced 6.4 million dmt on a proportional equity basis, for a total Company bauxite production of 47.4 million dmt.

Based on the terms of its bauxite supply contracts, the amount of bauxite AWAC purchases from its minority-owned joint ventures Mineração Rio do Norte S.A. (MRN) and Compagnie des Bauxites de Guinée (CBG) differ from its proportional equity in those mines. Therefore, in 2019, Alcoa had access to 47.6 million dmt of production from its portfolio of bauxite interests and sold 6.2 million dmt of bauxite to third parties; 41.4 million dmt of bauxite was delivered to Alcoa and AWAC refineries.

The Company aims to grow its third-party bauxite sales business. In December 2016, the Government of Western Australia granted permission to Alcoa's majority-owned subsidiary, AofA, to export up to 2.5 million dmt per year of bauxite for five years to third-party customers. The Company is liaising with existing and potential new customers about bauxite contracts beyond the initial five-year period but any future supply to third-party customers beyond 2021 will require approval from the Government of Western Australia. The primary customer base for third-party bauxite is located in Asia, particularly in China.

Bauxite Resource and Reserve Development Guidelines

The Company has access to large bauxite deposit areas with mining rights that extend in most cases more than 20 years from the date of this report. For purposes of evaluating the amount of bauxite that will be available to supply its refineries, the Company considers both estimates of bauxite resources as well as calculated bauxite reserves. "Bauxite resources" are deposits for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence (based on the amount of exploration sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes), such that there are reasonable prospects for economic extraction. "Bauxite reserves" represent the part of resource deposits that can be economically mined to supply alumina refineries, and include diluting materials and allowances for losses, which may occur when the material is mined. Appropriate assessments and studies have been carried out to define the reserves, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. Alcoa employs a conventional approach (including additional drilling with successive tightening of the drilling grid) with customized techniques to define and characterize its various bauxite deposit types allowing us to confidently establish the extent of its bauxite resources and their ultimate conversion to reserves.

Alcoa has adopted best practice guidelines for bauxite reserve and resource classification at its operating bauxite mines. Alcoa's reserves are declared in accordance with the Joint Ore Reserves Committee (JORC) code guidelines. The reported ore reserves set forth in the table below are those that we estimated could be extracted economically with current technology and in current market conditions. We do not use a price for bauxite, alumina or aluminum to determine our bauxite reserves. The primary criteria for determining bauxite reserves are the feed specifications required by the receiving alumina refinery. More specifically, reserves are set based on the chemical composition of the bauxite in order to minimize bauxite processing cost and maximize refinery economics for each individual refinery. The primary specifications that are important to this analysis are the "available alumina" content of the bauxite, which is the amount of alumina extractable from bauxite using the Bayer process, and "reactive silica" content of the bauxite, which is the amount of silica that is reactive within the Bayer process. Each alumina refinery will have a target specification for these parameters, but may receive bauxite within a range that allows blending in stockpiles to achieve the receiving refinery's target.

In addition to these chemical specifications, several other ore reserve design factors have been applied to differentiate bauxite reserves from other mineralized material. The contours of the bauxite reserves are designed using parameters such as available alumina content cutoff grade, reactive silica cutoff grade, ore density, overburden thickness, ore thickness and mine access considerations. These parameters are generally determined by using infill drilling or geological modeling. Further, our mining locations utilize annual in-fill drilling or geological modeling programs designed to progressively upgrade the reserve and resource classification of their bauxite based on the above-described factors.

The following table only includes the amount of proven and probable reserves controlled by the Company. While the level of reserves may appear low in relation to annual production levels, they are consistent with historical levels of reserves for the Company's mining locations and consistent with the Company reserves strategy. Given the Company's extensive bauxite resources, the abundant supply of bauxite globally, and the length of the Company's rights to bauxite, it is not cost-effective to establish bauxite reserves that reflect the total size of the bauxite resources available to the Company. Rather, bauxite resources are upgraded annually to reserves as needed by the location. Detailed assessments are progressively undertaken within a proposed mining area and mine activity is then planned to achieve a uniform quality in the supply of blended feedstock to the relevant refinery. Alcoa believes its present sources of bauxite on a global basis are sufficient to meet the forecasted requirements of its alumina refining operations for the foreseeable future.

In October 2019, SRK Consultores do Brasil LTDA was retained by Alcoa Alumínio S.A. to carry out an independent audit of Mineral Resources and Mineral Reserves estimates for the Juruti Bauxite Mine, including the plateaus of Capiranga, Capiranga Central, Guaraná and Mauari, located in the city of Juruti, state of Pará, North of Brazil. Therefore, Juruti's reserve statement presented below represents the up-to-date outcomes from that auditing process.

Bauxite Interests, Share of Reserves and Annual Production¹

Country	Project	Owners' Mining Rights (% Entitlement)	Expiration Date of Mining Rights	Probable Reserves ² (million dmt)	Proven Reserves ² (million dmt)	Available Alumina Content (%) A.Al ₂ O ₃	Reactive Silica Content (%) R.SiO ₂	2019 Annual Production (million dmt)	Ore Reserve Design Factors
Australia	Darling Range Mines ML1SA	Alcoa of Australia Limited (AofA) (100%)	2024	56.6	71.6	32.9	1.0	34.7	<ul style="list-style-type: none"> A.Al₂O₃ ≥ 27.5% R.SiO₂ ≤ 3.5% Minimum mineable thickness 2m Minimum bench widths of 45m
Brazil	Poços de Caldas	Alcoa Alumínio S.A. (Alcoa Alumínio) ³ (100%)	20284	0.1	1.0	38.8	3.9	0.3	<ul style="list-style-type: none"> A.Al₂O₃ ≥ 30% R.SiO₂ ≤ 7%
	Juruti RN101, RN102 RN103, RN104, RN107, #34	Alcoa World Alumina Brasil Ltda. (AWA Brasil) (100%)	21004	43.4	55.5	47.2	3.3	6.0	<ul style="list-style-type: none"> A.Al₂O₃ ≥ 35% R.SiO₂ ≤ 10% Wash Recovery: ≥ 30% Overburden /Ore (m/m) = 10/1
Equity Interests:									
Brazil	Trombetas	Mineração Rio do Norte S.A. (MRN) (18.2%)	20464	0.7	5.3	48.3	5.1	2.2	<ul style="list-style-type: none"> A.Al₂O₃ ≥ 46% R.SiO₂ ≤ 7% Wash Recovery: ≥ 30%
Guinea	Boké	Compagnie des Bauxites de Guinée (CBG) (22.95%)	2038	19.9	78.4	Tal ₂ O ₃ 47.1	TsiO ₂ 2.0	3.0	<ul style="list-style-type: none"> A.Al₂O₃ ≥ 44% R.SiO₂ ≤ 10% Minimum mineable thickness 2m Smallest Mining Unit size (SMU) 50m x 50m
Kingdom of Saudi Arabia	Al Ba'itha	Ma'aden Bauxite & Alumina Company (MBAC) (25.1%)	2037	30.9	16.3	TAA 48.2	TsiO ₂ 9.2	1.2	<ul style="list-style-type: none"> A.Al₂O₃ ≥ 40% Mining dilution modeled as a skin of 6cm above and 8.5 cm below Mining recovery applied as a skin loss of 14cm on each side of the mineralisation Mineralisation less than 1m thick excluded

- This table shows only the AWAC and/or Alcoa share (proportion) of reserve and annual production tonnage.
- "Probable reserves" are the portion of a bauxite reserve where the physical and chemical characteristics and limits are known with sufficient confidence for mining and to which various mining modifying factors have been applied. "Proven reserves" are the portion of a bauxite reserve where the physical and chemical characteristics and limits are known with high confidence and to which various mining modifying factors have been applied.
- Alcoa Alumínio is ultimately owned 100% by Alcoa (not AWAC).
- Brazilian mineral legislation does not limit the duration of mining concessions; rather, the concession remains in force until the deposit is exhausted. These concessions may be extended later or expire earlier than estimated, based on the rate at which these deposits are exhausted and on obtaining any additional governmental approval, as necessary.

Qualifying statements relating to the table above:

Australia—Darling Range Mines: Huntly and Willowdale are the two active AWAC mines in the Darling Range of Western Australia that supply bauxite to three local AWAC alumina refineries. They operate within ML1SA, the mineral lease issued by the State of Western Australia to Alcoa's majority-owned subsidiary, AofA. The ML1SA lease encompasses a gross area of 712,881 hectares (including private land holdings, state forests, national parks and conservation areas) in the Darling Range and extends from east of Perth to east of Bunbury (ML1SA Area). The ML1SA lease provides AofA with various rights, including certain exclusivity rights to explore for and mine bauxite, rights to deny third party mining tenements in limited circumstances, rights to mining leases for other minerals in the ML1SA Area, and the right to prevent certain governmental actions from interfering with or prejudicially affecting the rights of AofA. The ML1SA lease term extends to 2024 and can be renewed for an additional 21-year period to 2045. The above-declared reserves are current as of December 31, 2019. The amount of reserves reflects the total AWAC share. Additional resources are routinely upgraded by additional exploration and development drilling to reserve status.

Brazil—Poços de Caldas: The above-declared reserves are current as of December 31, 2019. Tonnage is total Alcoa share. Additional resources are being upgraded to reserves as needed.

Brazil—Juruti RN101, RN102, RN103, RN104, RN107, #34: The above-declared reserves are current as of December 31, 2019. All reserves are on Capiranga Plateau in mineral claim areas RN101, RN102, RN103, RN104, RN107, #34, within

which Alcoa has operating licenses issued by the state. Declared reserves are total AWAC share. Declared reserve tonnages and the annual production tonnage are washed and unwashed product tonnages. The Juruti mine's operating licenses are periodically renewed.

Brazil—Trombetas-MRN: The above-declared reserves are as of December 31, 2019. Declared and annual production tonnages reflect the total for Alumínio and AWAC shares (18.2%). Declared tonnages are washed product tonnages.

Guinea—Boké-CBG: The above-declared reserves are based on export quality bauxite reserves and are current as of December 31, 2019. Declared tonnages reflect only the AWAC share of CBG's reserves. Annual production tonnage is reported based on AWAC's 22.95% share. Declared reserves quality is reported based on total alumina content (Ta_2O_3) and total silica ($TsIO_2$) because CBG export bauxite is sold on this basis. Additional resources are being routinely drilled and modeled to upgrade to reserves as needed.

Kingdom of Saudi Arabia—Al Ba'itha: The Al Ba'itha Mine began production during 2014 and production was increased in 2016. Declared reserves are as of November 30, 2019. The declared reserves are located in the South Zone of the Az Zabirah Bauxite Deposit. The reserve tonnage in this declaration is AWAC share only (25.1%).

The following table provides additional information regarding the Company's bauxite mines, all of which are open-cut mines. Excavation is done at the surface of open-cut mines to extract mineral ore (such as bauxite). Open-cut mines are not underground and the sky is viewable from the mine floor:

Mine & Location	Means of Access	Operator	Title, Lease or Options	History	Type of Mine Mineralization Style	Power Source	Facilities, Use & Condition
Australia—Darling Range; Huntly and Willowdale.	Mine locations are accessed by road. Ore is transported to refineries by long distance conveyor and rail.	Alcoa	Mining lease from the Western Australia Government. MLISA. Expires in 2024, with option to renew.	Mining began in 1963.	Open-cut mines; Bauxite is derived from the weathering of Archean granites and gneisses and Precambrian dolerite.	Electrical energy from natural gas is supplied by the refinery.	Infrastructure includes buildings for administration and services; workshops; power distribution; water supply; crushers; long distance conveyors. Mines and facilities are operating. We are in the process of moving the Willowdale mining operations.
Brazil—Poços de Caldas. Closest town is Poços de Caldas, MG, Brazil.	Mine locations are accessed by road. Ore transport to the refinery is by road.	Alcoa	Mining licenses from the Government of Brazil and Minas Gerais. Company claims and third-party leases. Operation license expires in 2021 but can be extended subject to meeting any applicable conditions.	Mining began in 1965.	Open-cut mines; Bauxite derived from the weathering of nepheline syenite and phonolite.	Commercial grid power.	Mining offices and services are located at the refinery. Numerous small deposits are mined by contract miners and the ore is trucked to either the refinery stockpile or intermediate stockpile area. Mines and facilities are operating. Mine production has been reduced to align with the reduced production of the Poços refinery which is now producing specialty alumina.
Brazil—Juruti. Closest town is Juruti located on the Amazon River.	The mine's port at Juruti is located on the Amazon River and accessed by ship. Ore is transported from the mine site to the port by company owned rail.	Alcoa	Mining licenses from the Government of Brazil and Pará. Mining rights do not have a legal expiration date. See footnote 4 to the table above. Operating licenses for the mine, washing plant and exploration are in the process of being renewed. Operating license for the port remains valid until the government agency formalizes the renewal.	The Juruti deposit was systematically evaluated by Reynolds Metals Company (Reynolds) beginning in 1974. ParentCo merged Reynolds into the Company in 2000. ParentCo then executed a due diligence program and expanded the exploration area. Mining began in 2009.	Open-cut mines; Bauxite derived from weathering during the Tertiary of Cretaceous fine to medium grained feldspathic sandstones. The deposits are covered by the Belterra clays.	Electrical energy from fuel oil is generated at the mine site. Commercial grid power at the port.	At the mine site: Fixed plant facilities for crushing and washing the ore; mine services offices and workshops; power generation; water supply; stockpiles; rail sidings. At the port: Mine and rail administrative offices and services; port control facilities with stockpiles and ship loader. Mine and port facilities are operating. We are preparing to move the Juruti mining operations, which is expected to begin in 2020.

Mine & Location	Means of Access	Operator	Title, Lease or Options	History	Type of Mine Mineralization Style	Power Source	Facilities, Use & Condition
Brazil—MRN. Closest town is Trombetas in the State of Pará, Brazil.	The mine and port areas are connected by sealed road and company owned rail. Washed ore is transported to Porto Trombetas by rail. Trombetas is accessed by river and by air at the airport.	MRN	Mining rights and licenses from the Government of Brazil. Concession rights expire in 2046.	Mining began in 1979. Major expansion in 2003.	Open-cut mines. Bauxite derived from weathering during the Tertiary of Cretaceous fine to medium grained feldspathic sandstones. The deposits are covered by the Belterra clays.	MRN generates its own electricity from fuel oil.	Ore mined from several plateaus is crushed and transported to the washing plant by long-distance conveyors. The washing plant is located in the mining zone. Washed ore is transported to the port area by company-owned and operated rail. At Porto Trombetas the ore is loaded onto customer ships berthed in the Trombetas River. Some ore is dried and the drying facilities are located in the port area. Mine planning and services and mining equipment workshops are located in the mine zone. The main administrative, rail and port control offices and various workshops are located in the port area. MRN's main housing facilities are located near the port. The mines, port and all facilities are operating.
Guinea—CBG. Closest town to the mine is Sangaredi. Closest town to the port is Kamsar. The CBG Lease is located within the Boké, Telimele and Gaoual administrative regions.	The mine and port areas are connected by sealed road and company-operated rail. Ore is transported to the port at Kamsar by rail. There are air strips near both the mine and port. These are not operated by the company.	CBG	CBG Lease expires in 2038. The lease is renewable in 25-year increments. CBG's rights are specified within the Basic Agreement and Amendment 1 to the Basic Agreement with the Government of Guinea.	Construction began in 1969. First export ore shipment was in 1973.	Open-cut mines: The bauxite deposits within the CBG lease are of two general types. TYPE 1: In-situ laterization of Ordovician and Devonian plateau sediments locally intruded by dolerite dikes and sills. TYPE 2: Sangaredi type deposits are derived from clastic deposition of material eroded from the TYPE 1 laterite deposits and possibly some of the protholiths from the TYPE 1 plateaus deposits.	The company generates its own electricity from fuel oil at both Kamsar and Sangaredi.	Mine offices, workshops, power generation, and water supply for the mine and company mine city are located at Sangaredi. The main administrative offices, port control, railroad control, workshops, power generation and water supply are located in Kamsar. Ore is crushed, dried and exported from Kamsar. CBG has company cities within both Kamsar and Sangaredi. The mines, railroad, driers, port and other facilities are operating.
Kingdom of Saudi Arabia—Al Ba'itha Mine. Qibah is the closest regional center to the mine, located in the Qassim province.	The mine and refinery are connected by road and rail. Ore is transported to the refinery at Ras Al Khair by rail and truck.	Ma'aden Bauxite & Alumina Company (MBAC)	The current mining lease will expire in 2037.	The initial discovery and delineation of bauxite resources was carried out between 1979 and 1984. The southern zone of the Az Zabirah deposit was granted to Ma'aden in 1999. Mine construction was completed in the second quarter of 2015, and the mining operations continued at planned levels.	Open-cut mine; Bauxite occurs as a paleolaterite profile developed at an angular unconformity between underlying late Triassic to early Cretaceous sediments (parent rock sequence Biyahd Formation) and the overlying late Cretaceous Wasia Formation (overburden sequence).	The company generates electricity at the mine site from fuel oil.	The mine includes fixed plants for crushing and train loading; workshops and ancillary services; power plant, and water supply. There is a company village with supporting facilities. Mining operations commenced in 2014.

Alumina

This segment consists of the Company's worldwide refining system, which processes bauxite into alumina. Alcoa's alumina sales are made to customers all over the world and are typically priced by reference to published spot market prices. Our largest customer for smelter grade alumina is its own aluminum smelters, which in 2019 accounted for approximately 30% of its total alumina sales. A small portion of the alumina is sold to third-party customers who process it into industrial chemical products. This segment also includes AWAC's 25.1% share of MBAC.

Most of the Company's alumina contracts contain two pricing components: (1) the API price basis, and (2) a negotiated adjustment basis that takes into account various factors, including freight, quality, customer location, and market conditions. In 2019, approximately 95% of Alcoa Corporation's smelter grade alumina shipments to third parties were sold on this basis.

Alcoa's alumina refining facilities and its worldwide alumina capacity are shown in the following table:

Country	Facility	Nameplate Capacity ¹ (000 MTPY)	Alcoa Corporation Consolidated Capacity ¹ (000 MTPY)
Australia (AofA)	Kwinana	2,190	2,190
	Pinjarra	4,234	4,234
	Wagerup	2,555	2,555
Brazil	Poços de Caldas	390	390
	São Luís (Alumar)	3,500	1,890
Spain	San Ciprián	1,500	1,500
TOTAL		14,369	12,759

Equity Interests:

Country	Facility	Nameplate Capacity ¹ (000 MTPY)	Alcoa Corporation Consolidated Capacity ¹ (000 MTPY)
Kingdom of Saudi Arabia	Ras Al Khair (MBAC)	1,800	452

¹ Nameplate Capacity is an estimate based on design capacity and normal operating efficiencies and does not necessarily represent maximum possible production. Alcoa Corporation Consolidated Capacity represents our share of production from these facilities. For facilities wholly-owned by AWAC entities, Alcoa takes 100% of the production.

As of December 31, 2019, Alcoa had approximately 214,000 mtpy of idle capacity relative to total Alcoa consolidated capacity of 12,759,000 mtpy. The idle capacity is at the Poços de Caldas facility as a result of the full curtailment of the Poços de Caldas smelter.

In December 2019, Alcoa announced the permanent closure its refinery in Point Comfort, Texas. The refinery's 2,305,000 mtpy capacity had been fully curtailed since June 2016. For additional information, see Note D to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Aluminum

This segment consists of (i) the Company's worldwide smelting and casthouse system, (ii) a rolling mill in the United States, and (iii) a portfolio of energy assets in Brazil, Canada, and the United States. The smelting operations produce molten primary aluminum, which is then formed by the casting operations into either common alloy ingot (e.g., t-bar, sow, standard ingot) or into value-add ingot products (e.g., foundry, billet, rod, and slab). The rolling mill produces aluminum sheet primarily for the production of aluminum cans. The energy assets supply power to external customers in Brazil, and, to a lesser extent, in the United States, and internal customers within the Aluminum segment (Baie Comeau (Canada) smelter and Warrick (Indiana) smelter and rolling mill) and the Alumina segment (Brazilian refineries). This segment also includes Alcoa's 25.1% share of MAC, the smelting joint venture company in Saudi Arabia.

Smelting and Casting Operations

Contracts for primary aluminum vary widely in duration, from multi-year supply contracts to monthly or weekly spot purchases. Pricing for primary aluminum products is typically comprised of three components: (i) the published LME

aluminum price for commodity grade P1020 aluminum, (ii) the published regional premium applicable to the delivery locale and (iii) a negotiated product premium which accounts for factors such as shape and alloy.

Alcoa's primary aluminum facilities and its global smelting capacity are shown in the following table:

Country	Facility	Nameplate Capacity ¹ (000 MTPY)	Alcoa Corporation Consolidated Capacity ¹ (000 MTPY)
Australia	Portland	358	197
Brazil	Poços de Caldas ²	N/A	N/A
	São Luís (Alumar)	447	268
Canada	Baie Comeau, Québec	280	280
	Bécancour, Québec	413	310
	Deschambault, Québec	260	260
Iceland	Fjarðaál	344	344
Norway	Lista	94	94
	Mosjøen	188	188
Spain	San Ciprián	228	228
United States	Massena West, NY	130	130
	Ferndale, WA (Intalco)	279	279
	Wenatchee, WA	146	146
	Evansville, IN (Warrick)	269	269
TOTAL		3,436	2,993

Equity Interests:

Country	Facility	Nameplate Capacity ¹ (000 MTPY)	Alcoa Corporation Consolidated Capacity ¹ (000 MTPY)
Kingdom of Saudi Arabia	Ras Al Khair (MAC)	740	186

¹ Nameplate Smelting Capacity is an estimate based on design capacity and normal operating efficiencies and does not necessarily represent maximum possible production. Alcoa Corporation's consolidated capacity is its share of Nameplate Smelting Capacity based on its ownership interest in the respective smelter.

² The Poços de Caldas facility is a casthouse and does not include a smelter.

As of December 31, 2019, the Company had approximately 766,000 mtpy of idle smelting capacity relative to total Alcoa consolidated capacity of 2,993,000 mtpy. This includes 165,000 mtpy at the Bécancour smelter which began the restart process after reaching a new six-year labor contract in July 2019. The restart of the Bécancour smelter is expected to be completed in the second quarter of 2020. The Alumar and Wenatchee smelters have been fully curtailed since 2015. Additionally, the Warrick (108,000 mtpy) smelter, which is dedicated to supplying the on-site rolling mill, Intalco smelter (49,000 mtpy) and Portland smelter (30,000 mtpy) each have idle capacity.

In July 2019, Alcoa divested the Avilés and La Coruña facilities in Spain that had a combined total smelting capacity of 180,000 mtpy, of which 56,000 mtpy combined was previously curtailed in a prior year.

For additional information regarding the divestiture of Avilés and La Coruña, see the Restructuring and Other Charges, Net section in Part II Item 7 of this Form 10-K.

Rolling Operations

The Aluminum segment's rolled products business consists of the Company's rolling mill in Warrick, Indiana, which produces aluminum sheet primarily sold directly to customers for the production of aluminum cans (beverage and food), and formerly Alcoa's investment in MRC. In June 2019, Alcoa and Ma'aden amended the joint venture agreement transferring Alcoa's 25.1% interest in MRC to Ma'aden, amongst other things. See Note C to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K and the Joint Ventures section above.

Alcoa's rolled products business has the capability of participating in several market segments, including beverage can sheet, food can sheet, lithographic sheet, and industrial products. The term "RCS" or Rigid Container Sheet is commonly used for both beverage and food can sheet. This includes the material used to produce the body of beverage containers (body stock), the lid of beverage containers (end stock and tab stock), the material to produce food can body and lids (food stock), and the material to produce aluminum bottles (bottle stock) and bottle closures (closure sheet). Alcoa suspended production of lithographic sheet in the second quarter of 2018.

In 2019, our Warrick facility produced and sold 325.7 kilo metric tons (kMT) of RCS and industrial products, of which over 99% was sold to customers in North America. The majority of its sales were coated RCS products (food stock, beverage end and tab stock). Seasonal increases in can sheet sales are generally expected in the second and third quarters of the year. Can sheet demand is a function of consumer demand for beverages and food in aluminum packaging. Aluminum cans have a number of functional advantages for packaging companies, including product shelf life, carbonation retention, and logistics/distribution efficiency.

Energy Facilities and Sources

Energy accounts for approximately 19% of the Company's total alumina refining production costs. Electric power accounts for approximately 26% of the Company's primary aluminum production costs.

Electricity markets are regional and are limited in size by physical and regulatory constraints, including the physical inability to transport electricity efficiently over long distances, the design of the electric grid, including interconnections, and the regulatory structure imposed by various federal and state entities.

Electricity contracts may be short term (real-time or day ahead) or years in duration, and contracts can be executed for immediate delivery or years in advance. Pricing may be fixed, indexed to an underlying fuel source or other index such as LME, cost-based or based on regional market pricing. In 2019, Alcoa generated approximately 10% of the power used at its smelters worldwide and generally purchased the remainder under long-term arrangements.

The following table sets forth the electricity generation capacity and 2019 generation of facilities in which Alcoa Corporation has an ownership interest. See the Joint Ventures section above.

Country	Facility	Alcoa Corporation Consolidated Capacity (MW)	2019 Generation (MWh)
Brazil	Barra Grande	152	1,196,182
	Estreito	157	948,753
	Machadinho	119	1,187,426
	Serra do Facão	60	233,251
Canada	Manicouagan	133	1,160,886
Suriname	Afobaka	189	949,730
United States	Warrick	657	3,465,008
TOTAL		1,467	9,141,236

The figures in this table are presented in megawatts (MW) and megawatt hours (MWh), respectively.

Each listed facility generates hydroelectric power except the Warrick facility, which generates substantially all of the power used at the Warrick facility using coal purchased from third parties from nearby coal reserves. In 2019, Alcoa ceased using coal from the Alcoa-owned Liberty Mine, which was operated by a third-party coal company. During 2019, approximately 24% of the capacity from the Warrick power plant was sold into the market under its current operating permits. Alcoa Power Generating Inc. also owns certain Federal Energy Regulatory Commission (FERC)-regulated transmission assets in Indiana, Tennessee, New York, and Washington.

The consolidated capacity of the Brazilian energy facilities represented here in megawatts (MW), is the assured energy that is approximately 52% of hydropower plant nominal capacity. Since May 2015 (after curtailment of the Poços de Caldas and São Luís smelters), the excess generation capacity from the Brazilian hydroelectric facilities has been sold into the market.

On December 31, 2019, the Afobaka hydroelectric dam in Suriname was transferred to the Government of the Republic of Suriname. Prior to such date, power generated from Afobaka was sold to the Government of the Republic of Suriname under a bilateral contract. Accordingly, the Company collected revenue for power sales through December 31, 2019.

Manicouagan Power Limited Partnership (Manicouagan) is a joint venture between affiliates of Alcoa Corporation and Hydro-Québec. Manicouagan owns and operates the 335 megawatt McCormick hydroelectric project, which is located on the Manicouagan River in the Province of Québec.

Below is an overview an overview of our external energy for our smelters and refineries.

Region	External Energy Source	
	Electricity	Natural Gas
<p>North America</p>	<p><u>Québec, Canada</u> The three smelters in Québec purchase all or a majority of their electricity under contracts with Hydro-Québec that expire on December 31, 2029. The smelter located in Baie Comeau also purchases approximately one-quarter of its power needs from a 40% owned hydroelectric generating company, Manicouagan Power Limited Partnership.</p> <p><u>Wenatchee, Washington</u> This smelter is served by a contract with Chelan County Public Utility District No. 1 (Chelan PUD) under which Alcoa receives 26% of the hydropower output of Chelan PUD’s Rocky Reach and Rock Island dams. The Wenatchee smelter has been fully curtailed since 2015.</p> <p><u>Intalco, Washington</u> Previously, this smelter was sourced under a contract with the Bonneville Power Administration (BPA) at the Northwest Power Act mandated industrial firm power (IP) rate through September 30, 2022. In August 2018, Alcoa issued a notice of termination to BPA that became effective on August 31, 2019, after which it purchased all power from the market.</p> <p><u>Massena West</u> The Massena West smelter in New York receives power from the New York Power Authority (NYPA) pursuant to a contract between Alcoa and NYPA that will expire in March 2026.</p>	<p>Alcoa generally procures natural gas on a competitive bid basis from a variety of sources, including producers in the gas production areas and independent gas marketers. Contract pricing for gas is typically based on a published industry index such as the New York Mercantile Exchange (NYMEX) price.</p>
<p>Australia</p>	<p><u>Portland</u> This smelter purchases power from the National Electricity Market (NEM) variable spot market. The smelter has fixed for floating swap contracts with AGL Energy Ltd. In order to manage exposure to the variable energy rates from the NEM. The swap contracts will expire on July 31, 2021.</p>	<p><u>Western Australia</u> AofA uses gas to co-generate steam and electricity for its alumina refining processes at the Kwinana, Pinjarra and Wagerup refineries. In 2015, AofA secured a significant portion of its gas supplies to 2032, securing more than 95% of their gas requirements from 2020 through 2023 with decreasing percentages thereafter.</p>

Region	External Energy Source	
	Electricity	Natural Gas
Europe	<p><u>San Ciprián, Spain</u> Alcoa's smelter at San Ciprián, Spain, purchases electricity under a bilateral spot power contract that expires December 31, 2020.</p> <p>Alcoa participates in a demand response program in Spain, agreeing to reduce usage of electricity for a specific period of time, in return for compensation, which allows the utility or grid operator to divert electricity during times of peak demand. These rights are allocated through an auction process, the last occurring in December 2019, where Alcoa secured 325MW of interruptibility rights for the period of January to June 2020. Financial compensation of the indirect carbon emissions costs passed through in the electricity bill is received in accordance with EU Commission Guidelines and the Spanish compensation regime.</p>	<p><u>Spain</u></p> <p>In 2019, natural gas was supplied to the San Ciprián, Spain, alumina refinery pursuant to two supply contracts with Endesa and one supply contract with Naturgy that expired by December 2019, and one supply contract with BP that expires in June 2020. In 2020, the refinery's natural gas requirements are supplied pursuant to a supply contract with Endesa expiring in June 2020 and two supply contracts with BP expiring in June and December 2020, respectively.</p>
	<p><u>Lista and Mosjøen, Norway</u> These two smelters had long-term power arrangements until the end of 2019. Beginning in 2017, Alcoa entered into several long-term power purchase agreements, which secured approximately 50% of the necessary power for the Norwegian smelters for the period of 2020 to 2035. The remaining 50% is currently purchased under short-term contracts. Financial compensation of the indirect carbon emissions costs passed through in the electricity bill is received in accordance with EU Commission Guidelines and the Norwegian compensation regime.</p>	
	<p><u>Iceland</u> Landsvirkjun, the Icelandic national power company, supplies competitively priced electricity to Alcoa's Fjarðaál smelter in eastern Iceland under a 40-year power contract, which will expire in 2047.</p>	

Sources and Availability of Raw Materials

Generally, 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.

For each metric ton (MT) of alumina produced, Alcoa consumes the following amounts of the identified raw material inputs (approximate range across relevant facilities):

Raw Material	Units	Consumption per MT of Alumina
Bauxite	mt	2.2 – 3.6
Caustic soda	kg	60 – 115
Electricity	kWh	200 to 260 total consumed (0 to 220 imported)
Fuel oil and natural gas	GJ	6.2 – 12.2
Lime (CaO)	kg	6 – 60

For each metric ton of aluminum produced, Alcoa consumes the following amounts of the identified raw material inputs (approximate range across relevant facilities):

Raw Material	Units	Consumption per MT of Primary Aluminum
Alumina	mt	1.92 ± 0.02
Aluminum fluoride	kg	17.1 ± 5.0
Calcined petroleum coke	mt	0.37 ± 0.05
Cathode blocks	mt	0.005 ± 0.002
Electricity	kWh	12900 – 17000
Liquid pitch	mt	0.10 ± 0.03
Natural gas	mcf	3.0 ± 1.0

Certain aluminum produced includes alloying materials. Because of the number of different types of elements that can be used to produce various alloys, providing a range of such elements would not be meaningful. With the exception of a very small number of internally used products, Alcoa produces its alloys in adherence to an Aluminum Association (of which Alcoa is an active member) standard, which uses a specific designation system to identify alloy types. In general, each alloy type has a major alloying element other than aluminum but will also include lesser amounts of other constituents.

Competition

Alcoa is subject to highly competitive conditions in all aspects of the aluminum supply chain in which it competes. Competitors include a variety of both U.S. and non-U.S. companies in all major markets. Alcoa's competitive position depends, in part, on the Company's access to an economical power supply to sustain its operations in various countries.

In each of our business segments, we enjoy several competitive advantages. We are among the world's largest bauxite miners, with best practices in efficient

mining operations and sustainability. We are the world's largest alumina producer outside of China and operate competitive, efficient assets across our refining, aluminum smelting, and casting portfolios. Our business segments operate in close proximity to our broad, worldwide customer base, enabling us to meet customer demand in key markets in North America, South America, Europe, the Middle East, Australia, and China. Competitive advantages specific to each business segment are detailed below.

Bauxite:

The third-party market for metallurgical grade bauxite is growing quickly as global demand for bauxite increases—particularly in China. The majority of bauxite mined globally is converted to alumina for the production of aluminum. While Alcoa has historically mined bauxite for internal consumption in our alumina refineries, we aim to grow our third-party bauxite business to meet growing demand.

Our principal competitors in the third-party bauxite market include Rio Tinto and multiple suppliers from Guinea, Australia, Indonesia, and Malaysia, among other countries. We compete largely based on bauxite quality, price and proximity to customers, as well as long-term bauxite resources in strategic bauxite mine locations, including Australia, Brazil, and Guinea, which is home to the world's largest reserves of high-quality metallurgical grade bauxite. Alcoa has a long history of stable operations in these countries and has access to large bauxite deposits with mining rights that extend in most cases more than 20 years from the date of this report.

Alumina:

The alumina market is global and highly competitive, with many active suppliers, producers, and commodity traders. Alcoa faces competition from a number of companies, including Aluminum Corporation of China Limited, China Hongqiao Group Limited, Hindalco Industries Ltd., Hangzhou Jinjiang Group, National Aluminium Company Limited (NALCO), Noranda Aluminum Holding Corporation, Norsk Hydro ASA, Rio Tinto, South32 Limited, State Power Investment Corporation, United Company RUSAL Plc, and Chiping Xinfra Alumina Product Co., Ltd. In recent years, there has been significant growth in alumina refining in China and India. The majority of our product is sold in the form of smelter grade alumina, with 5% to 10% of total global alumina production being produced for non-metallurgical applications.

Key factors influencing competition in the alumina market include: cost position, price, reliability of bauxite supply, quality and proximity to customers and end markets. While we face competition from many industry players, we had an average cost position in the first quartile of global alumina production in 2019, in part attributable to our experienced workforce, deep technical expertise, and sophistication in refining technology and process automation. Also, our refineries are strategically located next to low cost bauxite mines, and our alumina refineries are tuned to maximize efficiency with the bauxite qualities from these internal mines. In addition to these refining efficiencies, vertical integration affords a stable and consistent long-term supply of bauxite to our refining portfolio.

Aluminum:

In our Aluminum segment, competition is dependent upon the type of product we are selling.

The market for primary aluminum is global, and demand for aluminum varies widely from region to region. We compete with commodity traders, such as Glencore, Trafigura, J. Aron and Gerald Group, and aluminum producers such as Aluminum Corporation of China Limited, China Hongqiao Group Limited, East Hope Group Co. Ltd., Emirates Global Aluminum, Norsk Hydro, Rio Tinto, Shandong Xinfra Aluminum & Power Group, Vedanta Aluminum Ltd., and United Company RUSAL Plc, as well as with alternative materials such as steel, titanium, copper, carbon fiber, composites, plastic and glass.

The aluminum industry itself is highly competitive; some of the most critical competitive factors in our industry are product quality, production costs (including source and cost of energy), price, access and proximity to raw materials, customers and end markets, timeliness of delivery, customer service (including technical support), product innovation, and breadth of offerings. Where aluminum products compete with other materials, the diverse characteristics of aluminum are also a significant factor, particularly its light weight, strength and recyclability.

In addition, in some end-use markets, competition is also affected by customer requirements that suppliers complete a qualification process to supply their plants. This process can be rigorous and may take many months to complete. However, the ability to obtain and maintain these qualifications can represent a competitive advantage.

The strength of our position in the primary aluminum market is largely attributable to the following factors:

- Low Cost Production: Alcoa leverages significant economies of scale to continuously reduce costs. As a result, Alcoa operates competitive, efficient assets across its aluminum smelting and casting portfolios. The Company's smelting cost position is supported by long-term energy arrangements at many locations; Alcoa has secured approximately 72% of its smelter power needs through 2024.
- Value-Added Product Portfolio: Alcoa's casthouses supply global customers with a diverse product portfolio, both in terms of shapes and alloys. We offer differentiated products that are cast into specific shapes to meet customer demand, with 64% of 2019 smelter shipments representing value-added products.
- Sustainability: As of December 31, 2019, approximately 73% of our aluminum smelting portfolio ran on renewable power sources, lessening our demand for fossil fuels.

Our rolled products business has the capability of participating in various market segments, including beverage can sheet, food can sheet, lithographic sheet, aluminum bottle sheet, and industrial products and in the U.S. competes with other North American producers of RCS products, namely Novelis Corp, Tri-Arrows Aluminum, and Constellium NV. There is also import supply of RCS from regions outside of North America, mainly for the beverage market.

We also compete against package types made of other materials including polyethylene terephthalate (PET) bottles, glass bottles, steel tin plate and other materials.

We compete on cost, quality, and service. The Company intends to continue to improve our cost position by increasing recycled aluminum content in our metal feedstock as well as continuing to focus on capacity utilization. We believe our team of technical and operational resources provides distinctive quality and customer service.

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 intellectual property, 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. Alcoa'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 December 31, 2019, Alcoa's worldwide patent portfolio consisted of approximately 670 granted patents and 240 pending patent applications. The Company also has a number of domestic and international registered trademarks that have significant recognition within the markets that are served, including the name "Alcoa" and the Alcoa symbol.

As part of the Separation Transaction, Alcoa Corporation and Arconic entered into certain intellectual property license agreements between them. These agreements, as amended, provide for a license of certain patents, trademarks and know-how from Arconic or Alcoa Corporation, as applicable, to the other, on a perpetual, royalty-free, non-exclusive basis, subject to certain exceptions.

Environmental Matters

Alcoa is subject to extensive federal, state and local environmental laws and regulations, including those relating to the release or discharge of materials into the air, water and soil, waste management, pollution prevention measures, the generation, storage, handling, use, transportation and disposal of hazardous materials, the exposure of persons to hazardous materials, greenhouse gas emissions, and the health and safety of our employees. We participate in environmental assessments and cleanups at approximately 60 locations. These include owned or operated facilities and adjoining properties, previously owned or operated facilities and adjoining properties, and waste sites, including Superfund (Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)) sites. In 2019, capital expenditures for new or expanded facilities for environmental control were approximately \$95 and approximately \$90 is expected in 2020. Additional information relating to environmental matters is included in Note R to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K under the caption Contingencies—Environmental Matters.

Employees

At the end of 2019, Alcoa had approximately 13,800 employees in 15 countries. Approximately 10,500 of these employees are represented by labor unions. In the U.S., approximately 2,300 employees are represented by various labor unions. The largest collective bargaining agreement in the U.S. is the master collective bargaining agreement with the United Steelworkers (USW), which covers approximately 1,600 employees at five U.S. locations. There are three additional collective bargaining agreements at three U.S. locations with the USW, the International Association of Machinists and Aerospace Workers (IAM), and the International Brotherhood of Electric Workers (IBEW), with varying expiration dates. On a regional basis, collective bargaining agreements with varying expiration dates cover approximately 2,200 employees in Europe, 1,500 employees in Canada, 1,800 employees in Central and South America, and 2,700 employees in Australia.

On September 19, 2019, a new four-year labor agreement was ratified by the USW, covering approximately 1,700 active employees at Warrick Operations in Indiana, Massena Operations in New York, Gum Springs in Arkansas, Wenatchee Works in Washington, and Point Comfort in Texas on the ratification date. On November 22, 2019, members the USW formally ratified a new four-year labor agreement covering employees at Lake Charles Operations in Louisiana.

The Company's labor agreement covering employees represented by the IBEW at the Warrick Power Plant in Indiana is set to expire on October 31, 2020, and negotiations will commence in October 2020.

A new six-year collective bargaining agreement with CSN (Confédération des Syndicats Nationaux) representing approximately 600 hourly employees at its Baie Comeau smelter in Canada was successfully ratified before expiration on May 31, 2019.

On January 11, 2018, a lockout of the bargained hourly employees commenced at the Bécancour smelter in Québec, impacting approximately 1,000 employees at this facility on the date of the lockout. The Bécancour facility is owned by Alcoa (74.95%) and Rio Tinto (25.05%). On July 2, 2019, a new six-year collective bargaining agreement was ratified, ending the eighteen-month lockout.

On August 8, 2018, the Company's bauxite mines and alumina refineries in Australia experienced a nearly eight-week strike by the unionized labor force that is represented by the Australian Workers' Union (AWU). The mines and refineries continued to operate during the strike with minimal disruption. The labor force had returned to work and a new labor agreement was ratified in November 2019 covering approximately 1,400 employees across the Bauxite and Alumina segments combined.

Negotiations continue in Australia for an agreement with the Construction, Forestry, Mining, Maritime, Forestry, and Energy union, which covers approximately 75 employees in the Western Australian power stations. Negotiations will soon commence for new agreements with the Australian Manufacturing Workers Union (AMWU) and Electrical Trades Union (ETU) which both have agreements in the Western Australian mines and refineries that expire in 2020.

On October 17, 2018, the Company announced its intention to begin a formal consultation process for collective dismissals that would affect all of the employees at its Avilés and La Coruña facilities in Spain. In January 2019, Alcoa reached an agreement with workers' representatives at these facilities. In July 2019, Alcoa divested both facilities to PARTER Capital Group AG, impacting approximately 640 employees at the two sites at the time of the divestiture.

Available Information

The Company's internet address is <http://www.alcoa.com>. Alcoa 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 amended (the Exchange Act) as soon as reasonably practicable after the Company electronically files such material with, or furnishes it to, the Securities and Exchange Commission (the 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>.

Dissemination of Company Information

Alcoa Corporation intends to make future announcements regarding company developments and financial performance through its website, www.alcoa.com, as well as through press releases, filings with the Securities and Exchange Commission, conference calls, and webcasts.

Information about our Executive Officers

The names, ages, positions and areas of responsibility of the executive officers of the Company as of the filing date of this Form 10-K are listed below.

Roy C. Harvey, 46, is President and Chief Executive Officer of Alcoa Corporation. He became Chief Executive Officer in November 2016 and assumed the role of President in May 2017. Mr. Harvey served as Executive Vice President of ParentCo and President of ParentCo's Global Primary Products (GPP) division from October 2015 to November 2016. From June 2014 to October 2015, he was Executive Vice President, Human Resources and Environment, Health, Safety and Sustainability at ParentCo. Prior to that time, Mr. Harvey was Chief Operating Officer for GPP at ParentCo from July 2013 to June 2014 and was Chief Financial Officer for GPP from December 2011 to July 2013. In addition to these roles, Mr. Harvey served as Director of Investor Relations at ParentCo from September 2010 through November 2011 and was Director of Corporate Treasury from January 2010 to September 2010. Mr. Harvey joined ParentCo in 2002 as a business analyst for GPP in Knoxville, Tennessee.

William F. Oplinger, 53, has served as Executive Vice President and Chief Financial Officer of Alcoa Corporation since November 2016. Mr. Oplinger served as Executive Vice President and Chief Financial Officer of ParentCo from April 1, 2013 to November 2016. Mr. Oplinger joined ParentCo in 2000, and through 2013 held key corporate positions in financial analysis and planning and also served as Director of Investor Relations. Mr. Oplinger also held principal positions in the ParentCo's GPP division, including as Controller, Operational Excellence Director, Chief Financial Officer, and Chief Operating Officer.

Leigh Ann C. Fisher, 53, has served as Executive Vice President of Alcoa Corporation since November 2016 and as Chief Human Resources Officer of Alcoa Corporation since November 1, 2019. She has responsibility for all aspects of human resource management, including talent and recruitment, compensation and benefits, training and development, and labor relations. Prior to assuming her role as Chief Human Resource Officer, Ms. Fisher served as the Chief Administrative Officer of Alcoa Corporation from November 2016 until November 2019, and as Chief Financial Officer of ParentCo's GPP division from July 2013 to November 2016. Ms. Fisher joined ParentCo in 1989 and was Group Controller for ParentCo's GPP division from 2011 to July 2013 and Group Controller for ParentCo's Engineered Products and Solutions division from 2008 to 2011. In December 2019, Ms. Fisher provided notice to the Company of her decision to retire from her current position, effective April 1, 2020, after which time she has agreed to remain an employee of the Company for a certain period to ensure a smooth transition of her duties.

Jeffrey D. Heeter, 54, has served as Executive Vice President and General Counsel of Alcoa Corporation since November 2016. In this role, Mr. Heeter has overall responsibility for the Company's global legal, compliance, governance and security matters. He previously served as the Secretary of Alcoa Corporation from November 2016 to November 2019. Mr. Heeter served as Assistant General Counsel and an Assistant Officer of ParentCo from 2014 to November 2016. Mr. Heeter was Group Counsel for GPP business at ParentCo from 2010 to 2014. From 2008 to 2010, Mr. Heeter was General Counsel of Alcoa of Australia in Perth, Australia. Mr. Heeter joined ParentCo in 1998.

Benjamin D. Kahrs, 43, has served as Executive Vice President and Chief Innovation Officer of Alcoa Corporation since November 1, 2019. Mr. Kahrs oversees the implementation of the new corporate operating model and the transformation of manufacturing capabilities, as well as the Company's Technical Center, Global Shared Services, Information Technology, and Automated Solutions. He was Senior Vice President, Manufacturing Excellence and R&D from November 2018 through October 2019 and Senior Vice President, Technology and Corporate Development from November 2016 to November 2018. Mr. Kahrs served as Vice President Strategy and Technology, GPP of ParentCo from November 2015 to November 2016 and was Location Manager at the Point Comfort, Texas facility from August 2012 to November 2015.

Timothy D. Reyes, 53, has served as Executive Vice President and Chief Commercial Officer of Alcoa Corporation since November 2019. In this role, he creates customer-focused commercial strategies and is responsible for business development. Mr. Reyes was previously President of Alcoa Corporation's Aluminum business unit from March 2017 to November 2019. Mr. Reyes was President, Alcoa Cast Products from November 2016 until March 2017, when the aluminum smelting, cast products and rolled products businesses, along with the majority of the energy segment assets, were combined into a new Aluminum business unit. From January 2015 to November 2016, he served as President, Alcoa Cast Products of ParentCo. Prior to this time, Mr. Reyes was President of Alcoa Materials Management, a subsidiary of ParentCo, from September 2009 until December 2014, responsible for the commercial activities related to primary metals, alumina, and bauxite within ParentCo's GPP group, and commodity price risk management and global transportation services for ParentCo.

John D. Slaven, 58, has served as Executive Vice President since joining Alcoa Corporation on February 4, 2019 and was appointed Chief Operations Officer of Alcoa Corporation, effective November 1, 2019. Mr. Slaven is responsible for the daily operations of the Company's bauxite, alumina, and aluminum assets. Prior to his current position, Mr. Slaven was Chief Strategy Officer of Alcoa Corporation. From 2006 until 2019, Mr. Slaven was Partner and Managing Director at the Boston Consulting Group, where he most recently led the North American Metals and Mining, Infrastructure and Public Transport practices. Prior to this time, from 2002 through early 2006, Mr. Slaven worked for ParentCo, where he implemented its Asia growth strategy, revitalized the Latin America business, and led ParentCo's sales and marketing growth in Asia before returning to New York to lead the corporate strategy, financial planning, and analysis functions.

Item 1A. Risk Factors.

Alcoa'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 Alcoa'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 Alcoa or that Alcoa currently deems immaterial also may materially adversely affect us in future periods. See the discussion under the caption Forward-Looking Statements above.

Commodity Risks

The aluminum industry and aluminum end-use markets are highly cyclical and are influenced by several factors, including global economic conditions and shifts in the global inventory of aluminum.

The nature of the industries in which our customers operate causes demand for our products to be cyclical, creating potential uncertainty regarding future profitability. The demand for aluminum is sensitive to, and impacted by, demand for the finished goods manufactured by our customers in industries, such as the commercial construction, transportation, and automotive industries, which may change as a result of changes in the global economy, foreign currency exchange rates, energy prices or other factors beyond our control. The demand for aluminum is highly correlated to economic growth, and we could be adversely affected by large or sudden shifts in the global inventory of aluminum and the resulting market price impacts. The Chinese market is a significant source of global demand for, and supply of, commodities, including aluminum. A sustained slowdown in Chinese aluminum demand, or a significant slowdown in other markets, that is not offset by decreases in supply of aluminum or increased aluminum demand in emerging economies, such as India, Brazil, and several Southeast Asian countries, could have an adverse effect on the global supply and demand for aluminum and aluminum prices. As a result of these factors, our profitability is subject to significant fluctuation.

We believe the long-term prospects for aluminum and aluminum products are positive, however, we are unable to predict the future course of industry variables or the strength of the global economy and the effects of government intervention. Negative economic conditions, such as a major economic downturn, a prolonged recovery period, a downturn in the commodity sector,

or disruptions in the financial markets, could have a material adverse effect on our business, financial condition, cash flows, results of operations, or the trading price of our common stock.

While the aluminum market is often the leading cause of changes in the alumina and bauxite markets, those markets also have industry-specific risks including, but not limited to, global freight markets, energy markets, and regional supply-demand imbalances. Aluminum industry specific risks can have a material effect on profitability for the alumina and bauxite markets.

We could be materially adversely affected by declines in aluminum and alumina prices, including global, regional and product-specific prices.

The overall price of primary aluminum consists of several components: (i) the underlying base metal component, which is typically based on quoted prices from the LME; (ii) the regional premium, which comprises the incremental price over the base LME component that is associated with the physical delivery of metal to a particular region (e.g., the Midwest premium for metal sold in the United States); and (iii) the product premium, which represents the incremental price for receiving physical metal in a particular shape (e.g., coil, billet, slab, rod, etc.) or alloy. Each of the above three components has its own drivers of variability.

The LME price is typically driven by macroeconomic factors, global supply and demand of aluminum (including expectations for growth and contraction and the level of global inventories), and trading activity of financial investors. Furthermore, an imbalance in global supply and demand of aluminum, such as decreasing demand without corresponding supply declines, could have a negative impact on aluminum pricing. In 2019, cash LME pricing for aluminum experienced a significant amount of volatility, reaching a high of \$1,923 per metric ton in March and a low of \$1,696 per metric ton in October. High LME inventories could lead to a reduction in the price of aluminum and declines in the LME price have had a negative impact on our results of operations. Further, in recent years, LME rule changes have resulted in an increased minimum daily load-out rate and caps on warehouse charges. These rule changes, and any subsequent changes the exchange chooses to make, could impact the supply/demand balance in the primary aluminum physical market and may impact regional delivery premiums and LME aluminum prices. Regional premiums tend to vary based on the supply of and demand for metal in a particular region and associated transportation costs. Product premiums generally are a function of supply and demand for a given primary aluminum shape and alloy combination in a particular region. Periods of industry overcapacity may also result in a weak aluminum pricing environment.

A sustained weak LME aluminum pricing environment, deterioration in LME aluminum prices, or a decrease in regional premiums or product premiums could have a material adverse effect on our business, financial condition, and results of operations or cash flow. Similarly, our operating results are affected by significant lag effects of declines in key costs of production that are commodity or LME-linked.

Most of our alumina contracts contain two pricing components: (1) the API price basis, and (2) a negotiated adjustment basis that takes into account various factors, including freight, quality, customer location and market conditions. Because the API component can exhibit significant volatility due to market exposure, revenue associated with our alumina operations are exposed to market pricing.

Our bauxite-related contracts are typically one to two-year contracts with very little, if any, market exposure; however, we intend to enter into long-term bauxite contracts and therefore, our revenue associated with our bauxite operations may become further exposed to market pricing.

Our profitability could be adversely affected by increases in the cost of raw materials, or by significant lag effects of decreases in commodity, LME-linked or production costs.

Our results of operations are affected by changes in the cost of raw materials, including energy, carbon products, caustic soda and other key inputs, as well as freight costs associated with transportation of raw materials to refining and smelting locations. We may not be able to fully offset the effects of higher raw material costs or energy costs through price increases, productivity improvements or cost reduction programs. Declines in the costs of alumina and power during a particular period may not be adequate to offset sharp declines in metal price in that period. Increases in the cost of raw materials or decreases in input costs that are disproportionate to concurrent sharper decreases in the price of aluminum could have a material adverse effect on our operating results.

Market-driven balancing of global aluminum supply and demand may be disrupted by non-market forces.

In response to market-driven factors relating to the global supply and demand of aluminum and alumina, we have curtailed or closed portions of our aluminum and alumina production capacity. Certain other industry producers have independently undertaken to reduce production as well. Reductions in production may be delayed or impaired by the terms of long-term contracts to buy power or raw materials.

The existence of non-market forces on global aluminum industry capacity, such as political pressures or governmental policies in certain countries relating to employment or the environment or to maintaining or further developing industry self-sufficiency, may affect overall supply and demand in the aluminum industry. For example, Chinese excess capacity and increased exports from China of heavily subsidized aluminum products could materially disrupt world aluminum markets causing pricing deterioration. If industry overcapacity exists due to the disruption by such non-market forces on the market-driven balancing of the global supply and demand of aluminum, a resulting weak pricing environment and margin compression may adversely affect the operating results of the Company.

Our operations consume substantial amounts of energy and profitability may decline if energy costs rise or if energy supplies are interrupted or become uncertain.

Although we generally expect to meet the energy requirements for our alumina refineries and primary aluminum smelters from internal sources or from long-term contracts, certain conditions could negatively affect our results of operations, including the following:

- significant increases in electricity costs or in fuel oil or natural gas prices;
- unavailability of electrical power or other energy sources due to droughts, hurricanes or other natural causes;
- unavailability of energy due to local or regional energy shortages resulting in insufficient supplies to serve consumers;
- interruptions in energy supply or unplanned outages due to equipment failure or other causes;
- curtailment of one or more refineries or smelters due to the inability to extend energy contracts upon expiration, negotiate new arrangements on cost-effective terms, or the unavailability of energy at competitive rates; or
- curtailment of one or more facilities due to high energy costs that render their continued operation uneconomic, discontinuation of power supply interruptibility rights granted to us under a regulatory regime in the country in which the facility is located, or due to a determination that energy arrangements do not comply with applicable laws, thus rendering the operations that had been relying on such country's interruptibility regime or energy framework uneconomic.

If events such as those listed above were to occur, the resulting high energy costs, the disruption of an energy source, the requirement to repay all or a portion of the benefit we received under a power supply interruptibility regime, or the requirement to remedy any non-compliance of an energy framework to comply with applicable laws, could have a material adverse effect on our business and results of operations.

Business Strategy Risks

We may not be able to realize the expected benefits from our strategy to be a lower cost, competitive commodity business by optimizing our portfolio and disposing of non-core assets, and we have incurred, and may incur in the future, significant costs associated with such portfolio and asset actions.

We are continuing to execute a strategy to be a low cost, competitive integrated aluminum production business by implementing productivity and cost-reduction initiatives, and optimizing our portfolio of assets, including by divesting non-core assets. We are taking decisive actions to lower the cost base of our operations through procurement strategies for raw materials, labor productivity, improving operating performance, deploying Company-wide business process models, reducing overhead costs (including by streamlining the Company's organizational structure by eliminating the business unit structure and consolidating the sales, procurement and commercial functions at the enterprise level), closing, selling or curtailing high-cost production capacity, and pursuing the sale of certain other operations. In October 2019, we initiated a multi-year review of our assets to drive lower costs and sustainable profitability, which includes the potential sale of non-core assets over the next twelve to eighteen months and an analysis of existing production capacities. We may not be able to realize the expected benefits or cost savings from this strategy.

We have made, and may continue to plan and execute, acquisitions and divestitures and take other actions to grow or streamline our portfolio. There is no assurance that anticipated benefits of our strategic actions will be realized. With respect to portfolio optimization actions such as divestitures, curtailments, restarts, expansions, and closures, we may face barriers to exit from unprofitable businesses or operations, including high exit costs or objections from various stakeholders, the lack of availability of buyers willing to purchase such assets at prices acceptable to us, delays due to any regulatory approvals, continuing environmental obligations, and third parties unwilling to release us from guarantees or other credit support provided in connection with the sale of assets. In addition, we may retain liabilities from such transactions, have ongoing indemnification obligations, and incur unforeseen liabilities for divested entities if a buyer fails to honor all commitments. Our business operations are capital intensive, and curtailment or closure of operations or facilities may include

significant charges, including asset impairment charges and other measures. There can be no assurance that divestitures or closures will be undertaken or completed in their entirety as planned at the anticipated cost, or that such actions will be beneficial to the Company.

Our announced a multi-year portfolio review of Company assets includes evaluating our portfolio to assess each facility's strategic benefits, competitiveness, and viability. As part of this strategic review, we may close certain facilities. There can be significant costs associated with facility closures, and the effect of dispositions over time will reduce the Company's cash flow and earnings capacity and result in a less diversified portfolio of businesses, and we will have a greater dependency on remaining businesses for our financial results. Additionally, we could curtail, whether temporarily or permanently, certain existing facilities, which may require us to incur curtailment and carrying costs related to those facilities, as well as further increased costs should production be resumed at any curtailed facility, which could have an adverse effect on our financial results and results of operations. Executing on these transactions will also divert senior management time and resources from our regular business operations.

Joint ventures, other strategic alliances, and business transactions may not achieve intended results. We may experience operational challenges in integrating or segregating assets for such a venture or transaction, and such a venture or transaction could increase the number of our outstanding shares or amount of outstanding debt and affect our financial position.

We participate in joint ventures, and have formed strategic alliances, and may enter into other similar arrangements in the future. For example, AWAC is an unincorporated global joint venture between Alcoa and Alumina Limited. AWAC consists of a number of affiliated entities, which own, operate or have an interest in, bauxite mines and alumina refineries, as well as an aluminum smelter, in seven countries. In addition, Alcoa is party to a joint venture with Ma'aden, the Saudi Arabian Mining Company. Although the Company has, in connection with these and our other existing joint ventures and strategic alliances, sought to protect our interests, joint ventures and strategic alliances inherently involve special risks. Whether or not the Company holds majority interests or maintains operational control in such arrangements, our partners may:

- have economic, political or business interests or goals that are inconsistent with, or opposed to those of, the Company;
- exercise veto rights so as to block actions that we believe to be in our or the joint venture's or strategic alliance's best interests;
- take action contrary to our policies or objectives with respect to our 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.

We continuously evaluate and may in the future enter into additional strategic transactions. Any such transactions could happen at any time, could be material to our business and could take any number of forms, including, for example, an acquisition, merger, sale or distribution of certain assets, refinancing, or other recapitalization or material strategic transaction. There can be no assurance that our joint ventures, strategic alliances, or additional strategic transactions will be beneficial to us, whether due to the above-described risks, unfavorable global economic conditions, increases in costs, foreign currency fluctuations, political risks, retained liabilities, indemnification obligations, or other factors. Evaluating potential transactions and integrating completed ones may divert the attention of our management from ordinary operating matters. In addition, to the extent we consummate an agreement for the sale and disposition of an asset or asset group, we may experience operational difficulties segregating them from our retained assets and operations, which could impact the execution or timing of such dispositions and could result in disruptions to our operations and/or claims for damages, among other things.

If we complete a strategic transaction, we may require additional financing that could result in an increase in the number of our outstanding shares of stock or the aggregate amount and/or cost of our debt, which may result in an adverse impact to our credit ratings. The number of shares of our stock or the aggregate principal amount of our debt that we may issue may be significant. Moreover, the terms of any debt financing may be expensive or adversely impact our results of operations.

We could be adversely affected by changes in the business or financial condition of a significant customer or joint venture partner.

A significant downturn or deterioration in the business or financial condition of a key customer or joint venture partner could affect our results of operations in a particular period. Our 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. If we are not successful in replacing business lost from such customers, profitability may be adversely affected. Our joint venture partners could be rendered unable to contribute their share of operating or capital costs, having an adverse impact on our business.

Global Operational Risks

Our participation in increasingly competitive and complex global markets exposes us to risks that could adversely affect our business, financial condition, operating results, or cash flows.

We have operations or activities in numerous countries and regions outside the United States, including Australia, Brazil, Canada, Europe, Guinea, Suriname, and the Kingdom of Saudi Arabia. The risks associated with the Company's global operations include:

- 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 and trade barriers, trade tensions, 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, changes to import or export regulations and fees, renegotiation or nullification of existing agreements, mining leases and permits, and changes to mining royalty rules or laws;
- weakening macroeconomic conditions;
- contracting manufacturing activity, especially in the global automotive sector;
- war or terrorist activities;
- major public health issues, such as an outbreak of a pandemic or epidemic (such as the novel coronavirus COVID-19), which could cause disruptions in our operations, supply chain, or workforce;
- difficulties enforcing intellectual property and contractual rights in certain jurisdictions; and
- unexpected events, accidents, or environmental incidents, including natural disasters.

While the impact of any of the foregoing factors is difficult to predict, any one or more of them could adversely affect our business, financial condition, operating results or cash flows. Existing insurance arrangements may not provide protection for the costs that may arise from such events.

As we continue to operate globally, we may face greater competition from certain geographic regions, including Asia, where China is actively promoting and subsidizing its aluminum industry, and negatively affecting prices outside of China. These actions by China and trade barriers may restrict us from participating in the Chinese market and prevent us from competing effectively with Chinese companies. Additionally, certain competitors possess financial, technical and management resources to develop and market products that may compete favorably against our products, and consolidation among our competitors may also allow them to compete more effectively.

Our global operations expose us to risks related to economic and political conditions, including the impact of tariffs and sanctions, which may negatively impact our business.

We are subject to risks associated with doing business internationally, including the effects of foreign and domestic laws and regulations, foreign or domestic government fiscal and political crises, and political and economic disputes and sanctions. These factors, among others, bring uncertainty to the markets in which we compete, and may adversely affect our business, financial condition, operating results or cash flows. For example, increased government enforcement in Brazil that resulted in disruptions in the alumina supply, as well as the impact of environmental and supply management regulatory reforms in China, could adversely impact our business and results of operations.

In the United States, the current administration has publicly supported, and in some instances has already proposed or taken action with respect to, significant changes to certain trade policies, including import tariffs and quotas, modifications to international trade policy, the withdrawal from or renegotiation of certain trade agreements, including the US-Mexico-Canada Agreement, and other changes that may affect U.S. trade relations with other countries, any of which may require us to significantly modify our current business practices or may otherwise materially and adversely affect our business or those of our customers. Such changes could also result in retaliatory actions by U.S. trading partners. For example, in March 2018, the United States announced a plan to indefinitely impose a 10 percent tariff on certain imported aluminum products under Section 232 of the Trade Expansion Act of 1962, and in May 2019, Canada and Mexico received an exemption from tariffs that had been imposed on aluminum produced and imported from those countries under Section 232. As a result of these or other potential U.S. import tariff actions, certain affected countries and other foreign governments have initiated or may impose retaliatory trade measures on aluminum produced in the United States. To the extent that further tariffs are imposed on a broader range of imports, or these tariffs and other trade actions result in a decrease in international demand for

aluminum produced in the United States or otherwise negatively impact demand for our products, our business may be adversely impacted, and could further exacerbate aluminum and alumina price volatility and overall market uncertainty.

Our global operations expose us to various legal and regulatory systems, and changes in conditions beyond our control in foreign countries.

In addition to the business risks inherent in operating outside the United States, legal and regulatory systems in foreign countries may be less developed and predictable, and the possibility of various types of adverse governmental action may be more pronounced. Unexpected or uncontrollable events or circumstances in any of the foreign markets in which we operate, including actions by foreign governments such as changes in fiscal regimes, termination of our agreements with such foreign governments, increased government regulation, or forced curtailment of operations, could materially and adversely affect our business, financial condition, results of operations or cash flows.

Weakness in global economic conditions or in any of the industries or geographic regions in which we or our customers operate, and the cyclical nature of our customers' businesses, could adversely impact our revenues and profitability by reducing demand and margins.

Our results of operations may be materially affected by the conditions in the global economy generally and in global capital markets. There has been extreme volatility in the capital markets and in the end markets and geographic regions in which we and our customers operate, which has negatively affected our revenues. Many of the markets in which our customers participate are also cyclical in nature and experience significant fluctuations in demand for our products based on economic conditions, consumer demand, raw material and energy costs, and government actions. Many of these factors are beyond our control.

A decline in consumer and business confidence and spending, severe reductions in the availability and cost of credit, and volatility in the capital and credit markets could adversely affect the business and economic environment in which we operate and the profitability of our business. We are also exposed to risks associated with the creditworthiness of our suppliers and customers. If the availability of credit to fund or support the continuation and expansion of our customers' business operations is curtailed or if the cost of that credit is increased, the resulting inability of our customers or of their customers to either access credit or absorb the increased cost of that credit could adversely affect our business by reducing our sales or by increasing our exposure to losses from uncollectible customer accounts. These conditions and a disruption of the credit markets could also result in financial instability of some of our suppliers and customers. The consequences of such adverse effects could include the interruption of production at the facilities of our customers, the reduction, delay or cancellation of customer orders, delays or interruptions of the supply of raw materials we purchase, and bankruptcy of customers, suppliers or other creditors. Any of these events could adversely affect our profitability, cash flow and financial condition.

We are exposed to fluctuations in foreign currency exchange rates and interest rates, as well as inflation and other economic factors in the countries in which we operate.

Economic factors, including inflation and fluctuations in foreign currency exchange rates and interest rates, competitive factors in the countries in which we operate, and continued volatility or deterioration in the global economic and financial environment, could affect our revenues, expenses and results of operations. Changes in the valuation of the U.S. dollar against other currencies, particularly the Australian dollar, Brazilian real, Canadian dollar, Euro, and Norwegian kroner, may affect our profitability, as some important inputs are purchased in other currencies, while our products are generally sold in U.S. dollars. As the U.S. dollar strengthens, the cost curve shifts down for smelters outside the United States but costs for our U.S. smelting portfolio may not decline.

Unanticipated changes in tax laws or exposure to additional tax liabilities could affect our future profitability.

We are subject to income taxes in both the United States and various non-U.S. jurisdictions. Unanticipated changes in foreign and domestic tax laws, regulations, or policies, or their interpretation and application by regulatory bodies, or exposure to additional tax liabilities could affect our future profitability. Our domestic and international tax liabilities are dependent upon the distribution of income among these different jurisdictions. Our 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 our deferred tax assets. Our 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, and changes in the valuation of deferred tax assets and liabilities. Significant changes to tax laws or regulations could have a substantial impact, positive or negative, on our effective tax rate, cash tax expenditures and cash flows, and deferred tax assets and liabilities.

We are subject to tax audits by various tax authorities in many jurisdictions, such as Australia, Brazil, Canada, and Spain. We regularly assess the potential outcomes of examinations by tax authorities in determining the adequacy of our provision for income taxes. The results of tax audits and examinations of previously filed tax returns or related litigation and continuing

assessments of our tax exposures could materially affect our financial results. See Note P to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K under the caption Income Taxes – Unrecognized Tax Benefits.

We may be exposed to significant legal proceedings, investigations or changes in foreign and/or U.S. federal, state, or local laws, regulations or policies.

Our 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 the Company. We may 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. We are also subject to a variety of legal compliance risks, including, among other things, potential claims relating to health and safety, environmental matters, intellectual property rights, product liability, taxes and compliance with U.S. and foreign export laws, anti-bribery laws, competition laws and sales and trading practices. We could be subject to fines, penalties, interest, or damages (in certain cases, treble damages). In addition, if we violate the terms of our agreements with governmental authorities, we may face additional monetary sanctions and other remedies as a court deems appropriate.

While we believe we have adopted appropriate risk management and compliance programs to address and reduce these risks, the global and diverse nature of our operations means that these risks 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 estimates for matters previously not susceptible of reasonable estimates, such as a significant judicial ruling, judgment, or settlement, or 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 our results of operations or cash flows in a particular period. See Part I Item 3 and Note R to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K under the caption Contingencies and Commitments—Contingencies—Litigation.

We are subject to a broad range of health, safety and environmental laws, regulations and other requirements in the jurisdictions in which we operate that may expose us to substantial claims, costs, and liabilities.

Our operations worldwide are subject to numerous complex and increasingly stringent federal, state, local and foreign laws, regulations, policies, and other requirements, including those related to health, safety, environmental, and waste management and disposal matters, which may expose us to substantial claims, costs, and liabilities. We may be subject to fines, penalties and other damages, such as natural resource damages and the costs associated with the investigation and cleanup of soil, surface water, groundwater, and other media under laws such as CERCLA (commonly known as Superfund) or similar U.S. and foreign regulations. These laws, regulations, policies, and other requirements could change or be applied or interpreted in ways that could (i) require us to enjoin, curtail, close or otherwise modify our operations, including the implementation of corrective measures, the installation of additional equipment, or the undertaking of other remedial actions, or (ii) subject us to enforcement risk or impose on or require us to incur additional capital expenditures, compliance or other costs, fines, or penalties, any of which could adversely affect our results of operations, cash flows and financial condition, and the trading price of our common stock.

The costs of complying with such laws, regulations, policies and other requirements, including participation in assessments, remediation activities, 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. As a result, we may be subject to claims arising from current or former conditions at sites that we own or operate currently, as well as at sites that we owned or operated in the past, and at contaminated sites that have always been owned or operated by third parties, regardless of whether we caused the contamination or whether the activity that caused the contamination was lawful at the time it was conducted. Liability may be without regard to fault and may be joint and several, so that we may be held responsible for more than our share of the contamination or other damages, or even for the entire share.

In addition, because environmental laws, regulations, policies and other requirements are constantly evolving, we will continue to incur costs to maintain compliance and such costs could increase materially and prove to be more limiting and costly than we anticipate. Evolving standards and expectations can result in increased litigation and/or increased costs, all of which can have a material and adverse effect on our business operations, earnings and cash flows. Future compliance with environmental, health and safety legislation and other regulatory requirements may prove to be more limiting and costly than we anticipate, and may disrupt our business operations and require significant expenditures. Our results of operations or liquidity in a particular period could be materially affected by certain health, safety or environmental matters, including remediation costs and damages related to certain sites.

Our operations include impoundment structures, which could impact the environment or cause exposure to hazardous substances or other damage, which could result in material liabilities to us.

Some of our operations generate hazardous waste and other byproducts, which we contain in tailing facilities, residue storage areas, and other structural impoundments that are subject to extensive regulation. Overtopping of storage areas caused by extreme weather events or unanticipated structural failure of impoundments could result in severe, and in some cases catastrophic, damage to the environment, natural resources, or property, or personal injury and loss of life. These and other similar impacts that our operations may have on the environment, as well as exposures to hazardous substances or wastes associated with our operations, could result in civil or criminal fines or penalties and enforcement actions issued by regulatory or judicial authorities enjoining, curtailing or closing operations or requiring corrective measures, any of which could materially and adversely affect us.

Climate change, climate change legislation or regulations, extreme weather conditions, and greenhouse gas effects may adversely impact our operations and markets.

Energy is a significant input in a number of our operations and there is growing recognition that consumption of energy derived from fossil fuels is a contributor to climate change. A number of governments or regulatory bodies in areas where we operate have introduced or are contemplating legislative and regulatory change in response to the potential impacts of climate change. We could see changes in the margins of greenhouse gas-intensive assets and energy-intensive assets as a result of regulatory impacts in the countries in which we operate. These regulatory mechanisms may be either voluntary or legislated and may impact our operations directly or indirectly through customers or our supply chain. Inconsistency of regulations may also change the attractiveness of the locations of some of the Company's assets. Assessments of the potential impact of future climate change legislation, regulation and international treaties and accords are uncertain, given the wide scope of potential regulatory change in countries in which we operate. We may realize increased capital expenditures resulting from required compliance with revised or new legislation or regulations, costs to purchase or profits from sales of, allowances or credits under a "cap and trade" system, increased insurance premiums and deductibles as new actuarial tables are developed to reshape coverage, a change in competitive position relative to industry peers and changes to profit or loss arising from increased or decreased demand for goods produced by the Company and, indirectly, from changes in costs of goods sold.

The potential physical impacts of climate change or extreme weather conditions on the Company's operations are highly uncertain, and will be particular to the geographic circumstances. These may include changes in rainfall patterns, wildfires, heat waves, shortages of water or other natural resources, changing sea levels, changing storm patterns, flooding, increased frequency and intensities of storms, and changing temperature levels. Any of these may disrupt our operations, hinder transportation of our products to customers, prevent access to our facilities, negatively impact our suppliers' or customers' operations and their ability to fulfill contractual obligations to us, and/or damage our facilities, all of which may increase our costs, reduce production and adversely affect our operations and financial performance.

Competition Risks

We face significant competition, which may have an adverse effect on profitability.

We compete with a variety of both U.S. and non-U.S. aluminum industry competitors as well as with producers of other materials, such as steel, titanium, plastics, composites, ceramics, and glass, among others. Use of such materials could reduce the demand for aluminum products, which may reduce our profitability and cash flow. Factors affecting our ability to compete include increased competition from overseas producers, our competitors' pricing strategies, the introduction or advancement of new technologies and equipment by our competitors, and our ability to maintain the cost-efficiency of our facilities. In addition, our competitive position depends, in part, on our ability to operate as an integrated aluminum value chain, leverage innovation expertise across businesses and key end markets, and access an economical power supply to sustain our operations in various countries. See Business—Competition.

Our business is capital intensive, and if there are downturns in the industries that we serve, we may be forced to significantly curtail or suspend operations, which could result in our recording asset impairment charges or taking other measures that may adversely affect our results of operations and profitability.

Our business operations are capital intensive. If there are downturns in the industries that we serve, we may be forced to significantly curtail or suspend our operations, including laying off employees, recording asset impairment charges and other measures. In addition, we may not realize the benefits or expected returns from announced plans, programs, initiatives and capital investments. Any of these events could adversely affect our results of operations and profitability.

Available Capital and Credit-Related Risks

Our business and growth prospects may be negatively impacted by limits on our ability to fund capital expenditures.

We require substantial capital to invest in growth opportunities and to maintain and prolong the life and capacity of our existing facilities. Our ability to generate cash flows is affected by many factors, including market and pricing conditions. Insufficient cash generation or capital project overruns may negatively impact our ability to fund as planned our sustaining and return-seeking capital projects, and such postponement in funding capital expenditures or inadequate funding to complete projects could result in operational issues. In addition, to the extent our access to competitive financial, credit, capital and/or banking markets becomes impaired, our operations, financial results and cash flows could be adversely impacted. We may also need to address commercial and political issues in relation to reductions in capital expenditures in certain of the jurisdictions in which we operate. If our interest in our joint ventures is diluted or we lose key concessions, our growth could be constrained. Any of the foregoing could have a material adverse effect on our business, results of operations, financial condition and prospects.

Deterioration in our credit profile or increases in interest rates could increase our costs of borrowing money and limit our access to the capital markets and commercial credit.

The major credit rating agencies evaluate our creditworthiness and give us specified credit ratings. These ratings are based on a number of factors, including our financial strength and financial policies as well as our strategies, operations and execution. These credit ratings are limited in scope, and do not address all material risks related to an investment in us, but rather reflect only the view of each rating agency at the time its rating is issued. Nonetheless, the credit ratings we receive impact our borrowing costs as well as our access to sources of capital on terms that will be advantageous to our business. Failure to obtain sufficiently high credit ratings could adversely affect our interest rates in future financings, our liquidity, or our competitive position and could also restrict our access to capital markets. In addition, our credit ratings could be lowered or withdrawn entirely by a rating agency if, in its judgment, the circumstances warrant. If a rating agency were to downgrade our rating, our borrowing costs could increase, our funding sources could decrease, and we would need to rely on our cash flows from operations. As a result of these factors, a downgrade of our credit ratings could have a materially adverse impact on our future operations, cash flows, and financial position.

In addition, our variable rate indebtedness may use London Interbank Offering Rate (LIBOR) as a benchmark for establishing the rate. LIBOR has been the subject of recent national, international and other regulatory guidance and proposals for reform, and in 2017, the U.K. Financial Conduct Authority announced that it intends to phase out LIBOR by the end of 2021. The financial industry is currently transitioning away from LIBOR as a benchmark for the interbank lending market. The discontinuation, reform, or replacement of LIBOR or any other benchmark rates may have an impact on contractual mechanics in the credit market or cause disruption in the broader financial markets. The consequences of these developments cannot be entirely predicted, but could include an increase in the cost of our variable rate indebtedness.

Our indebtedness restricts our current and future operations, which could adversely affect our ability to respond to changes in our business and manage our operations.

Alcoa and Alcoa Nederland Holding B.V. (ANHBV), a wholly-owned subsidiary of Alcoa, are party to a revolving credit agreement with a syndicate of lenders and issuers named therein (as subsequently amended, the Revolving Credit Agreement). The terms of the Revolving Credit Agreement and the indentures governing our outstanding notes contain covenants that impose significant operating and financial restrictions on us, including on our ability to, among other things:

- make investments, loans, advances, and acquisitions;
- amend certain material documents;
- dispose of assets;
- incur or guarantee additional debt and issue certain disqualified equity interests and preferred stock;
- make certain restricted payments, including limiting the amount of dividends on equity securities and payments to redeem, repurchase or retire equity securities or other indebtedness;
- engage in transactions with affiliates;
- materially alter the business we conduct;
- enter into certain restrictive agreements;
- create liens on assets to secure debt;

- consolidate, merge, sell or otherwise dispose of all or substantially all of Alcoa's, ANHBV's or a subsidiary guarantor's assets; and
- take any actions that would reduce our ownership of AWAC entities below an agreed level.

The Revolving Credit Agreement requires us to comply with financial covenants which includes maintaining an interest expense coverage ratio of not less than 5.00 to 1.00, and a leverage ratio for any period of four consecutive fiscal quarters that is not greater than 2.50 to 1.00. The calculation of these ratios, when considering the Company's existing debt obligations, could restrict the amount of additional borrowing capacity under the Company's Revolving Credit Facility or other credit facilities.

In addition, all obligations of Alcoa Corporation or a domestic entity under the Revolving Credit Agreement are secured by, subject to certain exceptions, a first priority lien on substantially all assets of Alcoa Corporation and the material domestic wholly-owned subsidiaries of Alcoa Corporation and certain equity interests of specified non-U.S. subsidiaries. All other obligations under the Revolving Credit Facility are secured by, subject to certain exceptions, a first priority security interest in substantially all assets of Alcoa Corporation, ANHBV, the material domestic wholly-owned subsidiaries of Alcoa Corporation, and the material foreign wholly-owned subsidiaries of Alcoa Corporation located in Australia, Brazil, Canada, Luxembourg, the Netherlands, Norway, and Switzerland including equity interests of certain subsidiaries that directly hold equity interests in AWAC entities. Our ability to comply with these agreements may be affected by events beyond our control, including prevailing economic, financial and industry conditions. These covenants could have an adverse effect on our business by limiting our ability to take advantage of financing, merger and acquisition, or other opportunities. The breach of any of these covenants or restrictions could result in a default under the Revolving Credit Agreement or the indentures governing our notes and other outstanding indebtedness, including such indebtedness for which the Company is a guarantor.

For more information on the restrictive covenants in the Revolving Credit Agreement, see the Liquidity and Capital Resources – Financing Activities section in Part II Item 7 of this Form 10-K.

Our failure to comply with the agreements relating to our outstanding indebtedness, including due to events beyond our control, could result in an event of default that could materially and adversely affect our business, financial condition, results of operations or cash flows.

If an event of default were to occur under any of the agreements relating to our outstanding indebtedness, including the Revolving Credit Agreement and the indenture governing our notes, we may not be able to incur additional indebtedness under the Revolving Credit Agreement and the holders of the defaulted debt could cause all amounts outstanding with respect to that debt to be due and payable immediately. We cannot assure that our assets or cash flow would be sufficient to fully repay borrowings under our outstanding debt instruments if accelerated upon an event of default, which could have a material adverse effect on our ability to continue to operate as a going concern. Further, if we are unable to repay, refinance or restructure our secured indebtedness, the holders of such indebtedness could proceed against the collateral securing that indebtedness. In addition, any event of default or declaration of acceleration under one debt instrument also could result in an event of default under one or more of our other debt instruments.

Cybersecurity Risks

Cyber-attacks and security breaches may threaten the integrity of our intellectual property and other sensitive information, disrupt our business operations, expose us to potential liability, and result in reputational harm and other negative consequences that could have a material adverse effect on our financial condition and results of operations.

We depend on computers, information and communications technology and related systems to enable us to operate efficiently and interface with customers as well as to maintain financial accuracy and efficiency. In addition, our business involves the use, storage, and transmission of information about our employees and customers. The protection of such information, as well as our proprietary information, is critical to us. In addition, we are subject to regulations around the world regarding the protection of information and data privacy, such as the European Union's General Data Privacy Regulation (the GDPR). We face 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 other cyber incidents are more frequent, constantly evolving, more sophisticated, and made by groups and individuals with a wide range of expertise and motives. Cyber-attacks and security breaches may include, but are not limited to, unauthorized attempts to access information or digital infrastructure, computer viruses, ransomware, malicious codes, hacking, phishing, denial of service, and other electronic security breaches.

We believe that we face a heightened threat of cyber-attacks because of the industry in which we operate and the markets we serve. As techniques used to obtain unauthorized access or sabotage systems change frequently and generally are not recognized until launched against a target, we may be unable to anticipate these techniques, including their scope and impact, or implement preventative measures. We have experienced attempts by external parties to penetrate our networks and

systems. Such attempts to date have not resulted in any material breaches, disruptions, or loss of information. While the Company continually works to safeguard our 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 our systems or networks, compromise confidential or otherwise protected information, destroy or corrupt data, or otherwise disrupt our operations. These events could negatively impact our reputation and 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 our financial condition and results of operations. Such security breaches could also result in a violation of applicable U.S. and international privacy and other laws, and subject us to private consumer, business partner, or securities litigation and governmental investigations and proceedings, any of which could result in our exposure to material civil or criminal liability. For example, the GDPR subjects companies to a range of new compliance obligations regarding the handling of personal data. In the event our operations are found to be in violation of the GDPR's requirements, we may be subject to significant civil penalties, business disruption and reputational harm, any of which could have a material adverse effect on our business.

In addition, cyber-attacks or breaches could require significant management attention and resources, and result in the diminution of the value of our investment in research and development. While we have disaster recovery and business continuity plans in place, if our information technology systems are damaged, breached or cease to function properly for any reason, including the poor performance of, failure of or cyber-attack on third-party service providers, catastrophic events, power outages, cyber-security breaches, network outages, failed upgrades or other similar events and, if the disaster recovery and business continuity plans do not effectively resolve such issues on a timely basis, we may suffer interruptions in our ability to manage or conduct business as well as reputational harm. As a result of such events, we may be subject to governmental investigations and litigation, any of which may adversely impact our business, results of operations, cash flows and financial condition.

Employee- and Pension-Related Risks

Loss of key personnel may adversely affect our business.

Our future success greatly depends on the continued service and performance of our executive management team and other key employees, and our ability to continue to attract and retain additional highly qualified personnel. Our executive management team and our other key employees are integral to our success based on their expertise and knowledge of our business and products. We compete for such personnel with other companies, including public and private company competitors who may periodically offer more favorable terms of employment. The loss or interruption of the services of any member of our executive management team or other key persons could have a material adverse effect on our business, results of operations and financial condition because we may not be able to find appropriate replacement personnel in a timely manner should the need arise.

Union disputes and other employee relations issues could adversely affect our financial results.

A significant portion of our employees are represented by labor unions in a number of countries under various collective bargaining agreements with varying durations and expiration dates. See Business—Employees. Union disputes and other employee relations issues could adversely affect our financial results. We may not be able to satisfactorily renegotiate collective bargaining agreements when they expire. In addition, existing collective bargaining agreements may not prevent strikes, work stoppages, work slowdowns, union organizing campaigns, or lockouts at our facilities in the future. We may also be subject to general country strikes or work stoppages unrelated to our business or collective bargaining agreements. A labor dispute or work stoppage of employees covered by collective bargaining agreements could have a material adverse effect on production at one or more of our facilities, and depending on the length of work stoppage, on our financial results.

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

Our results of operations may be negatively affected by the amount of expense we record for our pension and other postretirement benefit plans, reductions in the fair value of plan assets, and other factors. We calculate income or expense for our 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 the Company 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, the Company is required to make an annual measurement of plan assets and liabilities, which may result in a significant charge to stockholders' equity. See Management's Discussion and Analysis of Financial Condition and Results of Operations—Critical Accounting Policies and Estimates—Pension and Other Postretirement Benefits and Note N to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K under the caption Pension and Other Postretirement Benefits. 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 we 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. 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 our cash flows. Adverse capital market conditions could result in reductions in the fair value of plan assets and increase our liabilities related to such plans, adversely affecting our liquidity and results of operations.

Risk Related to Prior Separation Transaction

In connection with our Separation Transaction from ParentCo, Arconic agreed to indemnify us for certain liabilities and we agreed to indemnify Arconic for certain liabilities which could negatively impact financial results if indemnity liabilities arise in the future.

In connection with the Separation Transaction, Arconic agreed to indemnify us for certain liabilities, and we agreed to indemnify Arconic for certain liabilities, in each case for uncapped amounts. Indemnities that we may be required to provide Arconic may be significant and could negatively impact our business. Third parties could also seek to hold us responsible for any of the liabilities that Arconic has agreed to retain. Any amounts we are required to pay pursuant to these indemnification obligations and other liabilities could require us to divert cash that would otherwise have been used in furtherance of our operating business. Further, the indemnity from Arconic may not be sufficient to protect us against the full amount of such liabilities, and Arconic may not be able to fully satisfy its indemnification obligations. Moreover, even if we ultimately succeed in recovering from Arconic any amounts for which we are held liable, we may be temporarily required to bear these losses ourselves. Each of these risks could negatively affect our business, results of operations and financial condition.

Risks Related to Stock Ownership in the Company

Actions of activist stockholders of Alcoa could be disruptive and potentially costly, and the possibility that activist stockholders may contest, or seek changes that conflict with, our strategic direction could cause uncertainty about the strategic direction of our business.

Activist stockholders may from time to time attempt to effect changes in our Board of Directors or strategic direction and, in furtherance thereof, may seek changes in how Alcoa is governed. Our Board of Directors and management team strive to maintain constructive, ongoing communications with Alcoa stockholders, including activist stockholders, and welcome their views and opinions with the goal of working together constructively to enhance value for all stockholders. However, activist campaigns that contest, or conflict with, our strategic direction could have an adverse effect on us because: (i) responding to actions by activist stockholders can disrupt our operations, are costly and time-consuming, and divert the attention of our Board of Directors and senior management from the pursuit of business strategies, which could adversely affect our results of operations and financial condition; (ii) perceived uncertainties as to our future direction may cause stock price decline and lead to the perception of a change in the direction of the business, instability or lack of continuity which may be exploited by our competitors, cause concern to our current or potential customers, result in the loss of potential business opportunities and make it more difficult to attract and retain qualified personnel and business partners; and (iii) these types of actions could cause significant fluctuations in our stock price based on temporary or speculative market perceptions or other factors that do not necessarily reflect the underlying fundamentals and prospects of our business.

Anti-takeover provisions could enable our management to resist a takeover attempt by a third party and limit the power of our stockholders, which could decrease the trading price of our common stock.

Alcoa's amended and restated certificate of incorporation (certificate of incorporation) and amended and restated bylaws (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 Alcoa's Board of Directors rather than to attempt a hostile takeover. These provisions include, among others:

- the ability of our remaining directors to fill vacancies on our Board of Directors;
- procedural rules regarding how stockholders may present proposals or nominate directors for election at stockholder meetings;
- the right of our Board of Directors to issue preferred stock without stockholder approval; and
- the inability of our stockholders to act by written consent unless unanimous.

In addition, we are subject to Section 203 of the Delaware General Corporation Law, which provides that, subject to limited exceptions, persons that acquire, or are affiliated with persons that acquire, more than 15% of the outstanding voting stock of a Delaware corporation may not engage in a business combination with that corporation, including by merger, consolidation or acquisitions of additional shares, for a three-year period following the date on which that person or any of its affiliates becomes the holder of more than 15% of the corporation's outstanding voting stock.

We believe these provisions protect our stockholders from coercive or otherwise unfair takeover tactics by requiring potential acquirers to negotiate with our Board of Directors and by providing our Board of Directors with more time to assess any acquisition proposal. These provisions are not intended to make Alcoa immune from takeovers; however, these provisions will apply even if the offer may be considered beneficial by some stockholders and could delay or prevent an acquisition that our Board of Directors determines is not in the best interests of Alcoa and our stockholders. These provisions may also prevent or discourage attempts to remove and replace incumbent directors. These provisions of our certificate of incorporation, bylaws, and Delaware law, that have the effect of delaying or deterring a change in control of the Company could limit the opportunity for our stockholders to receive a premium for their shares and could affect the price that some investors are willing to pay for Alcoa common stock.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Alcoa Corporation's principal executive offices, located at 201 Isabella Street, Suite 500, Pittsburgh, Pennsylvania 15212-5858, are leased. Alcoa also leases several office facilities and sites, both domestically and internationally. In addition, Alcoa owns or has an ownership interest in its production sites, both domestically and internationally. Alcoa owns active mines and plants classified under the Bauxite, Alumina, and Aluminum segments of its business. These include facilities and assets around the world used for Alcoa's bauxite mining, alumina refining, aluminum smelting and casting production, energy generation, and aluminum rolling operations. Capacity and utilization of these facilities varies by segment and the level of demand for each product. See Part I Item 1 of this Form 10-K for additional information, including the ownership, capacity and utilization of these facilities according to each segment.

Several of our wholly-owned production facilities are encumbered under the Company's Revolving Credit Facility. For information on the Company's Revolving Credit Facility, see Part II Item 7 of this Form 10-K under the caption Management's Discussion and Analysis of Financial Condition and Results of Operations – Liquidity and Capital Resources – Financing Activities.

Although Alcoa's facilities vary in terms of age and condition, management believes that its facilities are suitable and generally adequate to support the current and projected operations of the business. See Notes B and J to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for information on properties, plants and equipment.

Item 3. Legal Proceedings.

In the ordinary course of its business, Alcoa is involved in a number of lawsuits and claims, both actual and potential. Proceedings that were previously disclosed may no longer be reported because, as a result of rulings in the case, settlements, changes in our business or other developments, in our judgment, they are no longer material to Alcoa's business, financial position or results of operations. For additional information related to ongoing legal matters, see Note R to the Consolidated Financial Statement in Item II Part 8 of this Form 10-K.

Environmental Matters

Alcoa is involved in proceedings under CERCLA and 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 are discussed in Note R to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K under the caption Contingencies and Commitments—Environmental Matters.

In August 2005, Dany Lavoie, a resident of Baie Comeau in the Canadian Province of Québec, filed a Motion for Authorization to Institute a Class Action and for Designation of a Class Representative against Alcoa Canada Ltd., Alcoa Limitée, Société Canadienne de Metaux Reynolds Limitée and Canadian British Aluminum in the Superior Court of Québec in the District of Baie Comeau, alleging that defendants, as the present and past owners and operators of an aluminum smelter in Baie Comeau, had negligently allowed the emission of certain contaminants from the smelter on the lands and houses of the St. Georges neighborhood and its environs causing property damage and health concerns. In May 2007, the court authorized a class action suit on behalf of all people who suffered property or personal injury damages caused by the emission of polycyclic aromatic hydrocarbons from the Company's aluminum smelter in Baie Comeau. In September 2007,

plaintiffs filed the claim against the original defendants. The Soderberg smelting operations that plaintiffs allege to be the source of emissions of concern ceased operations in 2013 and has been dismantled. A court appointed expert, engaged to perform analysis of the potential impacts from the emissions in accordance with a sampling protocol agreed by the parties, submitted its report to the court in May 2019. The parties are currently reviewing the results of the report with their own experts. During a recent case management conference, the court ordered the parties to file a new timetable to prepare the case for trial by May 1, 2020. At this stage of the proceeding, we are unable to reasonably predict an outcome or to estimate a range of reasonably possible loss.

Asbestos Litigation

Some of our subsidiaries as premises owners are defendants in active lawsuits filed on behalf of persons alleging injury as a result of occupational exposure to asbestos at various facilities. A former affiliate of a subsidiary has been named, along with a large common group of industrial companies, in a pattern complaint where our involvement is not evident. Since 1999, several thousand such complaints have been filed. To date, the former affiliate has been dismissed from almost every case that was actually placed in line for trial. Our subsidiaries and acquired companies all have had numerous insurance policies over the years that provide coverage for asbestos based claims. Many of these policies provide layers of coverage for varying periods of time and for varying locations. We have significant insurance coverage and believe that our reserves are adequate for 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 Alcoa Corporation.

General

In addition to the matters discussed above, various other lawsuits, claims, and proceedings have been or may be instituted or asserted against Alcoa Corporation, including those pertaining to environmental, safety and health, commercial, tax, product liability, intellectual property infringement, employment, and employee and retiree benefit matters, and other actions and claims arising out of the normal course of business. While the amounts claimed in these other matters may be substantial, the ultimate liability is not readily determinable because of the considerable uncertainties that exist. Accordingly, it is possible that the Company's liquidity or results of operations in a particular 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 financial position of the Company.

Item 4. Mine Safety Disclosures.

The information concerning mine safety violations or other regulatory matters required by Section 1503(a) of the Dodd-Frank Wall Street Reform and Consumer Protection Act and Item 104 of Regulation S-K (17 CFR 229.104) is included in Exhibit 95.1 of this report, which is incorporated herein by reference.

PART II

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

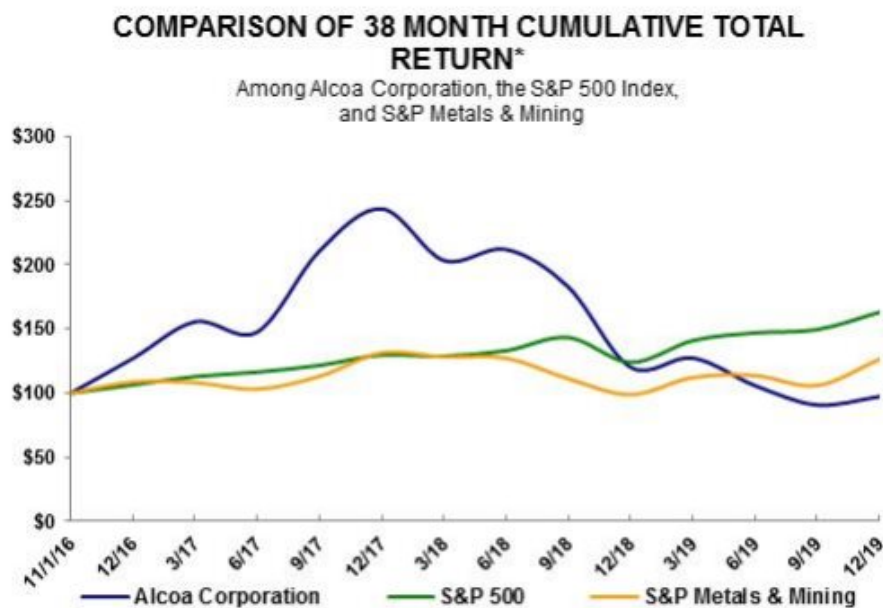
Shares of the Company’s common stock are listed on the New York Stock Exchange and trade under the symbol “AA” in “regular-way” trading, which began on November 1, 2016 immediately following the Separation Transaction.

Alcoa Corporation did not pay dividends in 2019, 2018, or 2017. Dividends on Alcoa Corporation common stock are subject to authorization by the Company’s Board of Directors. The payment and amount of dividends, if any, depends upon matters deemed relevant by the Company’s Board of Directors, such as Alcoa Corporation’s results of operations, financial condition, cash requirements, future prospects, any limitations imposed by law, credit agreements or senior securities, and other factors deemed relevant and appropriate. The Company’s senior secured revolving credit facility and the indenture governing our senior unsecured notes restrict our ability to pay dividends in certain circumstances. For more information, see Management’s Discussion and Analysis of Financial Condition and Results of Operations – Liquidity and Capital Resources – Financing Activities in Part II Item 7 of this Form 10-K.

As of February 14, 2020, there were approximately 11,500 holders of record of shares of the Company’s common stock. Because many of Alcoa Corporation’s shares are held by brokers and other institutions on behalf of stockholders, the Company is unable to estimate the total number of stockholders represented by these holders.

Stock Performance Graph

The following graph compares Alcoa Corporation's cumulative 38-month total shareholder return with (1) the Standard & Poor's (S&P) 500® Index and (2) the S&P 500® Metals & Mining GICS Level 3 Index, a group of companies categorized by S&P as active in the "Metals and Mining" industry within the "Materials" market sector. This comparison was based on an initial investment of \$100, including the reinvestment of any dividends from November 1, 2016 (beginning of "regular way" trading for Alcoa Corporation) through December 31, 2019. Such information shall not be deemed to be "filed."



*\$100 invested on 11/1/16 in stock or index, including reinvestment of dividends. Fiscal year ending December 31.

Copyright© 2020 Standard & Poor's, a division of S&P Global. All rights reserved.

	2016		2017				2018				2019			
	1-Nov	31-Dec	31-Mar	30-Jun	30-Sep	31-Dec	31-Mar	30-Jun	30-Sep	31-Dec	31-Mar	30-Jun	30-Sep	31-Dec
Alcoa Corporation	\$ 100	\$ 127	\$ 156	\$ 148	\$ 211	\$ 244	\$ 203	\$ 212	\$ 183	\$ 120	\$ 127	\$ 106	\$ 91	\$ 97
S&P 500® Index	100	106	113	116	122	130	129	133	143	124	141	147	150	163
S&P 500® Metals & Mining GICS Level 3 Index	100	109	108	103	113	131	128	127	111	99	112	114	106	126

Issuer Purchases of Equity Securities

Fourth Quarter 2019	Total Number of Shares Purchased	Weighted Average Price Paid Per Share	Total Number of Shares Purchased as Part of Publicly Announced Program	Approximate Dollar Value of Shares that May Yet be Purchased Under the Program ⁽¹⁾
October 1 to October 31	-	\$ -	-	\$ 150,000,000
November 1 to November 30	-	-	-	150,000,000
December 1 to December 31	-	-	-	150,000,000
Total	-	-	-	-

- (1) On October 17, 2018, Alcoa Corporation announced that its Board of Directors authorized a common stock repurchase program under which the Company may purchase shares of its outstanding common stock up to an aggregate transactional value of \$200, depending on cash availability, market conditions, and other factors. Repurchases under the program may be made using a variety of methods, which may include open market purchases, privately negotiated transactions, or pursuant to a Rule 10b5-1 plan. This program does not have a predetermined expiration date. Alcoa Corporation intends to retire the repurchased shares of common stock.

Item 6. Selected Financial Data.**(dollars in millions, except per-share amounts and average realized prices; metric tons in thousands (kmt))**

For the year ended December 31,	2019	2018	2017	2016	2015
Sales	\$ 10,433	\$ 13,403	\$ 11,652	\$ 9,318	\$ 11,199
Restructuring and other charges, net	1,031	527	309	318	983
Net (loss) income ⁽¹⁾	(853)	893	608	(346)	(739)
Net (loss) income attributable to Alcoa Corporation ⁽¹⁾	(1,125)	250	279	(400)	(863)
Earnings per share attributable to Alcoa Corporation common shareholders^(1,2):					
Basic	\$ (6.07)	\$ 1.34	\$ 1.51	\$ (2.19)	\$ (4.73)
Diluted	(6.07)	1.33	1.49	(2.19)	(4.73)
Shipments of alumina (kmt)	9,473	9,259	9,220	9,071	10,755
Shipments of aluminum products (kmt)	2,859	3,268	3,356	3,147	3,227
Average realized price per metric ton of alumina	\$ 343	\$ 455	\$ 340	\$ 253	\$ 311
Average realized price per metric ton of primary aluminum	2,141	2,484	2,224	1,862	2,092
Cash dividends declared per common share ⁽³⁾	\$ —	\$ —	\$ —	\$ —	\$ *
Total assets ⁽¹⁾	14,631	16,132	17,618	16,741	16,413
Total debt	1,800	1,802	1,412	1,445	225
Cash provided from (used for) operations	686	448	1,224	(311)	875
Capital expenditures	(379)	(399)	(405)	(404)	(391)

(1) As of January 1, 2019, the Company changed its method for valuing certain of its inventories held in the United States and Canada to the average cost method of accounting from the Last-in-first-out (LIFO) method. The effects of the change in accounting principle from LIFO to average cost have been retrospectively applied to 2018 and 2017 (see below for 2016 and 2015).

(2) For the year ended December 31, 2015, earnings per share was calculated based on the 182,471,195 shares of Alcoa Corporation common stock distributed on November 1, 2016 in conjunction with the completion of the Separation Transaction and is considered pro forma in nature.

(3) Dividends on common stock are subject to authorization by Alcoa Corporation's Board of Directors. Alcoa Corporation did not declare any dividends in 2019, 2018, 2017, and from November 1, 2016 through December 31, 2016.

* Prior to November 1, 2016, Alcoa Corporation was not a standalone publicly-traded company with issued and outstanding common stock.

Prior to the Separation Date, Alcoa Corporation did not operate as a separate, standalone entity. Alcoa Corporation's operations were included in ParentCo's financial results. Accordingly, for all periods prior to the Separation Date, Alcoa Corporation's Consolidated Financial Statements were prepared from ParentCo's historical accounting records and were presented on a standalone basis as if Alcoa Corporation's operations had been conducted independently from ParentCo. Such Consolidated Financial Statements include the historical operations that were considered to comprise Alcoa Corporation's businesses, as well as certain assets and liabilities that were historically held at ParentCo's corporate level but were specifically identifiable or otherwise attributable to Alcoa Corporation. The change in accounting method from LIFO to average cost has not been retrospectively applied to 2016 and 2015 due to the impracticability as a result of the Separation Transaction.

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 in Part II Item 8 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, average realized prices, and average cost amounts;
dry metric tons in millions (mdmt); metric tons in thousands (kmt))

Overview

Our Business

Alcoa Corporation (Alcoa or the Company) is a vertically integrated aluminum company comprised of bauxite mining, alumina refining, aluminum production (smelting, casting, and rolling), and energy generation. Aluminum is a commodity that is traded on the London Metal Exchange (LME) and priced daily. Additionally, alumina is subject to market pricing through the Alumina Price Index (API), which is calculated by the Company based on the weighted average of a prior month's daily spot prices published by the following three indices: CRU Metallurgical Grade Alumina Price; Platts Metals Daily Alumina PAX Price; and Metal Bulletin Non-Ferrous Metals Alumina Index. As a result, the price of both aluminum and alumina is subject to significant volatility and, therefore, influences the operating results of Alcoa Corporation.

Through direct and indirect ownership, Alcoa Corporation has 30 operating locations in nine countries around the world, situated primarily in Australia, Brazil, Canada, Iceland, Norway, Spain, and the United States. 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.

Business Update

In September 2019, Alcoa Corporation announced the implementation of a new operating model that will result in a leaner, more integrated, operator-centric organization. Effective November 1, 2019, the new operating model eliminates the business unit structure, consolidates sales, procurement and other commercial capabilities at an enterprise level, and streamlines the Executive Team that reports to the Chief Executive Officer. The new structure will reduce overhead with the intention of promoting operational and commercial excellence and increasing connectivity between the Company's operations and leadership. As a result of the new operating model, a charge of \$37 was recorded related to employee termination and severance costs. Annual operating cost savings of approximately \$60 related to the new operating model are expected beginning in the second quarter of 2020.

In October 2019, the Company announced initiatives to drive lower costs and sustainable profitability. Planned initiatives include (i) over the next 12 to 18 months, pursuing non-core asset sales expected to generate an estimated \$500 to \$1,000 in net proceeds in support of its updated strategic priorities and (ii) over the next five years, realigning its operating portfolio. For the portfolio review, the Company has placed 1.5 million metric tons of smelting capacity and 4 million metric tons of alumina refining capacity under review. The review will consider opportunities for significant improvement, potential curtailments, closures, or divestitures.

In December 2019, the Company announced the permanent closure of its alumina refinery in Point Comfort, Texas as its first action of the multi-year portfolio review. The site's 2.3 million metric tons of refining capacity had been fully curtailed since 2016. As a result of the decision to close the refinery, a \$274 charge was recorded to Restructuring and other charges, net (see Note D to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K). Beginning in 2020, the closure is expected to result in annual net income improvement of approximately \$15 (after-tax and noncontrolling interest) and cash savings of approximately \$10 (Alcoa's share) when compared to the ongoing spend for curtailment, exclusive of closure costs.

On December 31, 2019, Alcoa completed the transfer of the Afobaka hydroelectric dam to the Government of the Republic of Suriname, according to definitive agreements approved by its parliament. After curtailment of Alcoa's operations in Suriname in 2015 and permanent closure in early 2017, Alcoa continued to operate the dam, selling electricity to the government for its subsequent sale to customers in Suriname. Alcoa expects an annual net income reduction related to the loss of electricity sales of approximately \$20 (after-tax and noncontrolling interest) based on 2019 results.

In January 2020, the Company announced the sale of Elemental Environmental Solutions LLC (EES), a wholly-owned Alcoa subsidiary that operates the waste processing facility in Gum Springs, Arkansas, to a global environmental firm in a transaction valued at \$250. The transaction closed as of January 31, 2020 whereby the Company received \$200 with another \$50 held in escrow to be paid to Alcoa if certain post-closing conditions are satisfied. As a result of the transaction, the Company expects to recognize a gain of approximately \$175 in the first quarter of 2020 and annual net income improvement of approximately \$10.

Separation Transaction

References to ParentCo refer to Alcoa Inc., a Pennsylvania corporation, and its consolidated subsidiaries through October 31, 2016, at which time was renamed Arconic Inc. (Arconic).

On November 1, 2016 (the Separation Date), ParentCo separated into two standalone, publicly-traded companies, Alcoa Corporation and Arconic, effective at 12:01 a.m. Eastern Time (the Separation Transaction). Regular-way trading of Alcoa Corporation's common stock began with the opening of the New York Stock Exchange on November 1, 2016 under the ticker symbol "AA." The Company's common stock has a par value of \$0.01 per share.

To effect the Separation Transaction, ParentCo undertook a series of transactions to separate the net assets and certain legal entities of ParentCo, resulting in an initial cash payment of \$1,072 to ParentCo by Alcoa Corporation with the net proceeds of a previous debt offering (see Note L to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K). Additionally, \$247 was paid to Arconic by the Company in 2017, including \$243 from the proceeds associated with the sale of certain energy operations (see Note C to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K).

In connection with the Separation Transaction, Alcoa Corporation and Arconic entered into certain agreements to implement the legal and structural separation between the two companies, govern the relationship between the Company and Arconic after the completion of the Separation Transaction, and allocate between Alcoa Corporation and Arconic various assets, liabilities, and obligations. These agreements included a Separation and Distribution Agreement, Tax Matters Agreement, Employee Matters Agreement, Transition Services Agreement, certain Patent, Know-How, Trade Secret License and Trademark License Agreements, and Stockholder and Registration Rights Agreement.

Basis of Presentation. The Consolidated Financial Statements of Alcoa Corporation are prepared in conformity with accounting principles generally accepted in the United States of America (GAAP). In accordance with GAAP, certain situations require management to make estimates based on judgments and assumptions, which 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 periods. 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.

As of January 1, 2019, the Company changed its accounting method for valuing certain inventories from last-in, first-out (LIFO) to average cost. The effects of the change in accounting principle have been retrospectively applied to all prior periods presented.

The discussion that follows includes a comparison of our results of operations and liquidity and capital resources for the fiscal years ended December 31, 2019 and 2018. For a discussion of changes from the fiscal year ended December 31, 2017 to the fiscal year ended December 31, 2018, refer to Management's Discussion and Analysis of Financial Condition and Results of Operation in Part II Item 7 of Alcoa Corporation's Annual Report on Form 10-K for the year ended December 31, 2018 (filed February 26, 2019).

Results of Operations

Earnings Summary

Net loss attributable to Alcoa Corporation for 2019 was \$1,125 compared with net income of \$250 in 2018. The change of \$1,375 was primarily due to lower margin from declining alumina and aluminum prices and higher restructuring costs, partially offset by favorable currency impacts, a lower income tax provision, higher volume, and lower net income attributable to noncontrolling interest.

Sales—Sales for 2019 were \$10,433 compared with \$13,403 in 2018, a change of \$2,970, or 22%. The decrease was largely attributed to a lower average realized price for alumina and primary aluminum, the end of a flat rolled products tolling arrangement in Tennessee, and reduced sales from the divestiture of two aluminum facilities in Spain.

Cost of Goods Sold—Cost of goods sold as a percentage of Sales was 82% in 2019 compared with 75% in 2018. The percentage was negatively impacted by a lower average realized price for both alumina and aluminum products. The unfavorable impacts were partially offset by higher alumina shipments, net favorable foreign currency movements due to a stronger U.S. dollar, primarily against the Australian dollar, the euro, and the Brazilian real, improvements due to the divestiture of two aluminum facilities in Spain, and the partial exemption of tariffs on certain aluminum imports in 2019 (see Aluminum in Segment Information below).

Selling, General Administrative, and Other Expenses—Selling, general administrative, and other expenses were \$280, or 3% of Sales, in 2019 compared with \$248, or 2% of Sales, in 2018. The change of \$32 was primarily related to the unfavorable impact of a bad debt reserve recorded against a Canadian customer receivable due to a 2019 bankruptcy filing.

Provision for Depreciation, Depletion, and Amortization—The provision for DD&A was \$713 in 2019 compared with \$733 in 2018. The decrease of \$20, or 3%, was principally caused by net favorable foreign currency movements, largely due to a stronger U.S. dollar against the Brazilian real, Australian dollar and Canadian dollar and the divestiture of two aluminum facilities in Spain. The favorable changes were partially offset by higher depreciation from the shortened lives of certain residue disposal areas in Brazil as a result of regulatory changes that occurred in 2019.

Restructuring and Other Charges, Net—Restructuring and other charges, net was \$1,031 in 2019 compared with \$527 in 2018. In 2019, management took several actions to strengthen the Company which had a significant impact on Restructuring and other charges, net. These actions include divesting Alcoa's equity investment in Ma'aden Rolling Company, the curtailment and subsequent divestiture of the Avilés and La Coruña (Spain) aluminum facilities, additional actions taken to reduce the overall pension and other postretirement benefit (OPEB) liabilities, announcing a new operating model that will streamline reporting to assist in operational effectiveness, and deciding to permanently close the Point Comfort alumina refinery. The increase in charges from 2018 is mainly attributed to the above factors and is partially offset by lower settlements and curtailments related to retirement benefits and the absence of a charge related to value-added tax credits recorded in 2018. See Note D in Part II Item 8 of this Form 10-K for a detailed description of each restructuring action.

Other Expenses, net—Other expenses, net was \$162 in 2019 compared with \$64 in 2018. The change of \$98 was mostly due to unfavorable changes in foreign currency movements (\$73), an unfavorable change in equity earnings (\$32), primarily related to the joint venture in Saudi Arabia as a result of lower alumina and aluminum prices which were slightly offset by the partial year absence of rolling mill losses, and reduced gains related to mark-to-market derivative instruments. These items were partially offset by lower non-service costs related to pension and other postretirement benefit plans (\$22) primarily due to the actions taken by management to reduce the overall pension and OPEB liabilities.

Income Taxes—Alcoa Corporation's effective tax rate was (94.9)% (provision on loss) in 2019 compared with the U.S. federal statutory rate of 21%. Alcoa's effective tax rate and federal statutory rate for 2018 were 45% (provision on income) and 21%, respectively. The effective tax rate differs from the U.S. federal statutory rate primarily due to losses in countries with full valuation reserves resulting in no tax benefit, as well as foreign income taxed in higher rate jurisdictions. In 2019, the effective tax rate was also impacted by restructuring expenses related to divestitures in foreign jurisdictions that are not deductible for tax purposes.

In addition to reviewing the effective tax rate, management utilizes an adjusted effective tax rate (the operational tax rate) to assess the tax on operations exclusive of special items. Management reviews the operating results of the Company exclusive of special items, and therefore believes that this measure is meaningful for assessing the impact of these special items on the effective tax rate. Management anticipates the operational tax rate in 2020 to be between 70% and 80%. However, business portfolio actions, changes in the current economic environment, tax legislation or rate changes, currency fluctuations, ability to realize deferred tax assets, and the results of operations in certain tax jurisdictions may cause the actual rate to fall outside of the estimated range.

Noncontrolling Interest—Net income attributable to noncontrolling interest was \$272 in 2019 compared with \$643 in 2018. These amounts are entirely related to Alumina Limited's 40% ownership interest in several affiliated operating entities, which own, have an interest in, or operate the bauxite mines and alumina refineries within Alcoa's Bauxite and Alumina segments (except for the Poços de Caldas mine and refinery and portions of the São Luís refinery and investment in Mineração Rio do Norte S.A., all in Brazil) and a portion (55%) of the Portland smelter (Australia) within the Company's Aluminum segment. These individual entities comprise an unincorporated global joint venture between Alcoa Corporation and Alumina Limited known as Alcoa World Alumina and Chemicals (AWAC). Alcoa Corporation owns 60% of these individual entities, which are consolidated by the Company for financial reporting purposes and include Alcoa of Australia Ltd. (AofA), Alcoa World Alumina LLC (AWA), Alcoa World Alumina Brasil Ltda. (AWAB), and Alumina Española, S.A. (Española). Alumina Limited's 40% interest in the earnings of such entities is reflected as Noncontrolling interest on Alcoa Corporation's Statement of Consolidated Operations.

In 2019, these combined entities generated lower net income compared to 2018, primarily driven by lower alumina prices.

Segment Information

Alcoa Corporation is a producer of bauxite, alumina, and aluminum products (primary and flat-rolled). The Company's operations consist of three worldwide reportable segments: Bauxite, Alumina, and Aluminum. Segment performance under Alcoa Corporation's management reporting system is evaluated based on a number of factors; however, the primary measure of performance is the Adjusted EBITDA (Earnings before interest, taxes, depreciation, and amortization) of each segment. The Company calculates Segment Adjusted EBITDA as Total sales (third-party and intersegment) minus the following items: Cost of goods sold; Selling, general administrative, and other expenses; and Research and development expenses. Alcoa Corporation's Adjusted EBITDA may not be comparable to similarly titled measures of other companies.

Segment Adjusted EBITDA totaled \$1,626 in 2019, \$3,250 in 2018, and \$2,739 in 2017. The following information provides production, shipments, sales, and Segment Adjusted EBITDA data for each reportable segment, as well as certain realized

price and average cost data, for each of the three years in the period ended December 31, 2019. See Note E to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for additional information.

Bauxite

	2019	2018	2017
Production (mdmt)	47.4	45.8	45.8
Third-party shipments (mdmt)	6.2	5.7	6.6
Intersegment shipments (mdmt)	41.4	41.2	41.1
Total shipments (mdmt)	47.6	46.9	47.7
Third-party sales	\$ 297	\$ 271	\$ 333
Intersegment sales	979	944	875
Total sales	\$ 1,276	\$ 1,215	\$ 1,208
Segment Adjusted EBITDA	\$ 504	\$ 426	\$ 424
Operating costs	\$ 859	\$ 869	\$ 839
Average cost per dry metric ton of bauxite shipped	\$ 18	\$ 19	\$ 18

Operating costs in the table above includes all production-related costs: conversion costs, such as labor, materials, and utilities; depreciation, depletion, and amortization; and plant administrative expenses.

Overview. This segment represents the Company's global bauxite mining operations. A portion of this segment's production represents the offtake from equity method investments in Brazil and Guinea, as well as AWAC's share of production related to the equity investment in Saudi Arabia. Production in the above table can vary from Total shipments due primarily to differences between the equity allocation of production and off-take agreements with the respective equity investment. The bauxite mined by this segment is sold primarily to internal customers within the Alumina segment; a portion of the bauxite is sold to external customers. Bauxite mined by this segment and used internally is transferred to the Alumina segment at negotiated terms that are intended to approximate market prices; sales to third-parties are conducted on a contract basis. Generally, this segment's sales are transacted in U.S. dollars while costs and expenses are transacted in the local currency of the respective operations, which are the Australian dollar and the Brazilian real. Most of the operations that comprise the Bauxite segment are part of AWAC (see Noncontrolling Interest in Earnings Summary above).

Business Update. The Bauxite segment had record annual production in 2019 which included annual production records for the Willowdale, Huntly, and Juruti mines. The record annual production contributed to the record annual Adjusted EBITDA for the segment.

Additionally, in November 2019, employees in Western Australian eligible for coverage by the Australian Workers Union (AWU) enterprise agreement (EA) voted in support of the agreement proposed by the Company and representatives of the AWU in October 2019. The agreement has been ratified by the Fair Works Counsel and is in effect for approximately 1,500 employees across the Bauxite and Alumina segments combined.

Mining operations are relocated periodically in support of optimizing the value extracted from bauxite reserves. During 2019, the Company began the process of moving the Willowdale mining operations to the next planned location in the Darling range, and began preparing for movement of the Juruti mining operations which is expected to start in 2020. As a result of these movements, additional capital expenditures are anticipated for 2020 compared with 2019.

Production. In 2019, bauxite production increased 3% compared with 2018, from higher production at five of the segment's seven mines.

Sales. Third-party sales for the Bauxite segment increased 10% in 2019 compared with 2018, primarily attributed to a 9% increase in third-party shipments.

Intersegment sales for the Bauxite segment increased 4% in 2019 compared with 2018 which was primarily driven by a higher average realized price.

Segment Adjusted EBITDA. Bauxite Segment Adjusted EBITDA improved \$78 in 2019 compared with 2018, principally as a result of the previously mentioned higher average realized price for intersegment sales and net favorable foreign currency movements due to a stronger U.S. dollar against the Australian dollar and Brazilian real.

Forward-Look. In 2020, lower intersegment and third-party prices are anticipated in addition to higher capital expenditures as a result of the previously mentioned Willowdale and Juruti mining location moves.

Alumina

	2019	2018	2017
Production (kmt)	13,302	12,857	13,096
Third-party shipments (kmt)	9,473	9,259	9,220
Intersegment shipments (kmt)	4,072	4,326	4,475
Total shipments (kmt)	13,545	13,585	13,695
Third-party sales	\$ 3,250	\$ 4,215	\$ 3,133
Intersegment sales	1,561	2,101	1,723
Total sales	\$ 4,811	\$ 6,316	\$ 4,856
Segment Adjusted EBITDA	\$ 1,097	\$ 2,373	\$ 1,289
Average realized third-party price per metric ton of alumina	\$ 343	\$ 455	\$ 340
Operating costs	\$ 3,646	\$ 3,892	\$ 3,506
Average cost per metric ton of alumina shipped	\$ 269	\$ 286	\$ 256

In the above table, total shipments include metric tons that were not produced by the Alumina segment. Such alumina was purchased to satisfy certain customer commitments. The Alumina segment bears the risk of loss of the purchased alumina until control of the product has been transferred to this segment's customer. Additionally, operating costs in the table above includes all production-related costs: raw materials consumed; conversion costs, such as labor, materials, and utilities; depreciation and amortization; and plant administrative expenses.

Overview. This segment represents the Company's worldwide refining system, which processes bauxite into alumina. The alumina produced by this segment is sold primarily to internal and external aluminum smelter customers; a portion of the alumina is sold to external customers who process it into industrial chemical products. Approximately two-thirds of Alumina's production is sold under supply contracts to third parties worldwide, while the remainder is used internally by the Aluminum segment. Alumina produced by this segment and used internally is transferred to the Aluminum segment at prevailing market prices. A portion of this segment's third-party sales are completed through the use of alumina traders. Generally, this segment's sales are transacted in U.S. dollars while costs and expenses are transacted in the local currency of the respective operations, which are the Australian dollar, the Brazilian real, the U.S. dollar, and the euro. Most of the operations that comprise the Alumina segment are part of AWAC (see Noncontrolling Interest in Earnings Summary above). This segment also includes AWAC's 25.1% ownership interest in the mining and refining joint venture company in Saudi Arabia.

Business Update. The Alumina segment had record annual production in 2019 which included annual production records for the Wagerup, Pinjarra, and San Ciprián alumina refineries. In November 2019, employees in Western Australian eligible for coverage by the AWU EA voted in support of the agreement proposed by the Company and representatives of the AWU in October 2019. The agreement has been ratified by the Fair Works Counsel and is in effect for approximately 1,500 employees across the Bauxite and Alumina segments combined. Additionally, in December 2019, the Company announced the closure of the Point Comfort alumina refinery which had been fully curtailed since 2016.

During 2019, the average API (on 30-day lag) continued to decrease, while the Alumina segment improved stability across the refining system and realized the benefit of declining prices for caustic soda.

Capacity. At December 31, 2019, the Alumina segment had a base capacity of 12,759 kmt with 214 kmt of curtailed refining capacity, both of which were down from 2018 due to the announcement of the permanent closure of the previously curtailed Point Comfort alumina refinery. There were no other changes to curtailed or base capacity during 2019.

Production. In 2019, alumina production increased by 445 kmt compared to 2018, principally due to stabilization of operations across the refining system.

Sales. Third-party sales for the Alumina segment decreased 23% in 2019 compared with 2018, primarily attributable to a decline in average realized price which was principally driven by a lower average API (on 30-day lag).

Intersegment sales for the Alumina segment decreased 26% in 2019 compared with 2018 which was primarily driven by a lower average realized price.

Segment Adjusted EBITDA. Alumina Segment Adjusted EBITDA decreased \$1,276 in 2019 compared with 2018, largely attributed to the previously mentioned lower average realized prices, higher costs for bauxite and energy, and increased maintenance expenses. These negative impacts were partially offset by net favorable foreign currency movements due to a stronger U.S. dollar, particularly against the Australian dollar and Brazilian real, and lower costs for caustic soda.

Forward-Look. In 2020, higher natural gas costs in Australia are expected to be more than offset by lower costs for both bauxite and caustic soda. Additionally, approximately 10% of the Alumina segment's intercompany shipments will move to an API based price from a percentage of LME price.

Aluminum

Total Aluminum information	2019		2018		2017	
Third-party aluminum shipments (kmt)		2,859		3,268		3,356
Third-party sales	\$	6,803	\$	8,829	\$	8,027
Intersegment sales		17		18		21
Total sales	\$	6,820	\$	8,847	\$	8,048
Segment Adjusted EBITDA	\$	25	\$	451	\$	1,026

Primary aluminum information	2019		2018		2017	
Production (kmt)		2,135		2,259		2,328
Third-party shipments (kmt)		2,535		2,732		2,773
Third-party sales	\$	5,426	\$	6,787	\$	6,168
Average realized third-party price per metric ton	\$	2,141	\$	2,484	\$	2,224
Total shipments (kmt)		2,597		2,844		2,952
Operating costs	\$	5,847	\$	6,974	\$	5,868
Average cost per metric ton of primary aluminum shipped	\$	2,251	\$	2,452	\$	1,988

In the above table, total aluminum third-party shipments and total primary aluminum shipments include metric tons that were not produced by the Aluminum segment. Such aluminum was purchased by this segment to satisfy certain customer commitments. The Aluminum segment bears the risk of loss of the purchased aluminum until control of the product has been transferred to this segment's customer. Total aluminum information includes flat-rolled aluminum while Primary aluminum information does not. Operating costs includes all production-related costs: raw materials consumed; conversion costs, such as labor, materials, and utilities; depreciation and amortization; and plant administrative expenses.

The average realized third-party price per metric ton of primary aluminum includes three elements: a) the underlying base metal component, based on quoted prices from the LME; b) the regional premium, which represents the incremental price over the base LME component that is associated with the physical delivery of metal to a particular region (e.g., the Midwest premium for metal sold in the United States); and c) the product premium, which represents the incremental price for receiving physical metal in a particular shape (e.g., billet, slab, rod, etc.) or alloy.

Overview. This segment consists of the Company's (i) worldwide smelting and casthouse system, which processes alumina into primary aluminum, (ii) portfolio of energy assets in Brazil, Canada, and the United States, and (iii) a rolling mill in the United States.

Aluminum's combined smelting and casting operations produce primary aluminum products, virtually all of which are sold to external customers and traders; a portion of this primary aluminum is consumed by the rolling mill. The smelting operations produce molten primary aluminum, which is then formed by the casting operations into either common alloy ingot (e.g., t-bar, sow, standard ingot) or into value-add ingot products (e.g., foundry, billet, rod, and slab). A variety of external customers purchase the primary aluminum products for use in fabrication operations, which produce products primarily for the transportation, building and construction, packaging, wire, and other industrial markets. Results from the sale of aluminum powder and scrap are also included in this segment, as well as the impacts of embedded aluminum derivatives related to energy supply contracts.

The energy assets supply power to external customers in Brazil and, to a lesser extent, in the United States, as well as internal customers in the Aluminum (Canadian smelters and Warrick (Indiana) smelter and rolling mill) and Alumina segments (Brazilian refineries).

The rolling mill produces aluminum sheet primarily sold directly to customers in the packaging market for the production of aluminum cans (beverage and food). Additionally, from the Separation Date through the end of 2018, Alcoa Corporation had a tolling arrangement (contractually ended on December 31, 2018) with Arconic whereby Arconic's rolling mill in Tennessee produced can sheet products for certain customers of the Company's rolling operations. Alcoa supplied all of the raw materials to the Tennessee facility and paid Arconic for the tolling service. Seasonal increases in can sheet sales are generally experienced in the second and third quarters of the calendar year.

Generally, this segment's aluminum sales are transacted in U.S. dollars while costs and expenses of this segment are transacted in the local currency of the respective operations, which are the U.S. dollar, the euro, the Norwegian krone, the Icelandic króna, the Canadian dollar, the Brazilian real, and the Australian dollar.

This segment also includes Alcoa Corporation's 25.1% ownership interest in both the smelting and rolling mill joint venture company in Saudi Arabia (the rolling mill was divested in June 2019).

Business Update. During 2019, significant labor agreements in the United States and Canada were modernized and extended for up to six years. As a result of a more competitive and long-term labor agreement, the process to restart the Bécancour (Canada) smelter began in July 2019. Previously, in January 2018, a lockout of the bargained hourly employees commenced at the Bécancour smelter, as labor negotiations reached an impasse. Accordingly, management initiated a curtailment of two of the three potlines at the smelter. Additionally, in December 2018, half of the one operating potline at the Bécancour smelter was curtailed. This additional curtailment was deemed necessary to ensure continued safety and maintenance due to recent retirements and departures among the salaried workforce.

In May 2019, Canada and Mexico received an exemption from tariffs that had been imposed on aluminum produced and imported from those countries under Section 232 of the Trade Expansion Act of 1962. These tariffs were originally enacted in March 2018.

In June 2019, Alcoa and Saudi Arabian Mining Company (known as Ma'aden) amended the joint venture agreement that governs the operations of each of the three companies that comprise the joint venture. The amendment, among other items, transferred Alcoa's 25.1% interest in the rolling mill to Ma'aden and, as a result, Alcoa has no further direct or indirect equity interest in Ma'aden Rolling Company. See Note C to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for additional information.

In February 2019, Alcoa curtailed the smelters at Avilés and La Coruña (Spain) after reaching an agreement with the workers' representatives on a collective dismissal process. In July 2019, Alcoa divested the Company's interest in the Avilés and La Coruña aluminum facilities to PARTER Capital Group AG. See Note C to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Capacity. At December 31, 2019, the Aluminum segment had 766 kmt of idle smelting capacity on a base capacity of 2,993 kmt. In 2019, idle capacity decreased 150 kmt and base capacity decreased 180 kmt compared with December 31, 2018 due to the curtailment (February 2019) and subsequent divestiture (July 2019) of the Avilés and La Coruña facilities and the restart of 94 kmt at the Bécancour (Canada) smelter due to the aforementioned new labor agreement.

Production. In 2019, primary aluminum production decreased by 124 kmt compared with 2018, primarily due to lower production at the Bécancour smelter as a result of the previously mentioned curtailment and the curtailment and subsequent divestiture of the Avilés and La Coruña facilities, partially offset by a full year of restarted production at the Warrick smelter.

Sales. Third-party sales for the Aluminum segment decreased 23% in 2019 compared with 2018, primarily attributed to a reduction in metal price, a decrease in flat-rolled aluminum shipments due to the end of tolling arrangement with Arconic in December 2018, and decreased primary aluminum shipments, mainly resulting from the curtailment and subsequent divestiture of the Avilés and La Coruña facilities and decreased production from the Bécancour (Canada) smelter resulting from the previously mentioned curtailments. The reduction in metal price was mainly driven by a 15% lower average LME price (on 15-day lag) combined with a decrease in the Midwest regional premium of 5%.

Segment Adjusted EBITDA. Aluminum Segment Adjusted EBITDA decreased \$426 in 2019 compared with 2018. The decrease was mainly attributable to lower metal prices, unfavorable energy pricing, higher labor costs, and the establishment of a bad debt reserve against a Canadian customer receivable. These unfavorable impacts were partially offset by lower alumina and carbon costs, favorable foreign currency impacts due to a stronger U.S. dollar, primarily against the euro, Norwegian kroner, and Icelandic króna, and the partial exemption of the Section 232 tariffs in the United States.

Forward-Look. In 2020, benefits from the Bécancour (Canada) smelter restart and lower raw material costs are expected to offset the volatility in energy exposures not covered by long term contracts. Additionally, the segment will experience the impact of approximately 10% of the intercompany alumina receipts moving to an API based price from a percentage of LME price.

Reconciliations of Certain Segment Information

Reconciliation of Total Segment Third-Party Sales to Consolidated Sales

	2019	2018	2017
Bauxite	\$ 297	\$ 271	\$ 333
Alumina	3,250	4,215	3,133
Aluminum:			
Primary aluminum	5,426	6,787	6,168
Other(1)	1,377	2,042	1,859
Total segment third-party sales	10,350	13,315	11,493
Other	83	88	159
Consolidated sales	\$ 10,433	\$ 13,403	\$ 11,652

- (1) Other includes third-party sales of flat-rolled aluminum and energy, as well as realized gains and losses related to embedded derivative instruments designated as cash flow hedges of forward sales of aluminum.

Reconciliation of Total Segment Operating Costs to Consolidated Cost of Goods Sold

	2019	2018	2017
Bauxite	\$ 859	\$ 869	\$ 839
Alumina	3,646	3,892	3,506
Primary aluminum	5,847	6,974	5,868
Other(1)	1,404	1,915	1,687
Total segment operating costs	11,756	13,650	11,900
Eliminations(2)	(2,707)	(3,055)	(2,539)
Provision for depreciation, depletion, amortization(3)	(676)	(699)	(704)
Other(4)	164	157	293
Consolidated cost of goods sold	\$ 8,537	\$ 10,053	\$ 8,950

- (1) Other largely relates to the Aluminum segment's flat-rolled aluminum product division.
- (2) This line item represents the elimination of cost of goods sold related to intersegment sales between Bauxite and Alumina and between Alumina and Aluminum.
- (3) Depreciation, depletion, and amortization is included in the operating costs used to calculate average cost for each of the bauxite, alumina, and primary aluminum product divisions (see Bauxite, Alumina, and Aluminum above). However, for financial reporting purposes, depreciation, depletion, and amortization is presented as a separate line item on Alcoa Corporation's Statement of Consolidated Operations.
- (4) Other includes costs related to Transformation, and certain other items that impact Cost of goods sold on Alcoa Corporation's Statement of Consolidated Operations that are not included in the operating costs of the segments (see footnotes 2 and 5 in the Reconciliation of Total Segment Adjusted EBITDA to Consolidated Net (Loss) Income Attributable to Alcoa Corporation below).

Reconciliation of Total Segment Adjusted EBITDA to Consolidated Net (Loss) Income Attributable to Alcoa Corporation

	2019	2018	2017
Net (loss) income attributable to Alcoa Corporation:			
Total segment Adjusted EBITDA ⁽¹⁾	\$ 1,626	\$ 3,250	\$ 2,739
Unallocated amounts:			
Transformation ⁽²⁾	(7)	(3)	(49)
Intersegment eliminations ^{(1),(3)}	150	(8)	(80)
Corporate expenses ⁽⁴⁾	(101)	(96)	(131)
Provision for depreciation, depletion, and amortization	(713)	(733)	(750)
Restructuring and other charges, net	(1,031)	(527)	(309)
Interest expense	(121)	(122)	(104)
Other expenses, net	(162)	(64)	(27)
Other ⁽⁵⁾	(79)	(72)	(89)
Consolidated income (loss) before income taxes	(438)	1,625	1,200
Provision for income taxes	(415)	(732)	(592)
Net income attributable to noncontrolling interest	(272)	(643)	(329)
Consolidated net (loss) income attributable to Alcoa Corporation	\$ (1,125)	\$ 250	\$ 279

- (1) As of January 1, 2019, the Company changed its accounting method for valuing certain inventories from LIFO to average cost. The effects of the change in accounting principle have been retrospectively applied to all prior periods presented. As a result, for the years ended December 31, 2018 and 2017, Total segment Adjusted EBITDA increased \$47 and \$14, respectively, and the Intersegment eliminations value above decreased \$19 and increased \$27, respectively.
- (2) Transformation includes, among other items, the Adjusted EBITDA of previously closed operations.
- (3) Concurrent with the change in inventory accounting method as of January 1, 2019, management elected to change the presentation of certain line items in the reconciliation of total Segment Adjusted EBITDA to Consolidated net (loss) income attributable to Alcoa Corporation. Corporate inventory accounting previously included the impact of LIFO, metal price lag, and intersegment eliminations. The impact of LIFO has been eliminated with the change in inventory method. Metal price lag attributable to the Company's rolled operations business is now netted within the Aluminum segment to simplify presentation of an impact that nets to zero in consolidation. Only intersegment eliminations remain as a reconciling line item and are labeled as such.
- (4) Corporate expenses are composed of general administrative and other expenses of operating the corporate headquarters and other global administrative facilities, as well as research and development expenses of the corporate technical center.
- (5) Other includes certain items that impact Cost of goods sold and Selling, general administrative, and other expenses on Alcoa Corporation's Statement of Consolidated Operations that are not included in the Adjusted EBITDA of the reportable segments.

Environmental Matters

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

Liquidity and Capital Resources

Alcoa Corporation's primary future cash flows are centered on operating activities, particularly working capital, as well as sustaining and return-seeking capital expenditures. Alcoa's ability to fund its cash needs depends on the Company's ongoing ability to generate and raise cash in the future. Although management believes that Alcoa's future cash from operations, together with the Company's access to capital markets, will provide adequate resources to fund operating and investing needs, the Company's access to, and the availability of, financing on acceptable terms in the future will be affected by many factors, including: (i) Alcoa Corporation's credit rating; (ii) the liquidity of the overall capital markets; and (iii) the current state of the economy and commodity markets. There can be no assurances that the Company will continue to have access to capital markets on terms acceptable to Alcoa Corporation.

Cash provided from operations and financing activities is expected to be adequate to cover Alcoa'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, 2019, the Company's cash and cash equivalents were \$879, of which \$755 was held outside the United States. Alcoa Corporation has a number of commitments and obligations related to the Company's operations in various foreign jurisdictions, resulting in the need for cash outside the United States. Alcoa Corporation continuously evaluates its local and global cash needs for future business operations, which may influence future repatriation decisions.

Cash from Operations

Cash provided from operations was \$686 in 2019 compared with cash provided from operations of \$448 in 2018. Notable changes to the sources and (uses) of cash for 2019 include:

- \$781 improvement in certain working capital accounts (receivables, inventories, and accounts payable, trade);
- \$819 from lower pension contributions, including the absence of \$725 in unscheduled, discretionary payments made in 2018 which were primarily funded with a combination of net proceeds from the May 2018 debt issuance and cash on hand;
- \$108 related to lower current value-added tax receivables at foreign locations;
- \$74 resulting from the non-recurrence of a payment made in 2018 related to a legacy legal matter with the U.S. government assumed by the Company in the Separation Transaction;
- \$62 resulting from the non-recurrence of a payment made in 2018 related to the energy supply agreement for the Wenatchee (Washington) smelter;
- \$18 resulting from the non-recurrence of a payment made in 2018 for the settlement of a legal matter in Italy; and,
- (\$571) relating to changes in taxes, including income taxes. The use of cash includes changes related to higher tax payments made in 2019 compared with 2018, primarily payments of income taxes, and changes in the underlying tax accounts.

Financing Activities

Cash used for financing activities was \$444 in 2019 compared with cash used for financing activities of \$288 in 2018. The increased use of cash was primarily attributed to the non-recurrence of cash sources of \$560 due to the 2018 issuance of debt, \$21 of lower proceeds from the exercise of employee stock options, and \$12 of financial contributions paid to PARTER as part of the Avilés and La Coruña divestiture. These unfavorable changes were partially offset by \$257 lower net cash paid to Alumina Limited, \$128 for lower payments on debt, and \$50 from the non-recurrence of common stock repurchases made in 2018.

Credit Facilities. Alcoa Corporation has access to various sources of liquidity outside of cash generated through operations. Included in these sources is the Second Amended Revolving Credit Facility (the Revolving Credit Facility) entered into by Alcoa Corporation and Alcoa Nederland Holding B.V. (ANHBV), a revolving credit facility entered into during October 2019 by Alcoa Norway ANS, and a three-year revolving credit facility agreement, also entered into during October 2019, secured by certain customer receivables.

The Revolving Credit Facility provides a \$1,500 senior secured revolving credit facility to be used for working capital and/or other general corporate purposes of Alcoa Corporation and its subsidiaries. The Revolving Credit Agreement includes a number of covenants, including financial covenants, that require maintenance of a specified interest expense coverage ratio and a leverage ratio. The leverage ratio compares total indebtedness to a calculated earnings metric as defined in the credit facility agreement to determine compliance with the financial covenant. The calculation also determines the maximum indebtedness the Company can have based on the defined earnings metric. Based on the leverage ratio calculation as of December 31, 2019, the maximum additional borrowing capacity available to the Company to remain in compliance with the covenant was \$1,200; the lower capacity primarily resulting from the impact of the restructuring-related charges recorded in 2019 on the earnings metric calculation. However, the Company still has the ability to access the full \$1,500 credit facility through a combination of the maximum additional borrowing capacity and the issuances of letters of credit at December 31, 2019. The Company believes that its cash on hand, future operating cash flows, and borrowing capacity at December 31, 2019 is adequate to fund its operating and investing needs. As of December 31, 2019 and 2018, Alcoa was in compliance with all covenants.

The Revolving Credit Facility is scheduled to mature on November 21, 2023 unless extended or earlier terminated in accordance with the provisions of the Second Amended Revolving Credit Agreement. ANHBV may make extension requests during the term of the Revolving Credit Facility, subject to the lender consent requirements set forth in the Second Amended Revolving Credit Agreement.

On October 2, 2019, Alcoa Norway ANS, a wholly-owned subsidiary of Alcoa Corporation, entered into a one-year, multicurrency revolving credit facility agreement for NOK 1.3 billion (approximately \$147) which is guaranteed on an unsecured basis by Alcoa Corporation. This revolving credit facility is scheduled to mature on October 2, 2020, unless extended or terminated early in accordance with the provisions of the agreement.

On October 25, 2019, a wholly-owned subsidiary of the Company entered into a \$120 three-year revolving credit facility agreement secured by certain customer receivables. Alcoa Corporation guarantees the performance obligations of the wholly-owned subsidiaries under the facility, however no assets (other than the receivables) are pledged as collateral.

As of December 31, 2019, Alcoa's combined additional borrowing capacity of \$1,200 can be drawn through any combination of Alcoa's credit facilities. No amounts were borrowed relating to these facilities during 2019. See Note L to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for additional information related to these credit facilities.

Debt. As of December 31, 2019, Alcoa Corporation has three outstanding Notes maturing at varying times. A summary of the Notes and other debt is shown below. See Note L to the Consolidated Financial Statement in Part II Item 8 of this Form 10-K for additional information related to the Company's debt.

December 31,	2019		2018	
6.75% Notes, due 2024	\$	750	\$	750
7.00% Notes, due 2026		500		500
6.125% Notes, due 2028		500		500
Other		84		91
Unamortized discounts and deferred financing costs		(34)		(39)
Total		1,800		1,802
Less: amount due within one year		1		1
Long-term debt, less amount due within one year	\$	1,799	\$	1,801

Ratings. Alcoa Corporation's cost 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 Alcoa Corporation's debt by the major credit rating agencies.

On May 1, 2019, Fitch Ratings (Fitch) reaffirmed a BB+ rating for Alcoa Corporation's long-term debt. Additionally, Fitch revised the current outlook to stable from positive.

Common Stock Repurchase Program. In October 2018, Alcoa Corporation's Board of Directors authorized a common stock repurchase program with an aggregate transactional value of \$200, depending on cash availability, market conditions, and other factors. This program does not have a predetermined expiration date. Alcoa Corporation intends to retire the repurchased shares of common stock. In December 2018, the Company repurchased 1,723,800 shares of its common stock for \$50; these shares were immediately retired. No amounts were repurchased during 2019.

Investing Activities

Cash used for investing activities was \$468 in 2019 compared with \$405 in 2018. The increase in use of cash for 2019 was largely attributed to the cash expenditures related to the divestiture of Alcoa's investment in Ma'aden Rolling Company, partially offset by proceeds from the sale of excess land and lower capital expenditures.

In 2020, Alcoa expects capital expenditures to be approximately \$400 related to sustaining capital projects and approximately \$75 related to growth projects. The timing and amount of capital expenditures may fluctuate as a result of the Company's normal operations.

Contractual Obligations and Off-Balance Sheet Arrangements

Contractual Obligations. Alcoa Corporation is required to make future payments under various contracts, including long-term purchase obligations and financing arrangements. The Company also has commitments to fund its pension plans and provide payments for other postretirement benefit plans. As of December 31, 2019, a summary of Alcoa Corporation's outstanding contractual obligations is as follows:

	Total	2020	2021-2022	2023-2024	Thereafter
Operating activities:					
Energy-related purchase obligations	\$ 15,496	\$ 1,037	\$ 2,460	\$ 2,412	\$ 9,587
Raw material purchase obligations	5,620	1,016	918	627	3,059
Other purchase obligations	744	223	197	114	210
Estimated minimum required pension funding	1,205	295	510	400	—
Other postretirement benefit payments	705	105	185	160	255
Interest related to total debt	763	118	235	233	177
Operating leases	185	67	72	18	28
Layoff and other restructuring payments	137	124	13	—	—
Deferred revenue arrangements	60	8	16	16	20
Uncertain tax positions	43	—	—	—	43
Financing activities:					
Total debt	1,833	1	80	752	1,000
Investing activities:					
Equity contributions	16	11	5	—	—
Totals	\$ 26,807	\$ 3,005	\$ 4,691	\$ 4,732	\$ 14,379

Obligations for Operating Activities

Energy-related purchase obligations consist primarily of electricity and natural gas contracts with expiration dates ranging from 1 year to 28 years. Raw material obligations consist mostly of bauxite (relates to AWAC's bauxite mine interests in Guinea and Brazil), caustic soda, alumina, aluminum fluoride, calcined petroleum coke, and cathode blocks with expiration dates ranging from less than 1 year to 15 years. Other purchase obligations consist principally of freight for bauxite and alumina with expiration dates ranging from 1 to 13 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. In accordance with the terms of several of these supply contracts, obligations may be reduced as a result of an interruption to operations, such as a plant curtailment or a force majeure event.

Interest related to total debt is based on interest rates in effect as of December 31, 2019 and is calculated on debt with maturities that extend to 2028. Some of the contractual interest rates for certain debt are variable; actual cash payments may differ from the estimates provided in the preceding table.

Estimated minimum required pension funding and other postretirement benefit payments are based on actuarial estimates using current assumptions for, among others, discount rates, long-term rate of return on plan assets, rate of compensation increases, and/or health care cost trend rates. Actual payments may differ based on changes in assumptions. Other postretirement benefit payments will be slightly offset by subsidy receipts related to Medicare Part D, which are estimated to approximate \$5 to \$10 annually for years 2020 through 2029. Alcoa Corporation has determined that it is not practicable to present pension funding and other postretirement benefit payments beyond 2024 and 2029, respectively.

Layoff and other restructuring payments expected to be paid within one year relate to financial contributions that resulted from the share purchase agreement with PARTER from the divestiture of two Spanish aluminum facilities, take-or-pay provisions of supply contracts associated with curtailed facilities, a contractual commitment to an Italian government agency related to the transfer of the Portovesme smelter, severance costs, and the termination of an office lease contract. Amounts scheduled to be paid beyond one year largely relate to the previously mentioned financial contributions to PARTER.

Deferred revenue arrangements require Alcoa Corporation to deliver alumina to a certain customer over the specified contract period (through 2027). While this obligation is not expected to result in cash payments, it is included in the preceding table as the Company would have such an obligation 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, 2019. 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

Total debt amounts in the preceding table represent the principal amounts of all outstanding long-term debt, which have maturities that extend to 2028.

In October 2018, Alcoa Corporation's Board of Directors authorized a common stock repurchase program under which the Company may purchase shares of its outstanding common stock up to an aggregate transactional value of \$200, depending on various factors. The program does not have a predetermined expiration date. Accordingly, amounts have not been included in the preceding table. In December 2018, the Company repurchased 1,723,800 shares of its common stock for \$50 at a weighted average share price of \$29.01 (includes \$0.02 broker commission). No shares were repurchased in 2019.

Obligations for Investing Activities

Equity contributions are related to the joint venture, Elysis™ Limited Partnership (Elysis™). This joint venture requires Alcoa Corporation to invest a total of \$21 (C\$28) through 2021. In 2018, the Company contributed \$5 (C\$6) toward its initial investment commitment in Elysis™.

Off-Balance Sheet Arrangements. Alcoa Corporation has outstanding bank guarantees and letters of credit related to, among others, energy contracts, environmental obligations, legal and tax matters, outstanding debt, leasing obligations, workers compensation, and customs duties. Alcoa Corporation also has outstanding surety bonds primarily related to tax matters, contract performance, workers compensation, environmental-related matters, and customs duties. See Note R to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K for additional information.

Critical Accounting Policies and Estimates

The preparation of the Company's Consolidated Financial Statements in accordance with accounting principles generally accepted in the United States of America requires management to make certain estimates based on judgments and assumptions regarding uncertainties that affect the amounts reported in the Consolidated Financial Statements and disclosed in the Notes to the Consolidated Financial Statements. Areas that require such estimates include the review of properties, plants, and equipment and goodwill for impairment, and accounting for each of the following: asset retirement obligations; environmental and litigation matters; pension plans and other postretirement benefits obligations; derivatives and hedging activities; and income taxes.

Management uses historical experience and all available information to make these estimates, 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 the amounts recorded in the financial statements related to these items are based on the best estimates and judgments using all relevant information available at the time.

A summary of the Company's significant accounting policies is included in Note B to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Properties, Plants, and Equipment. 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 fair value. 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 assets also require significant judgments.

Goodwill. Goodwill is not amortized; it is instead 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 exit a business. Management will test goodwill on a qualitative or quantitative basis. A significant amount of judgment is involved in determining if an indicator of impairment has occurred. Such indicators may include, among others, 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. The fair value that could be realized in an actual transaction may differ from that used to evaluate goodwill for impairment.

In reviewing goodwill for impairment under the qualitative assessment, an entity will consider if 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 it is determined that an impairment is more likely than not, the entity is then required to perform a quantitative impairment test, otherwise no further analysis is required.

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. Management uses a DCF model to estimate the current fair value of its reporting units. A number of significant assumptions and estimates are involved in the application of the DCF model to forecast operating cash flows, including markets and market share, sales volumes and prices, production costs, tax rates, capital spending, discount rate, and working capital changes.

In the event the estimated fair value of a reporting unit per the DCF model is less than the carrying value, an impairment loss equal to the excess of the reporting unit's carrying value over its fair value not to exceed the total amount of goodwill applicable to that reporting unit would be recognized.

Management performed a quantitative assessment of the Alumina reporting unit in 2019. The estimated fair value of the Alumina reporting unit was substantially in excess of its carrying value, resulting in no impairment. Management performed a qualitative assessment of the Bauxite reporting unit in 2019 and determined that it was not more likely that the fair value of the reporting unit was less than its carrying value. Management last performed a quantitative impairment test for the Bauxite reporting unit in 2018. At that time, the estimated fair value of the Bauxite reporting unit was substantially in excess of its carrying value, resulting in no impairment. Additionally, in all prior years presented, there have been no triggering events that necessitated an impairment test for either the Bauxite or Alumina reporting units.

Asset Retirement Obligations. Alcoa Corporation recognizes asset retirement obligations (AROs) related to legal obligations associated with the standard operation of bauxite mines, alumina refineries, and aluminum smelters. These AROs consist primarily of costs associated with mine reclamation, closure of bauxite residue areas, spent pot lining disposal, and landfill closure. Alcoa Corporation also recognizes AROs for any significant lease restoration obligation, if required by a lease agreement, and for the disposal of regulated waste materials related to the demolition of certain power facilities. The fair values of these AROs are recorded on a discounted basis, at the time the obligation is incurred, and accreted over time for the change in present value. Additionally, Alcoa Corporation capitalizes asset retirement costs by increasing the carrying amount of the related long-lived assets and depreciating these assets over their remaining useful life.

Certain conditional asset retirement obligations (CAROs) related to alumina refineries, aluminum smelters, rolling mills, and energy generation facilities have not been recorded in the Consolidated Financial Statements due to uncertainties surrounding the ultimate settlement date. A CARO is a legal obligation to perform an asset retirement activity in which the timing and/or method of settlement are conditional on a future event that may or may not be within Alcoa Corporation's control. Such uncertainties exist as a result of the perpetual nature of the structures, maintenance and upgrade programs, and other factors. At the date a reasonable estimate of the ultimate settlement date can be made (e.g., planned demolition), Alcoa Corporation would record an ARO. Such amounts may be material to the Consolidated Financial Statements.

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, which are recognized as agreements are reached with third parties. The estimates also include costs related to other potentially responsible parties to the extent that Alcoa Corporation 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, among others, 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. 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.

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 yield curve model used to develop the discount rate parallels the plans' projected cash flows and has a weighted average duration of 11 years. The underlying cash flows of the high quality corporate bonds included in the model exceed the cash flows needed to satisfy the Company's plan obligations multiple times. If a deep market of high quality corporate bonds does not exist in a country, then the yield on government bonds plus a corporate bond yield spread is used. The impact on the combined pension and other postretirement liabilities of a change in the weighted average discount rate of $\frac{1}{4}$ of 1% would be approximately \$175 and either a charge or credit of approximately \$1 to pretax earnings in the following 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 four-year average or the 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 forward-looking investment returns by asset class. Management incorporates expected future investment returns on current and planned asset allocations using information from various external investment managers and consultants, as well as management's own judgment. A change in the assumption for the weighted average expected long-term rate of return on plan assets of $\frac{1}{4}$ of 1% would impact pretax earnings by approximately \$15 for 2020.

Mortality rate assumptions are based on mortality tables and future improvement scales published by third parties, such as the Society of Actuaries, and consider other available information including historical data as well as studies and publications from reputable sources.

Derivatives and Hedging. Derivatives are held for purposes other than trading and are part of a formally documented risk management program. Alcoa accounts for hedges of firm customer commitments for aluminum as fair value hedges. The fair values of the derivatives and changes in the fair values of the underlying hedged items are reported as assets and liabilities in the Consolidated Balance Sheet. Changes in the fair values of these derivatives and underlying hedged items generally offset and are recorded each period in Sales, consistent with the underlying hedged item.

The Company accounts for hedges of foreign currency exposures and certain forecasted transactions as cash flow hedges. The fair values of the derivatives are recorded as assets and liabilities in the Consolidated Balance Sheet. The changes in the fair values of these derivatives are recorded in Other comprehensive (loss) income and are reclassified to Sales, Cost of goods sold, or Other expenses, net in the period in which earnings are impacted by the hedged items or in the period that the transaction no longer qualifies as a cash flow hedge. These contracts cover the same periods as known or expected exposures, generally not exceeding five years. If no hedging relationship is designated, the derivative is marked to market through Other expenses, net. Cash flows from derivatives are recognized in the Statement of Consolidated Cash Flows in a manner consistent with the underlying transactions.

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 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 (greater than 50%) that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management applies judgment in assessing all available positive and negative evidence and 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. 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 Alcoa Corporation'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. In certain jurisdictions, deferred tax assets related to cumulative losses exist without a valuation allowance where in management's judgment the weight of the positive evidence more than offsets the negative evidence of the cumulative losses. Upon changes in facts and circumstances, management may conclude that deferred tax assets for which no valuation allowance is currently recorded may not be realized, 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.

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.

Related Party Transactions

Alcoa Corporation buys products from and sells products to various related companies, consisting of entities in which Alcoa Corporation retains a 50% or less equity interest, at negotiated prices between the two parties. These transactions were not material to the financial position or results of operations of Alcoa Corporation for all periods presented.

Recently Adopted Accounting Guidance

See the Recently Adopted Accounting Guidance section of Note B to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Recently Issued Accounting Guidance

See the Recently Issued Accounting Guidance section of Note B to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

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

See the Derivatives section of Note O to the Consolidated Financial Statements in Part II Item 8 of this Form 10-K.

Item 8. Financial Statements and Supplementary Data.

Management's Reports to Alcoa Corporation Stockholders

Management's Report on Financial Statements and Practices

The accompanying Consolidated Financial Statements of Alcoa Corporation and its subsidiaries (the Company) were prepared by management, which is responsible for their integrity and objectivity, in accordance with accounting principles generally accepted in the United States of America (GAAP) and include amounts that are based on management's best judgments and estimates. The other financial information included in the Company's Annual Report on Form 10-K for the year ended December 31, 2019 is consistent with that in the Consolidated Financial Statements.

Management 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, as defined in Rules 13a-15(f) and 15d-15(f) of the U.S. Securities Exchange Act of 1934 (as amended), for the Company. The 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 GAAP. 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 GAAP, 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.

Management conducted an assessment to evaluate the effectiveness of the Company's internal control over financial reporting as of December 31, 2019 using the criteria in *Internal Control—Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this assessment, management concluded that the Company maintained effective internal control over financial reporting as of December 31, 2019.

PricewaterhouseCoopers LLP, an independent registered public accounting firm, audited the effectiveness of the Company's internal control over financial reporting as of December 31, 2019, as stated in their report, which is included herein.

/s/ Roy C. Harvey

Roy C. Harvey
President and
Chief Executive Officer

/s/ William F. Oplinger

William F. Oplinger
Executive Vice President and
Chief Financial Officer

February 21, 2020

Report of Independent Registered Public Accounting Firm

To the Shareholders and Board of Directors of Alcoa Corporation

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheet of Alcoa Corporation and its subsidiaries (the “Company”) as of December 31, 2019 and 2018, and the related consolidated statements of operations, comprehensive income, changes in consolidated equity and cash flows for each of the three years in the period ended December 31, 2019, 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, 2019, based on criteria established in *Internal Control—Integrated Framework* (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2019 and 2018, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2019 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2019, based on criteria established in *Internal Control—Integrated Framework* (2013) issued by the COSO.

Changes in Accounting Principles

As described in Notes I and B to the consolidated financial statements, the Company changed the manner in which it accounts for certain inventories from last-in, first out (LIFO) to average cost and the manner in which it accounts for leases, respectively, in 2019.

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.

Critical Audit Matters

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

Realization of Net Deferred Tax Assets at Alcoa Canada Company

As described in Notes B and P to the consolidated financial statements, the Company had \$410 million of net deferred tax assets as of December 31, 2019, including \$137 million of net deferred tax assets at Alcoa Canada Company, most significantly related to pension obligations and derivatives. Alcoa Canada Company is in a three-year cumulative loss position as of December 31, 2019. 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. Management applies judgment in assessing all available positive and negative evidence, such as history of profitable operations and projections of taxable income, in evaluating whether it is more likely than not that the net deferred tax assets will be realized in the future. Projections of taxable income is based on macroeconomic indicators and involves assumptions related to, among others, commodity prices, volume levels, and key inputs and raw materials such as alumina, calcined petroleum coke, liquid pitch, energy, labor, and transportation costs.

The principal considerations for our determination that performing procedures relating to the realization of net deferred tax assets at Alcoa Canada Company is a critical audit matter are there was significant judgment by management in determining whether the net deferred tax assets are more likely than not to be realized in the future as Alcoa Canada Company is in a three-year cumulative loss position. This in turn led to a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating audit evidence relating to management's assessment of the realization of net deferred tax assets and management's assumption for projected taxable income, including commodity prices, and costs relating to alumina, calcined petroleum coke, liquid pitch, and energy.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to management's assessment of the realization of net deferred tax assets at Alcoa Canada Company, including controls over projected taxable income. These procedures also included, among others, evaluating the positive and negative evidence available in management's assessment of the realization of net deferred tax assets at Alcoa Canada Company, testing the completeness and accuracy of underlying data used in management's assessment, and evaluating the reasonableness of management's assumption related to projected taxable income. Evaluating management's assumption related to projected taxable income, including commodity prices, and costs relating to alumina, calcined petroleum coke, liquid pitch, and energy involved evaluating whether the assumptions used by management were reasonable considering (i) the current and past performance of Alcoa Canada Company, (ii) the consistency with external market and industry data, and (iii) whether the assumption was consistent with evidence obtained in other areas of the audit.

/s/ PricewaterhouseCoopers LLP

PricewaterhouseCoopers LLP
Pittsburgh, Pennsylvania
February 21, 2020

We have served as the Company's auditor since 2015.

Alcoa Corporation and Subsidiaries
Statement of Consolidated Operations
(in millions, except per-share amounts)

For the year ended December 31,	2019		2018		2017	
Sales (E)	\$	10,433	\$	13,403	\$	11,652
Cost of goods sold (exclusive of expenses below) (I)		8,537		10,053		8,950
Selling, general administrative, and other expenses		280		248		280
Research and development expenses		27		31		32
Provision for depreciation, depletion, and amortization		713		733		750
Restructuring and other charges, net (D)		1,031		527		309
Interest expense (T)		121		122		104
Other expenses, net (T)		162		64		27
Total costs and expenses		10,871		11,778		10,452
(Loss) income before income taxes		(438)		1,625		1,200
Provision for income taxes (I & P)		415		732		592
Net (loss) income (I)		(853)		893		608
Less: Net income attributable to noncontrolling interest (I)		272		643		329
Net (loss) income attributable to Alcoa Corporation (I)		(1,125)		250		279
Earnings per share attributable to Alcoa Corporation common shareholders (F & I):						
Basic	\$	(6.07)	\$	1.34	\$	1.51
Diluted	\$	(6.07)	\$	1.33	\$	1.49

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

Alcoa Corporation and Subsidiaries
Statement of Consolidated Comprehensive Income
(in millions)

For the year ended December 31,	Alcoa Corporation			Noncontrolling interest			Total		
	2019	2018	2017	2019	2018	2017	2019	2018	2017
Net (loss) income	\$ (1,125)	\$ 250	\$ 279	\$ 272	\$ 643	\$ 329	\$ (853)	\$ 893	\$ 608
Other comprehensive (loss) income, net of tax (G):									
Change in unrecognized net actuarial loss and prior service cost/benefit related to pension and other postretirement benefits	1	503	(456)	(10)	1	9	(9)	504	(447)
Foreign currency translation adjustments	(89)	(604)	188	(24)	(229)	96	(113)	(833)	284
Net change in unrecognized gains/losses on cash flow hedges	(321)	718	(1,139)	(11)	(20)	50	(332)	698	(1,089)
Total Other comprehensive (loss) income, net of tax	(409)	617	(1,407)	(45)	(248)	155	(454)	369	(1,252)
Comprehensive (loss) income (I)	\$ (1,534)	\$ 867	\$ (1,128)	\$ 227	\$ 395	\$ 484	\$ (1,307)	\$ 1,262	\$ (644)

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

Alcoa Corporation and Subsidiaries
Consolidated Balance Sheet
(in millions)

December 31,	2019	2018
Assets		
Current assets:		
Cash and cash equivalents (O)	\$ 879	\$ 1,113
Receivables from customers	546	830
Other receivables	114	173
Inventories (I)	1,644	1,819
Fair value of derivative instruments (O)	59	73
Prepaid expenses and other current assets (I)	288	320
Total current assets	3,530	4,328
Properties, plants, and equipment, net (J)	7,916	8,327
Investments (H)	1,113	1,360
Deferred income taxes (P)	642	560
Fair value of derivative instruments (O)	18	82
Other noncurrent assets (T)	1,412	1,475
Total Assets	\$ 14,631	\$ 16,132
Liabilities		
Current liabilities:		
Accounts payable, trade	\$ 1,484	\$ 1,663
Accrued compensation and retirement costs	413	400
Taxes, including income taxes	104	426
Fair value of derivative instruments (O)	67	82
Other current liabilities	494	347
Long-term debt due within one year (L & O)	1	1
Total current liabilities	2,563	2,919
Long-term debt, less amount due within one year (L & O)	1,799	1,801
Accrued pension benefits (N)	1,505	1,407
Accrued other postretirement benefits (N)	749	868
Asset retirement obligations (Q)	606	529
Environmental remediation (R)	296	236
Fair value of derivative instruments (O)	581	261
Noncurrent income taxes (P)	276	301
Other noncurrent liabilities and deferred credits (T)	370	222
Total liabilities	8,745	8,544
Contingencies and commitments (R)		
Equity		
Alcoa Corporation shareholders' equity:		
Common stock (M)	2	2
Additional capital	9,639	9,611
Retained (deficit) earnings (I)	(555)	570
Accumulated other comprehensive loss (G)	(4,974)	(4,565)
Total Alcoa Corporation shareholders' equity	4,112	5,618
Noncontrolling interest (A & I)	1,774	1,970
Total equity	5,886	7,588
Total Liabilities and Equity	\$ 14,631	\$ 16,132

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

Alcoa Corporation and Subsidiaries
Statement of Consolidated Cash Flows
(in millions)

For the year ended December 31,	2019	2018	2017
Cash from Operations			
Net (loss) income (I)	\$ (853)	\$ 893	\$ 608
Adjustments to reconcile net (loss) income to cash from operations:			
Depreciation, depletion, and amortization	713	733	752
Deferred income taxes (I & P)	15	(30)	168
Equity earnings, net of dividends (H)	21	17	9
Restructuring and other charges, net (D)	1,031	527	309
Net gain from investing activities—asset sales (T)	(3)	—	(116)
Net periodic pension benefit cost (N)	119	146	111
Stock-based compensation (M)	30	35	24
Provision for bad debt expense	21	—	—
Other	30	(59)	32
Changes in assets and liabilities, excluding effects of divestitures and foreign currency translation adjustments:			
Decrease (Increase) in receivables	283	(43)	(118)
Decrease (Increase) in inventories (I)	137	(306)	(279)
Decrease (Increase) in prepaid expenses and other current assets	27	(32)	43
(Decrease) Increase in accounts payable, trade	(153)	(165)	377
(Decrease) in accrued expenses	(175)	(319)	(563)
(Decrease) Increase in taxes, including income taxes	(330)	241	111
Pension contributions (N)	(173)	(992)	(106)
(Increase) in noncurrent assets	(24)	(101)	(99)
(Decrease) in noncurrent liabilities	(30)	(97)	(39)
Cash provided from operations	686	448	1,224
Financing Activities			
Cash paid to former parent company related to separation (A)	—	—	(247)
Net change in short-term borrowings (original maturities of three months or less)	—	—	7
Additions to debt (original maturities greater than three months) (L)	—	560	21
Payments on debt (original maturities greater than three months) (L)	(7)	(135)	(60)
Proceeds from the exercise of employee stock options (M)	2	23	43
Repurchase of common stock (M)	—	(50)	—
Financial contributions for the divestiture of businesses (C)	(12)	—	—
Contributions from noncontrolling interest (A)	51	149	80
Distributions to noncontrolling interest	(472)	(827)	(342)
Other	(6)	(8)	(8)
Cash used for financing activities	(444)	(288)	(506)
Investing Activities			
Capital expenditures	(379)	(399)	(405)
Proceeds from the sale of assets and businesses (C)	23	1	245
Additions to investments (H)	(112)	(7)	(66)
Cash used for investing activities	(468)	(405)	(226)
Effect of exchange rate changes on cash and cash equivalents and restricted cash	(7)	(4)	14
Net change in cash and cash equivalents and restricted cash	(233)	(249)	506
Cash and cash equivalents and restricted cash at beginning of year	1,116	1,365	859
Cash and cash equivalents and restricted cash at end of year	\$ 883	\$ 1,116	\$ 1,365

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

Alcoa Corporation and Subsidiaries
Statement of Changes in Consolidated Equity
(in millions)

	Alcoa Corporation shareholders						Total equity
	Common stock	Additional capital	Retained (deficit) earnings	Accumulated other comprehensive loss	Noncontrolling interest		
Balance at December 31, 2016	\$ 2	\$ 9,531	\$ 39	\$ (3,775)	\$ 2,021	\$ 7,818	
Net income	—	—	279	—	329	608	
Other comprehensive (loss) income (G)	—	—	—	(1,407)	155	(1,252)	
Stock-based compensation (M)	—	24	—	—	—	24	
Common stock issued:							
Compensation plans (M)	—	43	—	—	—	43	
Contributions	—	—	—	—	80	80	
Distributions	—	—	—	—	(342)	(342)	
Other	—	(8)	—	—	(3)	(11)	
Balance at December 31, 2017	2	9,590	318	(5,182)	2,240	6,968	
Net income	—	—	250	—	643	893	
Other comprehensive income (loss) (G)	—	—	—	617	(248)	369	
Stock-based compensation (M)	—	35	—	—	—	35	
Common stock issued:							
Compensation plans (M)	—	23	—	—	—	23	
Repurchase of common stock (M)	—	(50)	—	—	—	(50)	
Contributions	—	—	—	—	149	149	
Distributions	—	—	—	—	(827)	(827)	
Other	—	13	2	—	13	28	
Balance at December 31, 2018	2	9,611	570	(4,565)	1,970	7,588	
Net (loss) income	—	—	(1,125)	—	272	(853)	
Other comprehensive (loss) (G)	—	—	—	(409)	(45)	(454)	
Stock-based compensation (M)	—	30	—	—	—	30	
Common stock issued:							
Compensation plans (M)	—	2	—	—	—	2	
Contributions	—	—	—	—	51	51	
Distributions	—	—	—	—	(472)	(472)	
Other	—	(4)	—	—	(2)	(6)	
Balance at December 31, 2019	\$ 2	\$ 9,639	\$ (555)	\$ (4,974)	\$ 1,774	\$ 5,886	

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

Alcoa Corporation and subsidiaries
Notes to the Consolidated Financial Statements
(dollars in millions, except per-share amounts; metric tons in thousands (kmt))

A. Basis of Presentation

Alcoa Corporation (or the Company) is a vertically integrated aluminum company comprised of bauxite mining, alumina refining, aluminum production (smelting, casting, and rolling), and energy generation. Through direct and indirect ownership, the Company has 30 operating locations in nine countries around the world, situated primarily in Australia, Brazil, Canada, Iceland, Norway, Spain, and the United States.

References in these Notes to “ParentCo” refer to Alcoa Inc., a Pennsylvania corporation, and its consolidated subsidiaries through October 31, 2016, at which time it was renamed Arconic Inc. (Arconic).

Separation Transaction. On November 1, 2016 (the Separation Date), ParentCo separated into two standalone, publicly-traded companies, Alcoa Corporation and Arconic, effective at 12:01 a.m. Eastern Time (the Separation Transaction). Regular-way trading of Alcoa Corporation’s common stock began with the opening of the New York Stock Exchange on November 1, 2016 under the ticker symbol “AA.” The Company’s common stock has a par value of \$0.01 per share.

To effect the Separation Transaction, ParentCo undertook a series of transactions to separate the net assets and certain legal entities of ParentCo, resulting in an initial cash payment of \$1,072 to ParentCo by Alcoa Corporation with the net proceeds of a previous debt offering (see Note L). Additionally, \$247 was paid to Arconic by the Company in 2017, including \$243 from the proceeds associated with the sale of certain energy operations (see Note C).

In connection with the Separation Transaction, Alcoa Corporation and Arconic entered into certain agreements to implement the legal and structural separation between the two companies, govern the relationship between the Company and Arconic after the completion of the Separation Transaction, and allocate between Alcoa Corporation and Arconic various assets, liabilities, and obligations. These agreements included a Separation and Distribution Agreement, Tax Matters Agreement, Employee Matters Agreement, Transition Services Agreement, certain Patent, Know-How, Trade Secret License and Trademark License Agreements, and Stockholder and Registration Rights Agreement.

Basis of Presentation. The Consolidated Financial Statements of Alcoa Corporation are prepared in conformity with accounting principles generally accepted in the United States of America (GAAP). In accordance with GAAP, certain situations require management to make estimates based on judgments and assumptions, which 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 periods. 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.

As of January 1, 2019, the Company changed its accounting method for valuing certain inventories from last-in, first-out (LIFO) to average cost. The effects of the change in accounting principle have been retrospectively applied to all prior periods presented. See Note I for additional information.

Principles of Consolidation. The Consolidated Financial Statements of the Company include the accounts of Alcoa Corporation and companies in which Alcoa Corporation has a controlling interest, including those that comprise the Alcoa World Alumina & Chemicals (AWAC) joint venture (see below). Intercompany transactions have been eliminated. The equity method of accounting is applied to investments in affiliates and other joint ventures over which the Company has significant influence but does not have effective control. Investments in affiliates in which Alcoa Corporation cannot exercise significant influence are accounted for on the cost method.

AWAC is an unincorporated global joint venture between Alcoa Corporation and Alumina Limited and consists of several affiliated operating entities, which own, have an interest in, or operate the bauxite mines and alumina refineries within the Company’s Bauxite and Alumina segments (except for the Poços de Caldas mine and refinery and portions of the São Luís refinery and investment in Mineração Rio do Norte S.A., all in Brazil) and a portion (55%) of the Portland smelter (Australia) within the Company’s Aluminum segment. Alcoa Corporation owns 60% and Alumina Limited owns 40% of these individual entities, which are consolidated by the Company for financial reporting purposes and include Alcoa of Australia Limited (AofA), Alcoa World Alumina LLC (AWA), Alcoa World Alumina Brasil Ltda. (AWAB), and Alumina Española, S.A. (Española). Alumina Limited’s interest in the equity of such entities is reflected as Noncontrolling interest on the accompanying Consolidated Balance Sheet.

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

Related Party Transactions. Alcoa Corporation buys products from and sells products to various related companies, consisting of entities in which the Company retains a 50% or less equity interest, at negotiated prices between the two parties. These transactions were not material to the financial position or results of operations of Alcoa Corporation for all periods presented.

B. Summary of Significant Accounting Policies

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 or market, with the cost of inventories principally determined under the average cost method.

Effective January 1, 2019, the Company changed its accounting method for valuing certain inventories from last-in, first-out (LIFO) to the average cost method. The effects of the change in accounting principle have been retrospectively applied to all prior periods presented in the Company's Consolidated Financial Statements. See Note I for additional information.

Properties, Plants, and Equipment. Properties, plants, and equipment are recorded at cost. Interest related to the construction of qualifying assets is capitalized as part of the construction costs. Depreciation is recorded principally on the straight-line method over the estimated useful lives of the assets. Depreciation is recorded on temporarily idled facilities until such time management approves a permanent closure. The following table details the weighted-average useful lives of structures and machinery and equipment by type of operation (numbers in years):

	Structures	Machinery and equipment
Bauxite mining	35	17
Alumina refining	28	29
Aluminum smelting and casting	37	23
Energy generation	33	24
Aluminum rolling	31	21

Repairs and maintenance are charged to expense as incurred while costs for significant improvements that add productive capacity or that extend the useful life are capitalized. Gains or losses from the sale of assets are generally recorded in Other expenses, net. 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.

Leases. The Company determines whether an arrangement is a lease at the inception of the arrangement based on the terms and conditions in the contract. A contract contains a lease if there is an identified asset which the Company has the right to control. Both operating and financing lease right-of-use (ROU) assets are included in Properties, plants, and equipment with the corresponding operating lease liabilities included within Other current liabilities and Other noncurrent liabilities and deferred credits, while financing lease liabilities are included in Long-term debt due within one year and Long-term debt, less amount due within one year on the Consolidated Balance Sheet.

Operating lease ROU assets and liabilities are recognized at the commencement date based on the present value of lease payments over the lease term. The Company uses its incremental borrowing rate at the commencement date in determining the present value of lease payments unless a rate is implicit in the lease. Lease terms include options to extend the lease when it is reasonably certain that those options will be exercised. Leases with an initial term of 12 months or less, including anticipated renewals, are not recorded on the balance sheet.

The Company has made a policy election not to record any non-lease components of a lease agreement in the lease liability. Variable lease payments are not presented as part of the initial ROU asset or liability recorded at the inception of a contract. Lease expense for operating lease payments is recognized on a straight-line basis over the lease term. For finance leases, interest expense is recognized on the lease liability and the ROU asset is amortized over the lease term.

Equity Investments. Alcoa invests in a number of privately-held companies, primarily through joint ventures and consortia, which are accounted for using the equity method. The equity method is applied in situations where the Company has the ability to exercise significant influence, but not control, over the investee. Management reviews equity investments for impairment whenever certain indicators are present suggesting that the carrying value of an investment is not recoverable.

Deferred Mining Costs. Alcoa recognizes deferred mining costs during the development stage of a mine life cycle. Such costs include the construction of access and haul roads, detailed drilling and geological analysis to further define the grade and quality of the known bauxite, and overburden removal costs. These costs relate to sections of the related mines where the Company is currently extracting bauxite or preparing for production in the near term. These sections are outlined and planned incrementally and generally are mined over periods ranging from one to five years, depending on mine specifics. The amount of geological drilling and testing necessary to determine the economic viability of the bauxite deposit being mined is such that the reserves are considered to be proven, and the mining costs are amortized based on this level of reserves. Deferred mining costs are included in Other noncurrent assets on the accompanying Consolidated Balance Sheet.

Goodwill and Other Intangible Assets. Goodwill is not amortized but 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 exit a business.

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. The Company has five reporting units, of which three are included in the Aluminum segment (smelting/casting, energy generation, and rolling operations). The remaining two reporting units are the Bauxite and Alumina segments. Of these five reporting units, only Bauxite and Alumina contain goodwill. As of December 31, 2019, the carrying value of the goodwill for Bauxite and Alumina was \$50 and \$100, respectively. These amounts include an allocation of goodwill held at the corporate level (see Note K).

Goodwill is tested for impairment by assessing qualitative factors to determine whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount or performing a quantitative assessment using a discounted cash flow method. The qualitative assessment considers factors such as general economic conditions, equity and credit markets, industry and market conditions, and earnings and cash flow trends. If the qualitative assessment indicates a possible impairment, then a quantitative impairment test is performed to determine the fair value of the reporting unit using a discounted cash flow method. Otherwise, no further analysis is required. Alcoa's policy for its annual review of goodwill is to perform the quantitative impairment test for each of its two reporting units that contain goodwill at least once during every three-year period as part of its annual review of goodwill.

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 type of operation (numbers in years):

	Software	Other intangible assets
Bauxite mining	3	10
Alumina refining	7	21
Aluminum smelting and casting	3	39
Energy generation	—	29
Aluminum rolling	3	20

Asset Retirement Obligations. Alcoa recognizes asset retirement obligations (AROs) related to legal obligations associated with the standard operation of bauxite mines, alumina refineries, and aluminum smelters. These AROs consist primarily of costs associated with mine reclamation, closure of bauxite residue areas, spent pot lining and regulated waste materials disposal, and landfill closure. Additionally, costs are recorded as AROs upon management's decision to permanently close and demolish certain structures and for any significant lease restoration obligations. The fair values of these AROs are recorded on a discounted basis at the time the obligation is incurred and accreted over time for the change in present value. Additionally, the Company capitalizes asset retirement costs by increasing the carrying amount of the related long-lived assets and depreciating these assets over their remaining useful life. Certain conditional asset retirement obligations related to alumina refineries, aluminum smelters, rolling mills, and energy generation facilities have not been recorded in the Consolidated Financial Statements due to uncertainties surrounding the ultimate settlement date. The fair value of these asset retirement obligations will be recorded when a reasonable estimate of the ultimate settlement date can be made.

Environmental Matters. Environmental related 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 estimates also include costs related to other potentially responsible parties to the extent that Alcoa has reason to believe such parties will not fully pay their proportionate share. In instances where the Company has ongoing monitoring and maintenance responsibilities, it is Alcoa's policy to maintain a reserve equal to five years of expected costs. 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. 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. Legal costs, which are primarily for general litigation, environmental compliance, tax disputes, and general corporate matters, are expensed as incurred.

Revenue Recognition. The Company recognizes revenue when it satisfies a performance obligation(s) in accordance with the provisions of a customer order or contract. This is achieved when control of the product has been transferred to the customer, which is generally determined when title, ownership, and risk of loss pass to the customer, all of which occurs upon shipment or delivery of the product. The shipping terms vary across all businesses and depend on the product, the country of origin, and the type of transportation. Accordingly, the sale of Alcoa's products to its customers represent single performance obligations for which revenue is recognized at a point in time. Revenue is based on the consideration it expects to receive in exchange for its products. Returns and other adjustments have not been material. Based on the foregoing, no significant judgment is required to determine when control of a product has been transferred to a customer.

The Company considers shipping and handling activities as costs to fulfill the promise to transfer the related products. As a result, customer payments of shipping and handling costs are recorded as a component of revenue. Taxes collected (e.g., sales, use, value-added, excise) from its customers related to the sale of its products are remitted to governmental authorities and excluded from revenue.

Stock-Based Compensation. Compensation expense for employee equity grants is recognized using the non-substantive vesting period approach, in which the expense (net of estimated forfeitures) is recognized ratably over the requisite service period based on the grant date fair value. The fair value of new stock options is estimated on the date of grant using a lattice-pricing model. Determining the fair value of stock options at the grant date requires judgment, including estimates for the average risk-free interest rate, dividend yield, volatility, annual forfeiture rate, 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.

Most plan participants can choose whether to receive their award in the form of stock options, stock units, or a combination of both. This choice is made before the grant is issued and is irrevocable.

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 yield curve model used to develop the discount rate parallels the plans' projected cash flows and has a weighted average duration of 11 years. The underlying cash flows of the high quality corporate bonds included in the model exceed the cash flows needed to satisfy the Company's plan obligations multiple times. If a deep market of high quality corporate bonds does not exist in a country, then the yield on government bonds plus a corporate bond yield spread is used.

The expected long-term rate of return on plan assets is generally applied to a five-year market-related value of plan assets (a four-year average or the 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 forward-looking investment returns by asset class. Management incorporates expected future investment returns on current and planned asset allocations using information from various external investment managers and consultants, as well as management's own judgment.

Mortality rate assumptions are based on mortality tables and future improvement scales published by third parties, such as the Society of Actuaries, and consider other available information including historical data as well as studies and publications from reputable sources.

Derivatives and Hedging. Derivatives are held for purposes other than trading and are part of a formally documented risk management program.

Alcoa accounts for hedges of firm customer commitments for aluminum as fair value hedges. The fair values of the derivatives and changes in the fair values of the underlying hedged items are reported as assets and liabilities in the Consolidated Balance Sheet. Changes in the fair values of these derivatives and underlying hedged items generally offset and are recorded each period in Sales, consistent with the underlying hedged item.

The Company accounts for hedges of foreign currency exposures and certain forecasted transactions as cash flow hedges. The fair values of the derivatives are recorded as assets and liabilities in the Consolidated Balance Sheet. The changes in the fair values of these derivatives are recorded in Other comprehensive (loss) income and are reclassified to Sales, Cost of goods sold, or Other expenses, net in the period in which earnings are impacted by the hedged items or in the period that the transaction no longer qualifies as a cash flow hedge. These contracts cover the same periods as known or expected exposures, generally not exceeding five years.

If no hedging relationship is designated, the derivative is marked to market through Other expenses, net.

Cash flows from derivatives are recognized in the Statement of Consolidated Cash Flows in a manner consistent with the underlying transactions.

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 Alcoa'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 (greater than 50%) that a tax benefit will not be realized. In evaluating the need for a valuation allowance, management applies judgement in assessing all available positive and negative evidence and 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. 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 Alcoa'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.

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 limitation 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.

Foreign Currency. The local currency is the functional currency for Alcoa's significant operations outside the United States, except for certain operations in Canada and Iceland, where the U.S. dollar is used as the functional currency. The determination of the functional currency for Alcoa's operations is made based on the appropriate economic and management indicators. Where local currency is the functional currency, assets and liabilities are translated into U.S. dollars using year-end exchange rates and income and expenses are translated using the average exchange rates for the reporting period. Unrealized foreign currency translation gains and losses are deferred in Accumulated other comprehensive loss on the Consolidated Balance Sheet.

Recently Adopted Accounting Guidance. On January 1, 2019, the Company adopted Accounting Standards Update (ASU) No. 2016-02, Leases, issued by the Financial Accounting Standards Board (FASB) regarding the accounting for leases, using the modified retrospective approach. This ASU requires lessees to recognize a right-of-use asset and lease liability on the balance sheet for operating and finance leases with a term of 12 months or more. Additionally, 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. A right-of-use asset represents an entity's right to use the underlying asset for the lease term, and a lease liability represents an entity's obligation to make lease payments. The Company has made a policy election not to record any non-lease components in the lease liability. Previously, an asset and liability were only recorded for leases classified as capital leases (financing leases). The measurement, recognition, and presentation of expenses and cash flows arising from leases by a lessee remains the same. Management elected the package of practical expedients permitted under the transition guidance within the new standard, which among other things, allowed carry forward of historical lease classifications. Additionally, in July 2018, the FASB issued ASU No. 2018-11, Targeted Improvements, to provide for an alternative transition method to the new lease guidance, whereby an entity can choose to not reflect the impact of the new lease guidance in the prior periods included in its financial statements. The Company elected this alternative transition method upon adoption on January 1, 2019. Management also elected the practical expedient related to land easements, allowing the Company to carry forward the current treatment on existing arrangements.

As a result of the adoption, management recorded a right-of-use asset and lease liability, each in the amount of \$201, on Alcoa's Consolidated Balance Sheet as of January 1, 2019 for several types of operating leases, including land and buildings,

alumina refinery process control technology, plant equipment, vehicles, and computer equipment. See Note S for additional information related to the adoption of this standard.

Alcoa's adoption of the following accounting guidance in 2019 did not have a material impact on the Company's Consolidated Financial Statements:

Accounting Standards Update

2018-01 Leases: Land Easement Practical Expedient for Transition

2018-02 Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income

2018-07 Stock Compensation: Improvements to Nonemployee Share-Based Payment Accounting

Recently Issued Accounting Guidance. In December 2019, the FASB issued ASU No. 2019-12, Income Taxes (Topic 740) which is intended to simplify the accounting for income taxes by eliminating certain exceptions and simplifying certain requirements under Topic 740. Updates are related to intraperiod tax allocation, deferred tax liabilities for equity method investments, interim period tax calculations, tax laws or rate changes in interim periods, and income taxes related to employee stock ownership plans. The guidance for ASU No. 2019-12 becomes effective for Alcoa on January 1, 2021. Management is currently evaluating the impact of these changes on the Consolidated Financial Statements.

In November 2019, the FASB issued ASU No. 2019-08, Compensation—Stock Compensation (Topic 718) and Revenue from Contracts with Customers (Topic 606). In June 2018, the FASB issued ASU No. 2018-07, Stock Compensation: Improvements to Nonemployee Share-Based Payment Accounting. ASU 2018-07 effectively changed the accounting for nonemployee share-based payment transactions to be consistent with the accounting for employee share-based payments but did not provide guidance on measuring share-based payment awards granted to a customer. The amendments in ASU No. 2019-08 clarify that an entity must measure and classify share-based payment awards granted to a customer by applying the guidance in Topic 718. The Company adopted ASU No. 2018-07 effective January 1, 2019, and as such, ASU No. 2019-08 will be effective for the Company on January 1, 2020. The adoption of this guidance will not have a material impact on the Company's Consolidated Financial Statements as the Company does not utilize share-based payments for customers.

In August 2018, the FASB issued separate guidance regarding the respective disclosure requirements associated with fair value measurements and defined benefit plans. This guidance makes changes to the disclosures of fair value measurements and defined benefit plans through several removals, modifications, additions, and/or clarifications of the existing requirements. The following are the changes that will have an immediate disclosure impact for Alcoa upon adoption of the guidance for fair value measurements: (i) disclosure of the valuation processes for Level 3 fair value measurements is no longer required, (ii) changes in unrealized gains and losses for the reporting period included in other comprehensive income (loss) for recurring Level 3 fair value measurements held at the end of the reporting period is a new disclosure requirement, and (iii) the range and weighted average (or other reasonable and rational method) of significant unobservable inputs used to develop Level 3 fair value measurements is a new disclosure requirement. The following are the changes that will have an immediate disclosure impact for the Company upon adoption of the guidance for defined benefit plans: (i) disclosure of the amounts in accumulated other comprehensive income (loss) expected to be recognized as components of net periodic benefit cost over the next fiscal year is no longer required, (ii) disclosure of the effects of a one-percentage-point change in assumed health care cost trend rates on both the aggregate of the service and interest cost components of net periodic benefit costs and the benefit obligation for postretirement health care benefits is no longer required, and (iii) an explanation of the reasons for significant gains and losses related to changes in the benefit obligation for the reporting period is a new disclosure requirement. The guidance for fair value measurements and defined benefit plans becomes effective for the Company on January 1, 2020 and December 31, 2020, respectively, with early adoption permitted. Other than updating the applicable disclosures, the adoption of this guidance will not have an impact on the Company's Consolidated Financial Statements.

In August 2018, the FASB issued ASU No. 2018-15, Intangibles – Goodwill and Other – Internal-Use Software. This ASU aligns the accounting for cloud computing implementation costs with that of costs to develop or obtain internal-use software, meaning such costs that are part of the application development stage are capitalized as an asset and amortized over the term of the arrangement, otherwise, such costs are expensed as incurred. It also clarifies the classification of amounts related to capitalized implementation costs in the financial statements. This guidance becomes effective for the Company on January 1, 2020, with early adoption permitted. Management has completed our assessment of the impact related to this guidance and concluded that the adoption of this guidance will not have a material impact on the Company's Consolidated Financial Statements.

In June 2016, the FASB issued ASU No. 2016-13, Financial Instruments – Credit Losses. This ASU 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 an allowance for its estimate of expected credit losses and 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 the Company on January 1, 2020. Management has completed our assessment of the impact related to this guidance and concluded that the adoption of this guidance will not have a material impact on the Company's Consolidated Financial Statements.

C. Acquisitions and Divestitures

Gum Springs Waste Treatment Business

In January 2020, the Company announced the sale of Elemental Environmental Solutions LLC (EES), a wholly-owned Alcoa subsidiary that operates the waste processing facility in Gum Springs, Arkansas, to a global environmental firm in a transaction valued at \$250. The transaction closed as of January 31, 2020 whereby the Company received \$200 with another \$50 held in escrow to be paid to Alcoa if certain post-closing conditions are satisfied.

Afobaka Hydroelectric Dam

On December 31, 2019, Alcoa completed the transfer of the Afobaka hydroelectric dam to the Government of the Republic of Suriname, according to definitive agreements approved by its parliament. After curtailment of Alcoa's operations in Suriname in 2015 and permanent closure in early 2017, Alcoa continued to operate the dam, selling electricity to the government for its subsequent sale to customers in Suriname. At the time of the transfer, the fixed assets related to the dam were fully depreciated and all outstanding amounts due to Alcoa for electricity sales were settled.

Avilés and La Coruña Aluminum Facilities

In July 2019, Alcoa completed the divestiture of the Avilés and La Coruña (Spain) aluminum facilities to PARTER Capital Group AG (PARTER). Charges related to the curtailment, employee dismissal process, and divestiture totaled \$253, which were recorded in Restructuring and other charges, net, Cost of goods sold, and Selling, general administrative, and other expenses as outlined below.

Related to the divestiture, the Company recorded Restructuring and other charges, net, of \$127 for the year ended December 31, 2019, resulting from financial contributions of up to \$95 to PARTER per the agreement and a net charge of \$32 to meet a working capital commitment and write-off the remaining net book value of the plants' assets. For the year ended December 31, 2019, net cash outflows related to the close of the transaction were \$47 with the remaining financial contributions of \$68 to be paid in quarterly installments through the second quarter of 2021. These financial contributions after the closing date are classified as Cash used for financing activities on the Company's Statement of Consolidated Cash Flows.

The smelters at Avilés and La Coruña were curtailed in February 2019 and charges recorded prior to the completion of the divestiture included in the Statement of Consolidated Operations include: Restructuring and other charges, net for asset impairments (\$80), severance and employee related costs (\$20), and contract termination costs (\$8); Cost of goods sold primarily for the write down of remaining inventories to their net realizable value (\$16); and, Selling, general administrative, and other expenses for miscellaneous charges (\$2). See Note D for additional detail.

Ma'aden Rolling Company

In December 2009, Alcoa invested in a joint venture related to the ownership and operation of an integrated aluminum complex (bauxite mine, alumina refinery, aluminum smelter, and rolling mill) in the Kingdom of Saudi Arabia. The joint venture is owned 74.9% by the Saudi Arabian Mining Company (known as Ma'aden) and 25.1% by Alcoa, and originally consisted of three separate companies as follows: the Ma'aden Bauxite and Alumina Company (MBAC; the bauxite mine and alumina refinery), the Ma'aden Aluminium Company (MAC; the aluminum smelter and casthouse), and the Ma'aden Rolling Company (MRC; the rolling mill).

In June 2019, Alcoa and Ma'aden amended the joint venture agreement that governs the operations of each of the three companies that comprise the joint venture. The amendment, among other items, transferred Alcoa's 25.1% interest in MRC to Ma'aden and, as a result, Alcoa has no further direct or indirect equity interest in MRC. Prior to the amendment, both partners contributed \$100 to MRC to meet current cash requirements. As a result of the divestiture, Alcoa recorded Restructuring and other charges, net of \$319 for the write-off of the investment in MRC (\$161), the cash contributions described above (\$100), the write-off of the Company's share of MRC's delinquent payables due to MAC (\$59) that were forgiven as part of this transaction, partially offset by a gain resulting from the write-off of the fair value of debt guarantee (\$1). See Note D for additional detail.

Yadkin Hydroelectric Project

In February 2017, Alcoa's wholly-owned subsidiary, Alcoa Power Generating Inc., completed the sale of its 215-megawatt Yadkin Hydroelectric Project (Yadkin) to Cube Hydro Carolinas, LLC for \$249 in cash (\$8 of which was received in June and November 2017 combined as post-closing adjustments). In 2017, Alcoa Corporation recognized a gain of \$122 (pre- and after-tax) in Other expenses, net on the accompanying Statement of Consolidated Operations. In accordance with the Separation and Distribution Agreement (see Note A), the Company remitted \$243 of the proceeds to Arconic. The sale of Yadkin is subject to further post-closing adjustments related to potential earnouts through January 31, 2027, unless the provisions of the earnouts are met earlier. Any such adjustment would result in the Company receiving additional cash (none of which would be remitted to Arconic) and recognizing non-operating income. Yadkin encompasses four hydroelectric power developments (reservoirs, dams, and powerhouses), known as High Rock, Tuckertown, Narrows, and Falls, situated along a 38-mile stretch of the Yadkin River through the central part of North Carolina. Prior to the divestiture, the power generated by Yadkin was primarily sold into the open market.

D. Restructuring and Other Charges, Net

Restructuring and other charges, net for each year in the three-year period ended December 31, 2019 were comprised of the following:

	2019	2018	2017
Loss on divestitures	\$ 446	\$ —	\$ —
Asset impairments	225	18	40
Settlements and/or curtailments related to retirement benefits (N)	119	331	8
Asset retirement obligations (Q)	75	5	10
Environmental remediation (R)	69	2	8
Severance and employee termination costs	51	2	15
Allowance on value-added tax credits (T)	—	107	—
Power contract payments – non-recurring	—	62	244
Legal matter in Italy	—	—	(22)
Other	52	48	49
Reversals of previously recorded layoff and other costs	(6)	(48)	(43)
Restructuring and other charges, net	\$ 1,031	\$ 527	\$ 309

Severance and employee termination 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.

2019 Actions. In 2019, Alcoa Corporation recorded Restructuring and other charges, net, of \$1,031 which were comprised of the following components: \$319 related to the divestiture of Alcoa Corporation's interest in the Ma'aden Rolling Company (see below); \$274 for exits costs related to a decision to permanently close and demolish the Point Comfort alumina refinery (see below); \$235 for costs related to the smelter curtailment and subsequent divestiture of the Avilés and La Coruña aluminum facilities in Spain (see below); \$119 related to the settlement and/or curtailment of certain pension and other postretirement benefits; \$37 for employee termination and severance costs related to the implementation of the new operating model (see below); \$9 for closure costs related to a coal mine; and \$38 for net charges related to various other items.

In December 2019, Alcoa Corporation announced the permanent closure of the Point Comfort (Texas) alumina refinery. Restructuring charges recorded in 2019 related to the closure included asset impairments of \$129, asset retirement obligations of \$72, environmental remediation costs of \$69, and severance costs of \$4 for the layoff of approximately 40 employees. Additionally, a charge of \$2 for the write down of remaining inventories to their net realizable value was recorded in Cost of goods sold on the accompanying Statement of Consolidated Operations.

In September 2019, Alcoa Corporation announced the implementation of a new operating model that will result in a leaner, more integrated, operator-centric organization. Effective November 1, 2019, the new operating model eliminates the business unit structure, consolidates sales, procurement and other commercial capabilities at an enterprise level, and streamlines the Executive Team. The new structure will reduce overhead with the intention of promoting operational and commercial excellence and increasing connectivity between the Company's plants and leadership. As a result of the new operating model, Alcoa Corporation recorded a charge of \$37 related to employee termination and severance costs for approximately 260 employees company-wide. The restructuring actions and related cash outlays are anticipated to be substantially complete by the end of the first quarter 2020.

In January 2019, Alcoa Corporation reached an agreement with the workers' representatives at the Avilés and La Coruña (Spain) aluminum facilities as part of the collective dismissal process announced in October 2018 and curtailed the smelters

at these two locations, with a combined remaining operating capacity of 124 kmt, in February 2019. As part of the agreement, the Company agreed to conduct a sale process to identify third parties with interest in acquiring the facilities and to maintain the smelters in restart condition up to June 30, 2019. Through the sale process, PARTER, a private equity investment firm, was identified as a potential buyer for both Spanish facilities, inclusive of the smelters and casthouses at both facilities and the paste plant at La Coruña. Prior to the June 30, 2019 deadline, Alcoa Corporation agreed with the workers' representatives to extend the timeline for the potential buyer to meet the financial conditions of a draft share purchase agreement by one week. On July 5, 2019, Alcoa Corporation signed a conditional share purchase agreement with PARTER for the purchase of these two facilities, which was subject to PARTER meeting certain financial conditions prior to July 31, 2019 to support the facilities future operations. Prior to signing the conditional share purchase agreement with PARTER, Alcoa Corporation reached agreement with the workers' representatives related to the potential transaction. If PARTER was not able to meet the financial conditions prior to July 31, 2019, the Company would have proceeded with the collective dismissal and social plan as of August 1, 2019. As of July 31, 2019, PARTER met the financial conditions and the transaction closed.

Restructuring and other charges, net, related to the curtailment and collective dismissal process of the Spanish facilities included asset impairments of \$80, severance and employee-related costs of \$20 and contract termination costs of \$8. Additional charges included \$16 recorded in Cost of goods sold, primarily for the write down of remaining inventories to their net realizable value, and \$2 in miscellaneous charges recorded in Selling, general administrative, and other expenses on the accompanying Statement of Consolidated Operations.

Restructuring and other charges, net, related to the divestiture of the Spanish facilities totaled \$127 for the year ended December 31, 2019, for financial contributions of up to \$95 to PARTER per the agreement, a net charge of \$32 to meet a working capital commitment and write-off the remaining net book value of the plants' assets. For the year ended December 31, 2019, net cash outflows related to the close of the transaction were \$47 with the remaining financial contributions of \$68 to be paid in quarterly installments through the second quarter of 2021.

In December 2009, Alcoa Corporation invested in a joint venture related to the ownership and operation of an integrated aluminum complex (bauxite mine, alumina refinery, aluminum smelter, and rolling mill) in the Kingdom of Saudi Arabia. The joint venture is owned 74.9% by Ma'aden and 25.1% by Alcoa Corporation, and originally consisted of three separate companies as follows: MBAC, MAC, and MRC. Alcoa Corporation accounts for its investment in the joint venture under the equity method as one integrated investment asset, consistent with the terms of the joint venture agreement.

In June 2019, Alcoa Corporation and Ma'aden amended the joint venture agreement that governs the operations of each of the three companies that comprise the joint venture. Under the terms of the amended agreement:

- Alcoa Corporation made a contribution to MRC in the amount of \$100, along with Ma'aden's earlier capital contribution of \$100, to meet current MRC cash requirements, including paying certain amounts owed by MRC to MAC and Alcoa Corporation;
- Alcoa Corporation and Ma'aden consented to the write-off of \$235 of MRC's delinquent payables to MAC;
- Alcoa Corporation transferred its 25.1% interest in MRC to Ma'aden and, as a result, has no further direct or indirect equity interest in MRC;
- Alcoa Corporation is released from all future MRC obligations, including Alcoa Corporation's sponsor support of \$296 of MRC debt (see Note R) and its share of any future MRC cash requirements; and,
- Alcoa Corporation and Ma'aden further defined MBAC and MAC shareholder rights, including the timing and determination of the amount of dividend payments of excess cash to the joint venture partners following required distributions to the commercial lenders of MBAC and MAC; among other matters.

The amendment also defines October 1, 2021 as the date after which Alcoa Corporation is permitted to sell all of its shares in both MBAC and MAC collectively, for which Ma'aden has a right of first refusal. The agreement further outlines that Alcoa Corporation's call option and Ma'aden's put option, relating to additional interests in the joint venture, are exercisable for a period of six-months after October 1, 2021.

The parties will maintain their commercial relationship and as part of the agreement, Alcoa Corporation provided sales, logistics and customer technical services support for MRC products for the North American can sheet market through December 2019. The Company will retain its 25.1% minority interest in MBAC and MAC, and Ma'aden will continue to own a 74.9% interest.

The \$319 restructuring charge resulting from the MRC divestiture included the write-off of Alcoa Corporation's investment in MRC of \$161, the cash contributions described above of \$100, and the write-off of Alcoa Corporation's share of MRC's delinquent payables due to MAC of \$59 that were forgiven as part of this transaction, which were partially offset by a gain of \$1 from the write-off of the fair value of debt guarantee.

2018 Actions. In 2018, Alcoa Corporation recorded Restructuring and other charges, net, of \$527, which were comprised of the following components: \$331 (net) related to settlements and curtailments of certain pension and other postretirement benefits (see Note N); \$107 to establish an allowance on certain value-added tax credits related to the Company's operations in Brazil (see Note T); \$86 for costs related to the energy supply agreement at the curtailed Wenatchee (Washington) smelter, including \$73 associated with 2018 management decision not to restart the fully curtailed Wenatchee smelter within the term provided in the energy supply agreement; a \$15 net benefit for settlement of matters related to the Portovesme (Italy) smelter; and an \$18 net charge for other items.

In June 2018, management decided not to restart the fully curtailed Wenatchee smelter within the term provided in the related electricity supply agreement. Alcoa Corporation was therefore required to make a \$62 payment to the energy supplier under the provisions of the agreement. Additionally, management decided to permanently close one (38 kmt) of the four potlines at this smelter. This potline has not operated since 2001 and the investments needed to restart this line were cost prohibitive. The remaining three curtailed potlines have a capacity of 146 kmt. In connection with these decisions, the Company recognized a charge of \$73, composed of the \$62 payment, \$10 for asset impairments, and \$1 for asset retirement obligations triggered by the decision to decommission the potline.

2017 Actions. In 2017, Alcoa Corporation recorded Restructuring and other charges, net, of \$309, which were comprised of the following components: \$244 related to the early termination of a power contract (see below); \$49 for exit costs related to a decision to permanently close and demolish a smelter (see below); \$41 for additional contract costs related to the curtailed Wenatchee and São Luís (Brazil) smelters; \$22 for layoff costs, including the separation of approximately 130 employees (115 in the Aluminum segment), mostly for voluntary separation programs; a \$22 reversal to reduce a reserve previously established at the end of 2015 related to a legal matter in Italy; an \$18 net charge for other items, including the relocation of the Company's headquarters and principal executive office from New York, New York to Pittsburgh, Pennsylvania; and a \$43 reversal associated with several reserves related to prior periods (see below).

In October 2017, Alcoa Corporation and Luminant Generation Company LLC (Luminant) executed an early termination agreement of a power contract, as well as other related fuel and lease agreements, effective October 1, 2017, related to the Company's Rockdale (Texas) smelter, which has been fully curtailed since the end of 2008. In accordance with the terms of the early termination agreement, Alcoa made a cash payment of \$238 and transferred approximately 2,200 acres of related land and other assets and liabilities to Luminant (net asset carrying value of \$6).

Since the curtailment of the Rockdale smelter, the Company had been selling surplus electricity into the energy market. In 2017 (through September 30), Alcoa Corporation recognized \$105 in Sales and \$148 in Cost of goods sold on the accompanying Statement of Consolidated Operations related to the sale of the surplus electricity and the cost of the Luminant power contract.

In December 2017, management approved the permanent closure and demolition of the Rockdale smelter (capacity of 191 kmt-per-year) and related operations effective immediately. Demolition and remediation activities related to this action began in 2018 and are expected to be completed by the end of 2022. Separately, the Company continues to own more than 30,000 acres of land surrounding the Rockdale operations.

In 2017, costs related to this decision included asset impairments of \$32, representing the write-off of the remaining book value of all related properties, plants, and equipment; \$1 for the layoff of approximately 10 employees (Corporate); and \$16 in other costs. Additionally in 2017, remaining inventories, mostly operating supplies and raw materials, were written down to their net realizable value, resulting in a charge of \$6, which was recorded in Cost of goods sold on the accompanying Statement of Consolidated Operations. The other costs of \$16 represent \$8 in asset retirement obligations and \$8 in environmental remediation, both of which were triggered by the decisions to permanently close and demolish the Rockdale facilities.

In July 2017, Alcoa Corporation announced plans to restart three (capacity of 161 kmt-per-year) of the five potlines (capacity of 269 kmt-per-year) at the Warrick (Indiana) smelter. This smelter was previously permanently closed in March 2016 by ParentCo. As a result of the decision to reopen this smelter, in 2017, Alcoa Corporation reversed \$33 in remaining liabilities related to the original closure decision. These liabilities consisted of \$20 in asset retirement obligations and \$4 in environmental remediation obligations, which were necessary due to the previous decision to demolish the smelter, and \$9 in severance and contract termination costs. Additionally, the carrying value of the smelter and related assets was reduced to zero as the smelter ramped down between the permanent closure decision date (end of 2015) and the end of March 2016.

The separations associated with 2017 restructuring programs were essentially completed during the 2018 fiscal year. In 2018 and 2017, cash payments of \$3 and \$9, respectively, were made against layoff reserves related to 2017 restructuring programs.

Alcoa Corporation does not include Restructuring and other charges, net in the results of its reportable segments. The impact of allocating such charges to segment results would have been as follows:

	2019		2018		2017
Bauxite	\$ 5	\$	1	\$	2
Alumina	272		112		3
Aluminum	611		102		51
Segment total	888		215		56
Corporate	143		312		253
Total Restructuring and other charges, net	\$ 1,031	\$	527	\$	309

Activity and reserve balances for restructuring charges were as follows:

	Severance and employee termination costs		Other costs		Total
Balances at December 31, 2016	\$	38	\$	28	\$ 66
Restructuring charges, net		15		50	65
Cash payments		(30)		(43)	(73)
Reversals and other		(12)		(1)	(13)
Balances at December 31, 2017		11		34	45
Restructuring charges, net		2		109	111
Cash payments		(7)		(95)	(102)
Reversals and other		(1)		(6)	(7)
Balances at December 31, 2018		5		42	47
Restructuring charges, net		51		161	212
Cash payments		(19)		(99)	(118)
Reversals and other		(2)		(2)	(4)
Balances at December 31, 2019	\$	35	\$	102	\$ 137

The activity and reserve balances include only Restructuring charges, net that impact the reserves for Severance and employee termination costs and Other costs. Restructuring and other charges, net that affected other liability accounts such as environmental obligations (see Note R), asset retirement obligations (see Note Q), and pension and other postretirement reserves (see Note N) are excluded from the above activity and balances. Reversals and other include reversals of previously recorded liabilities and foreign currency translation impacts.

The current portion of the reserve balance is reflected in Other current liabilities on the Consolidated Balance Sheet. The noncurrent portion of the reserve at December 31, 2019 was \$13, of which \$12 relates to financial contributions to PARTER.

E. Segment and Related Information

Segment Information

Alcoa Corporation is a producer of bauxite, alumina, and aluminum products (primary and flat-rolled). The Company has three operating and reportable segments, which are organized by product on a global basis: Bauxite, Alumina, and Aluminum. Segment performance under Alcoa Corporation's management reporting system is evaluated based on a number of factors; however, the primary measure of performance is the Adjusted EBITDA (Earnings before interest, taxes, depreciation, and amortization) of each segment. The Company calculates segment Adjusted EBITDA as Total sales (third-party and intersegment) minus the following items: Cost of goods sold; Selling, general administrative, and other expenses; and Research and development expenses. Alcoa Corporation's Adjusted EBITDA may not be comparable to similarly titled measures of other companies. The chief operating decision maker function regularly reviews the financial information, including Sales and Adjusted EBITDA, of these three operating segments to assess performance and allocate resources.

Segment assets include, among others, customer receivables (third-party and intersegment), inventories, properties, plants, and equipment, and equity investments. The accounting policies of the segments are the same as those described in the Summary of Significant Accounting Policies (see Note B). Transactions among segments are established based on negotiation among the parties. Differences between segment totals and Alcoa Corporation's consolidated totals for line items not reconciled are in Corporate.

The following are detailed descriptions of Alcoa Corporation's reportable segments:

Bauxite. This segment represents the Company's global bauxite mining operations. A portion of this segment's production represents the offtake from equity method investments in Brazil and Guinea, as well as AWAC's share of bauxite production related to an equity investment in Saudi Arabia. The bauxite mined by this segment is sold primarily to internal customers within the Alumina segment; a portion of the bauxite is sold to external customers. Bauxite mined by this segment and used internally is transferred to the Alumina segment at negotiated terms that are intended to approximate market prices; sales to third-parties are conducted on a contract basis. Generally, this segment's sales are transacted in U.S. dollars while costs and expenses are transacted in the local currency of the respective operations, which are the Australian dollar and the Brazilian real. Most of the operations that comprise the Bauxite segment are part of AWAC (see Principles of Consolidation in Note A).

Alumina. This segment represents the Company's worldwide refining system, which processes bauxite into alumina. The alumina produced by this segment is sold primarily to internal and external aluminum smelter customers; a portion of the alumina is sold to external customers who process it into industrial chemical products. Approximately two-thirds of Alumina's production is sold under supply contracts to third parties worldwide, while the remainder is used internally by the Aluminum segment. Alumina produced by this segment and used internally is transferred to the Aluminum segment at prevailing market prices. A portion of this segment's third-party sales are completed through the use of alumina traders. Generally, this segment's sales are transacted in U.S. dollars while costs and expenses are transacted in the local currency of the respective operations, which are the Australian dollar, the Brazilian real, the U.S. dollar, and the euro. Most of the operations that comprise the Alumina segment are part of AWAC (see Principles of Consolidation in Note A). This segment also includes AWAC's 25.1% ownership interest in a mining and refining joint venture company in Saudi Arabia (see Note H).

Aluminum. This segment consists of the Company's (i) worldwide smelting and casthouse system, which processes alumina into primary aluminum, (ii) portfolio of energy assets in Brazil, Canada, and the United States, and (iii) rolling mill in the United States.

Aluminum's combined smelting and casting operations produce primary aluminum products, virtually all of which are sold to external customers and traders; a portion of this primary aluminum is consumed by the rolling mill. The smelting operations produce molten primary aluminum, which is then formed by the casting operations into either common alloy ingot (e.g., t-bar, sow, standard ingot) or into value-add ingot products (e.g., foundry, billet, rod, and slab). A variety of external customers purchase the primary aluminum products for use in fabrication operations, which produce products primarily for the transportation, building and construction, packaging, wire, and other industrial markets. Results from the sale of aluminum powder and scrap are also included in this segment, as well as the impacts of embedded aluminum derivatives (see Note O) related to energy supply contracts.

The energy assets supply power to external customers in Brazil and, to a lesser extent, in the United States, and internal customers in the Aluminum (Canadian smelters and Warrick (Indiana) smelter and rolling mill) and Alumina segments (Brazilian refineries).

The rolling mill produces aluminum sheet primarily sold directly to customers in the packaging market for the production of aluminum cans (beverage and food). Additionally, from the Separation Date through the end of 2018, Alcoa Corporation had a tolling arrangement (contractually ended on December 31, 2018) with Arconic whereby Arconic's rolling mill in Tennessee produced can sheet products for certain customers of the Company's rolling operations. Alcoa Corporation supplied all of the raw materials to the Tennessee facility and paid Arconic for the tolling service.

Generally, this segment's aluminum sales are transacted in U.S. dollars while costs and expenses of this segment are transacted in the local currency of the respective operations, which are the U.S. dollar, the euro, the Norwegian krone, the Icelandic króna, the Canadian dollar, the Brazilian real, and the Australian dollar.

This segment also includes Alcoa Corporation's 25.1% ownership interest in both a smelting (full year) and rolling mill (through the second quarter of 2019) joint venture company in Saudi Arabia (see Note H).

The operating results, capital expenditures, and assets of Alcoa Corporation's reportable segments were as follows:

	Bauxite	Alumina	Aluminum	Total
2019				
Sales:				
Third-party sales	\$ 297	\$ 3,250	\$ 6,803	\$ 10,350
Intersegment sales	979	1,561	17	2,557
Total sales	\$ 1,276	\$ 4,811	\$ 6,820	\$ 12,907
Segment Adjusted EBITDA	\$ 504	\$ 1,097	\$ 25	\$ 1,626
Supplemental information:				
Depreciation, depletion, and amortization	\$ 120	\$ 214	\$ 346	\$ 680
Equity income (loss)	—	6	(49)	(43)
2018				
Sales:				
Third-party sales	\$ 271	\$ 4,215	\$ 8,829	\$ 13,315
Intersegment sales	944	2,101	18	3,063
Total sales	\$ 1,215	\$ 6,316	\$ 8,847	\$ 16,378
Segment Adjusted EBITDA	\$ 426	\$ 2,373	\$ 451	\$ 3,250
Supplemental information:				
Depreciation, depletion, and amortization	\$ 111	\$ 197	\$ 394	\$ 702
Equity income (loss)	—	32	(38)	(6)
2017				
Sales:				
Third-party sales	\$ 333	\$ 3,133	\$ 8,027	\$ 11,493
Intersegment sales	875	1,723	21	2,619
Total sales	\$ 1,208	\$ 4,856	\$ 8,048	\$ 14,112
Segment Adjusted EBITDA	\$ 424	\$ 1,289	\$ 1,026	\$ 2,739
Supplemental information:				
Depreciation, depletion, and amortization	\$ 82	\$ 207	\$ 419	\$ 708
Equity loss	—	(5)	(19)	(24)
2019				
Assets:				
Capital expenditures	\$ 53	\$ 137	\$ 152	\$ 342
Equity investments	212	293	587	1,092
Total assets	1,434	4,303	6,588	12,325
2018				
Assets:				
Capital expenditures	\$ 47	\$ 194	\$ 125	\$ 366
Equity investments	189	290	856	1,335
Total assets	1,448	4,643	7,715	13,806

The following tables reconcile certain segment information to consolidated totals:

	2019	2018	2017
Sales:			
Total segment sales	\$ 12,907	\$ 16,378	\$ 14,112
Elimination of intersegment sales	(2,557)	(3,063)	(2,619)
Other	83	88	159
Consolidated sales	\$ 10,433	\$ 13,403	\$ 11,652

	2019	2018	2017
Net (loss) income attributable to Alcoa Corporation:			
Total Segment Adjusted EBITDA ⁽¹⁾	\$ 1,626	\$ 3,250	\$ 2,739
Unallocated amounts:			
Transformation ⁽²⁾	(7)	(3)	(49)
Intersegment eliminations ^{(1),(3)}	150	(8)	(80)
Corporate expenses ⁽⁴⁾	(101)	(96)	(131)
Provision for depreciation, depletion, and amortization	(713)	(733)	(750)
Restructuring and other charges, net (D)	(1,031)	(527)	(309)
Interest expense (T)	(121)	(122)	(104)
Other expenses, net (T)	(162)	(64)	(27)
Other ⁽⁵⁾	(79)	(72)	(89)
Consolidated (loss) income before income taxes	(438)	1,625	1,200
Provision for income taxes (P)	(415)	(732)	(592)
Net income attributable to noncontrolling interest	(272)	(643)	(329)
Consolidated net (loss) income attributable to Alcoa Corporation	\$ (1,125)	\$ 250	\$ 279

- (1) As of January 1, 2019, the Company changed its accounting method for valuing certain inventories from LIFO to average cost. The effects of the change in accounting principle have been retrospectively applied to all prior periods presented. See Note I. As a result, for the years ended December 31, 2018 and 2017, Total segment Adjusted EBITDA increased \$47 and \$14, respectively, and the Intersegment eliminations value above decreased \$19 and increased \$27, respectively.
- (2) Transformation includes, among other items, the Adjusted EBITDA of previously closed operations.
- (3) Concurrent with the change in inventory accounting method as of January 1, 2019, management elected to change the presentation of certain line items in the reconciliation of total Segment Adjusted EBITDA to Consolidated net (loss) income attributable to Alcoa Corporation. Corporate inventory accounting previously included the impact of LIFO, metal price lag and intersegment eliminations. The impact of LIFO has been eliminated with the change in inventory method. Metal price lag attributable to the Company's rolled operations business is now netted within the Aluminum segment to simplify presentation of an impact that nets to zero in consolidation. Only intersegment eliminations remain as a reconciling line item and are labeled as such.
- (4) Corporate expenses are composed of general administrative and other expenses of operating the corporate headquarters and other global administrative facilities, as well as research and development expenses of the corporate technical center.
- (5) Other includes certain items that impact Cost of goods sold and Selling, general administrative, and other expenses on Alcoa Corporation's Statement of Consolidated Operations that are not included in the Adjusted EBITDA of the reportable segments.

December 31,	2019	2018
Assets:		
Total segment assets	\$ 12,325	\$ 13,806
Elimination of intersegment receivables	(170)	(271)
Unallocated amounts:		
Cash and cash equivalents	879	1,113
Corporate fixed assets, net	519	520
Corporate goodwill	145	146
Deferred income taxes	642	560
Other	291	258
Consolidated assets	\$ 14,631	\$ 16,132

Product Information

Alcoa Corporation has five product divisions as follows:

Bauxite—Bauxite is a reddish clay rock that is mined from the surface of the earth’s terrain. This ore is the basic raw material used to produce alumina and is the primary source of aluminum.

Alumina—Alumina is an oxide that is extracted from bauxite and is the basic raw material used to produce primary aluminum. This product can also be consumed for non-metallurgical purposes, such as industrial chemical products.

Primary aluminum—Primary aluminum is metal in the form of a common alloy ingot (e.g., t-bar, sow, standard ingot) or a value-add ingot (e.g., billet, rod, and slab). These products are sold primarily to customers that produce products for the transportation, building and construction, packaging, wire, and other industrial markets.

Flat-rolled aluminum—Flat-rolled aluminum is metal in the form of sheet, which is sold primarily to customers that produce beverage and food cans, including body, tab, and end stock.

Energy—Energy is the generation of electricity, which is sold in the wholesale market to traders, large industrial consumers, distribution companies, and other generation companies.

The following table represents the general commercial profile of the Company’s Bauxite, Alumina, Primary aluminum, and Flat-rolled aluminum product divisions (see text below table for Energy):

Product division	Pricing components	Shipping terms⁽⁴⁾	Payment terms⁽⁵⁾
Bauxite	Negotiated	FOB/CIF	LC Sight
Alumina:			
Smelter-grade	API ⁽¹⁾ /spot	FOB	LC Sight/CAD/Net 30 days
Non-metallurgical	Negotiated	FOB/CIF	Net 30 days
Primary aluminum:			
Common alloy ingot	LME + Regional premium ⁽²⁾	DAP/CIF	Net 10 to 45 days
Value-add ingot	LME + Regional premium + Product premium ⁽²⁾	DAP/CIF	Net 30 to 45 days
Flat-rolled aluminum	Metal + Conversion ⁽³⁾	DAP	Negotiated

- (1) API (Alumina Price Index) is a pricing mechanism that is calculated by the Company based on the weighted average of a prior month’s daily spot prices published by the following three indices: CRU Metallurgical Grade Alumina Price; Platts Metals Daily Alumina PAX Price; and Metal Bulletin Non-Ferrous Metals Alumina Index.
- (2) LME (London Metal Exchange) is a globally recognized exchange for commodity trading, including aluminum. The LME pricing component represents the underlying base metal component, based on quoted prices for aluminum on the exchange. The regional premium represents the incremental price over the base LME component that is associated with the physical delivery of metal to a particular region (e.g., the Midwest premium for metal sold in the United States). The product premium represents the incremental price for receiving physical metal in a particular shape (e.g., billet, rod, slab, etc.) or alloy.
- (3) Metal represents the underlying base metal component plus a regional premium (see footnote 2). Conversion represents the incremental price over the metal price component that is associated with converting primary or scrap aluminum into sheet.
- (4) CIF (cost, insurance, and freight) means that the Company pays for these items until the product reaches the buyer’s designated destination point related to transportation by vessel. DAP (delivered at place) means the same as CIF related to all methods of transportation. FOB (free on board) means that the Company pays for costs, insurance, and freight until the product reaches the seller’s designated shipping point.
- (5) The net number of days means that the customer is required to remit payment to the Company for the invoice amount within the designated number of days. LC Sight is a letter of credit that is payable immediately (usually within five to ten business days) after a seller meets the requirements of the letter of credit (i.e. shipping documents that evidence the seller performed its obligations as agreed to with a buyer). CAD (cash against documents) is a payment arrangement in which a seller instructs a bank to provide shipping and title documents to the buyer at the time the buyer pays in full the accompanying bill of exchange.

For the Company's Energy product division, sales of electricity are based on current market prices. Electricity is provided to customers on demand through a national or regional power grid; the customer simultaneously receives and consumes the electricity. Payment terms are generally within 10 days related to the previous 30 days of electricity consumption.

The following table details Alcoa Corporation's Third-party sales by product division:

	2019	2018	2017
Sales:			
Primary aluminum	\$ 5,426	\$ 6,787	\$ 6,168
Alumina	3,246	4,209	3,121
Flat-rolled aluminum	1,220	1,884	1,666
Energy	290	335	446
Bauxite	276	254	333
Other	(25)	(66)	(82)
	\$ 10,433	\$ 13,403	\$ 11,652

Other includes realized gains and losses related to embedded derivative instruments designated as cash flow hedges of forward sales of aluminum (see Note O).

Geographic Area Information

Geographic information for Third-party sales was as follows (based upon the country where the point of sale originated):

	2019	2018	2017
Sales:			
United States ⁽¹⁾	\$ 4,606	\$ 5,887	\$ 5,313
Spain ⁽²⁾	3,077	3,806	3,303
Australia	2,249	2,930	2,266
Brazil	428	498	569
Canada	5	216	150
Other	68	66	51
	\$ 10,433	\$ 13,403	\$ 11,652

(1) Sales of a portion of the alumina from refineries in Australia and Brazil and most of the aluminum from smelters in Canada occurred in the United States.

(2) Sales of the aluminum produced from smelters in Iceland and Norway, as well as the off-take related to an interest in the Saudi Arabia joint venture (see Note H), occurred in Spain.

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

December 31,	2019	2018
Long-lived assets:		
Australia	\$ 2,044	\$ 2,002
Brazil	1,596	1,729
United States	1,491	1,599
Iceland	1,160	1,216
Canada	1,047	1,064
Norway	365	381
Spain	209	321
Other	4	15
	\$ 7,916	\$ 8,327

F. Earnings Per Share

Basic earnings per share (EPS) amounts are computed by dividing Net (loss) income attributable to Alcoa Corporation 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 share information used to compute basic and diluted EPS attributable to Alcoa Corporation common shareholders was as follows (in millions):

	2019	2018	2017
Average shares outstanding—basic	185	186	184
Effect of dilutive securities:			
Stock options	—	1	1
Stock units	—	2	2
Average shares outstanding—diluted	185	189	187

In 2019, basic average shares outstanding and diluted average shares outstanding were the same because the effect of potential shares of common stock was anti-dilutive. Had Alcoa generated net income in 2019, one million common share equivalents related to four million outstanding stock units and stock options combined would have been included in diluted average shares outstanding for the respective period. Options to purchase two million shares of common stock outstanding at December 31, 2019 had a weighted average exercise price of \$32.66 per share which was greater than the average market price of Alcoa Corporation's common stock.

Options to purchase one million shares of common stock outstanding as of December 31, 2018 at a weighted average exercise price of \$38.67 per share were not included in the computation of diluted EPS because the exercise prices of these options were greater than the average market price of Alcoa Corporation's common stock.

G. Accumulated Other Comprehensive Loss

The following table details the activity of the three components that comprise Accumulated other comprehensive loss for both Alcoa Corporation's shareholders and noncontrolling interest:

	Alcoa Corporation			Noncontrolling interest		
	2019	2018	2017	2019	2018	2017
Pension and other postretirement benefits (N)						
Balance at beginning of period	\$ (2,283)	\$ (2,786)	\$ (2,330)	\$ (46)	\$ (47)	\$ (56)
Other comprehensive (loss) income:						
Unrecognized net actuarial loss and prior service cost/benefit	(309)	19	(671)	(14)	(3)	9
Tax benefit (expense)	28	(8)	25	—	—	(2)
Total Other comprehensive (loss) income before reclassifications, net of tax	(281)	11	(646)	(14)	(3)	7
Amortization of net actuarial loss and prior service cost/benefit ⁽¹⁾	299	546	199	5	4	2
Tax expense ⁽²⁾	(17)	(54)	(9)	(1)	—	—
Total amount reclassified from Accumulated other comprehensive loss, net of tax ⁽⁷⁾	282	492	190	4	4	2
Total Other comprehensive (loss) income	1	503	(456)	(10)	1	9
Balance at end of period	\$ (2,282)	\$ (2,283)	\$ (2,786)	\$ (56)	\$ (46)	\$ (47)
Foreign currency translation						
Balance at beginning of period	\$ (2,071)	\$ (1,467)	\$ (1,655)	\$ (810)	\$ (581)	\$ (677)
Other comprehensive (loss) income ⁽³⁾	(89)	(604)	188	(24)	(229)	96
Balance at end of period	\$ (2,160)	\$ (2,071)	\$ (1,467)	\$ (834)	\$ (810)	\$ (581)
Cash flow hedges (O)						
Balance at beginning of period	\$ (211)	\$ (929)	\$ 210	\$ 31	\$ 51	\$ 1
Other comprehensive (loss) income:						
Net change from periodic revaluations	(437)	803	(1,489)	20	(4)	83
Tax benefit (expense)	83	(159)	251	(6)	1	(25)
Total Other comprehensive (loss) income before reclassifications, net of tax	(354)	644	(1,238)	14	(3)	58
Net amount reclassified to earnings:						
Aluminum contracts ⁽⁴⁾	44	108	130	—	—	—
Financial contracts ⁽⁵⁾	(43)	(37)	(19)	(35)	(24)	(12)
Foreign exchange contracts ⁽⁴⁾	18	6	(2)	—	—	—
Interest rate contract ⁽⁶⁾	4	—	—	—	—	—
Sub-total	23	77	109	(35)	(24)	(12)
Tax benefit (expense) ⁽²⁾	10	(3)	(10)	10	7	4
Total amount reclassified from Accumulated other comprehensive loss, net of tax ⁽⁷⁾	33	74	99	(25)	(17)	(8)
Total Other comprehensive (loss) income	(321)	718	(1,139)	(11)	(20)	50
Balance at end of period	\$ (532)	\$ (211)	\$ (929)	\$ 20	\$ 31	\$ 51
Total Accumulated other comprehensive loss	\$ (4,974)	\$ (4,565)	\$ (5,182)	\$ (870)	\$ (825)	\$ (577)

- (1) These amounts were included in the computation of net periodic benefit cost for pension and other postretirement benefits. For 2019, the amounts for Alcoa Corporation include \$116, and for Noncontrolling interest include \$3 related to settlements and/or curtailments of certain pension and other postretirement benefits. For 2018, the amounts for Alcoa Corporation include \$330, (net) and for Noncontrolling interest include \$1 related to settlements and/or curtailments of certain pension and other postretirement benefits (see Note N).
- (2) These amounts were reported 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) These amounts were reported in Sales on the accompanying Statement of Consolidated Operations.
- (5) These amounts were reported in Cost of goods sold on the accompanying Statement of Consolidated Operations.
- (6) These amounts were included in Other expenses, net on the accompanying Statement of Consolidated Operations.
- (7) A positive amount indicates a corresponding charge to earnings and a negative amount indicates a corresponding benefit to earnings.

H. Investments

December 31,	2019	2018
Equity investments	\$ 1,103	\$ 1,350
Other investments	10	10
	\$ 1,113	\$ 1,360

Equity Investments. The following table summarizes information of Alcoa Corporation's equity investments as of December 31, 2019 and 2018. In 2019, 2018, and 2017, Alcoa Corporation received \$39, \$45, and \$71, respectively, in dividends from these equity investments. The Company divested its interest in the Ma'aden Rolling Company in June 2019 (see below). Each of the investees either owns the facility listed or has an ownership interest in an entity that owns the facility listed:

Investee	Country	Nature of investment	Ownership interest
Ma'aden Aluminum Company	Saudi Arabia	Aluminum smelter and casthouse	25.1%
Ma'aden Bauxite and Alumina Company	Saudi Arabia	Bauxite mine and alumina refinery	25.1%
Halco Mining, Inc.	Guinea	Bauxite mine	45%
Energética Barra Grande S.A.	Brazil	Hydroelectric generation facility	42.18%
Pechiney Reynolds Quebec, Inc.	Canada	Aluminum smelter	50%
Consortio Serra do Facão	Brazil	Hydroelectric generation facility	34.97%
Mineração Rio do Norte S.A.	Brazil	Bauxite mine	18.2%
Manicouagan Power Limited Partnership	Canada	Hydroelectric generation facility	40%
Elysis™ Limited Partnership	Canada	Aluminum smelting technology	48.235%

Saudi Arabia Joint Venture—Alcoa Corporation and Ma'aden have a 30-year (from December 2009) joint venture shareholders agreement (automatic extension for an additional 20 years, unless the parties agree otherwise or unless earlier terminated) setting forth the terms for the development, construction, ownership, and operation of an integrated aluminum complex in Saudi Arabia. The project developed by the joint venture consists of a bauxite mine from the Al Ba'itha bauxite deposit in the northern part of Saudi Arabia, an alumina refinery, a primary aluminum smelter, and an aluminum rolling mill.

The joint venture is owned 74.9% by Ma'aden and 25.1% by Alcoa Corporation and originally consisted of three separate companies as follows: the bauxite mine and alumina refinery (MBAC), the smelter (MAC), and the rolling mill (MRC). In June 2019, Alcoa Corporation and Ma'aden amended the joint venture agreement that governs the operations of each of the three companies that comprise the joint venture. Under the terms of the agreement, Alcoa Corporation transferred its 25.1% interest in MRC to Ma'aden and, as a result, has no further direct or indirect equity interest in MRC. Refer to Note D for additional information related to the agreement amendment.

A number of Alcoa Corporation employees perform various types of services for the smelting, rolling mill, and mining and refining companies as part of the operation of the fully-integrated aluminum complex. At December 31, 2019 and 2018, the Company had an aggregate outstanding receivable of \$8 and \$11, respectively, from the smelting, rolling mill, and mining and refining companies for labor and other employee-related expenses.

As of December 31, 2019 and 2018, the carrying value of Alcoa's investment in this joint venture was \$603 and \$874, respectively.

Elysis™ Limited Partnership—In June 2018, Alcoa Corporation, Rio Tinto plc, and the provincial government of Québec, Canada launched a new joint venture, Elysis™ Limited Partnership (Elysis™). The purpose of this partnership is to advance larger scale development and commercialization of its patent-protected technology that produces oxygen and eliminates all direct greenhouse gas emissions from the traditional aluminum smelting process. Alcoa and Rio Tinto plc, as general partners, each own a 48.235% stake in Elysis™, and the Québec provincial government, as a limited partner, owns a 3.53% stake. The federal government of Canada and Apple Inc., as well as the Québec provincial government, will provide initial financing to the partnership. The total planned combined investment (equity and debt) of the five participants in the joint venture is \$144 (C\$188). Alcoa and Rio Tinto plc will invest a combined \$42 (C\$55) in the joint venture, as well as contribute and license certain intellectual property and patents to Elysis™. To date, the Company has contributed \$5 (C\$6) toward its initial investment commitment in Elysis™. In addition to cash contributions, Alcoa is contributing \$3 in research and development expenses annually. The Company's basis in the investment has been reduced to zero for its share of losses incurred to date. As a result, the Company has \$17 in unrecognized losses as of December 31, 2019 that will be recognized upon additional contributions into the partnership.

The following table summarizes the profit and loss data for the respective periods ended December 31, as it relates to Alcoa Corporation's equity investments. For 2019, the information shown for the Saudi Arabia Joint Venture includes the full period for both MAC and MBAC, and the data for MRC through the divestiture date. The investments are grouped based on

the nature of the investment. The Mining investments are part of the Bauxite segment, while the Energy and Other investments are primarily part of the Aluminum segment.

	Saudi Arabia Joint Venture		Mining		Energy		Other	
2019								
Sales	\$	3,185	\$	846	\$	269	\$	159
Cost of goods sold		2,722		580		143		151
Net (loss) income		(198)		35		107		(28)
Equity in net (loss) income of affiliated companies, before reconciling adjustments		(50)		16		42		(13)
Other		3		5		1		16
Alcoa Corporation's equity in net (loss) income of affiliated companies		(47)		21		43		3
2018								
Sales	\$	3,986	\$	802	\$	283	\$	120
Cost of goods sold		3,334		522		146		110
Net income		9		71		114		16
Equity in net income of affiliated companies, before reconciling adjustments		2		23		46		8
Other		(13)		(10)		(4)		(1)
Alcoa Corporation's equity in net (loss) income of affiliated companies		(11)		13		42		7
2017								
Sales	\$	3,032	\$	766	\$	339	\$	332
Cost of goods sold		2,776		539		174		292
Net (loss) income		(157)		77		139		23
Equity in net (loss) income of affiliated companies, before reconciling adjustments		(39)		27		53		11
Other		9		(1)		2		—
Alcoa Corporation's equity in net (loss) income of affiliated companies		(30)		26		55		11

The following table summarizes the balance sheet data for Alcoa Corporation's equity investments. The information shown for the Saudi Arabia Joint Venture for 2019 only includes the combined balances for MAC and MBAC.

	Saudi Arabia Joint Venture		Mining		Energy		Other	
2019								
Current assets	\$	1,109	\$	191	\$	106	\$	181
Noncurrent assets		7,931		923		509		761
Current liabilities		677		156		41		59
Noncurrent liabilities		5,587		511		87		42
2018								
Current assets	\$	1,684	\$	185	\$	84	\$	139
Noncurrent assets		9,115		817		542		97
Current liabilities		1,379		126		36		49
Noncurrent liabilities		6,101		439		101		4

I. Inventories

December 31,	2019		2018	
Finished goods	\$	305	\$	346
Work-in-process		282		189
Bauxite and alumina		446		609
Purchased raw materials		453		529
Operating supplies		158		146
	\$	1,644	\$	1,819

As of January 1, 2019, the Company changed its method for valuing certain of its inventories held in the United States and Canada to the average cost method of accounting from the LIFO method. Inventories held by other subsidiaries of the parent company were previously, and continue to be, valued principally using the average cost method. Management believes that the change in accounting is preferable as it results in a consistent method to value inventory across all regions of the business, it improves comparability with industry peers, and it more closely resembles the physical flow of inventory.

The effects of the change in accounting principle from LIFO to average cost have been retrospectively applied to all periods presented. This change resulted in a favorable adjustment to Retained (deficit) earnings of \$143 and an unfavorable adjustment to Noncontrolling interest of \$22 as of January 1, 2017. In addition, certain financial statement line items in the Company's Statement of Consolidated Operations, Statement of Consolidated Comprehensive Income, and Statement of Consolidated Cash Flows for the years ended December 31, 2018 and 2017 and Consolidated Balance Sheet as of December 31, 2018 were adjusted as follows:

	<u>As Originally Reported</u>	<u>Effect of Change</u>	<u>As Adjusted</u>
Statement of Consolidated Operations for the year ended December 31, 2018:			
Cost of goods sold	\$ 10,081	\$ (28)	\$ 10,053
Provision for income taxes	726	6	732
Net income	871	22	893
Net income attributable to noncontrolling interest	644	(1)	643
Net income attributable to Alcoa Corporation	227	23	250
Earnings per share attributable to Alcoa Corporation common shareholders:			
Basic	\$ 1.22	\$ 0.12	\$ 1.34
Diluted	1.20	0.13	1.33
Statement of Consolidated Comprehensive Income for the year ended December 31, 2018:			
Comprehensive income	\$ 1,240	\$ 22	\$ 1,262
Comprehensive income attributable to noncontrolling interest	396	(1)	395
Comprehensive income attributable to Alcoa Corporation	844	23	867
Consolidated Balance Sheet as of December 31, 2018:			
Inventories	\$ 1,644	\$ 175	\$ 1,819
Prepaid expenses and other current assets	301	19	320
Retained earnings	341	229	570
Noncontrolling interest	2,005	(35)	1,970
Statement of Consolidated Cash Flows for the year ended December 31, 2018:			
Net income	\$ 871	\$ 22	\$ 893
Deferred income taxes	(36)	6	(30)
(Increase) in inventories	(278)	(28)	(306)
Statement of Consolidated Operations for the year ended December 31, 2017:			
Cost of goods sold	\$ 8,991	\$ (41)	\$ 8,950
Provision for income taxes	600	(8)	592
Net income	559	49	608
Net income attributable to noncontrolling interest	342	(13)	329
Net income attributable to Alcoa Corporation	217	62	279
Earnings per share attributable to Alcoa Corporation common shareholders:			
Basic	\$ 1.18	\$ 0.33	\$ 1.51
Diluted	1.16	0.33	1.49
Statement of Consolidated Comprehensive Income for the year ended December 31, 2017:			
Comprehensive loss	\$ (693)	\$ 49	\$ (644)
Comprehensive income attributable to noncontrolling interest	497	(13)	484
Comprehensive loss attributable to Alcoa Corporation	(1,190)	62	(1,128)
Statement of Consolidated Cash Flows for the year ended December 31, 2017:			
Net income	\$ 559	\$ 49	\$ 608
Deferred income taxes	176	(8)	168
(Increase) in inventories	(238)	(41)	(279)

The following table compares the amounts that would have been reported under LIFO with the amounts recorded under the average cost method in the Consolidated Financial Statements as of December 31, 2019 and for the year then ended:

	As Computed under LIFO	As Reported under Average Cost	Effect of Change
Statement of Consolidated Operations for the year ended December 31, 2019:			
Cost of goods sold	\$ 8,528	\$ 8,537	\$ 9
Provision for income taxes	400	415	15
Net loss	(829)	(853)	(24)
Net income attributable to noncontrolling interest	246	272	26
Net loss attributable to Alcoa Corporation	(1,075)	(1,125)	(50)
Earnings per share attributable to Alcoa Corporation common shareholders:			
Basic	\$ (5.80)	\$ (6.07)	\$ (0.27)
Diluted	(5.80)	(6.07)	(0.27)
Statement of Consolidated Comprehensive Income for the year ended December 31, 2019:			
Comprehensive loss	\$ (1,283)	\$ (1,307)	\$ (24)
Comprehensive income attributable to noncontrolling interest	201	227	26
Comprehensive loss attributable to Alcoa Corporation	(1,484)	(1,534)	(50)
Consolidated Balance Sheet as of December 31, 2019:			
Inventories	\$ 1,478	\$ 1,644	\$ 166
Prepaid expenses and other current assets	284	288	4
Retained deficit	(734)	(555)	179
Noncontrolling interest	1,783	1,774	(9)
Statement of Consolidated Cash Flows for the year ended December 31, 2019:			
Net loss	\$ (829)	\$ (853)	\$ (24)
Deferred income taxes	—	15	15
Decrease in inventories	128	137	9

J. Properties, Plants, and Equipment, Net

December 31,	2019		2018	
Land and land rights, including mines	\$	333	\$	328
Structures (by type of operation):				
Bauxite mining		1,138		1,119
Alumina refining		2,415		2,478
Aluminum smelting and casting		3,457		3,532
Energy generation		440		506
Aluminum rolling		290		285
Other		386		380
		8,126		8,300
Machinery and equipment (by type of operation):				
Bauxite mining		499		480
Alumina refining		3,956		3,604
Aluminum smelting and casting		6,251		6,489
Energy generation		879		889
Aluminum rolling		1,057		1,029
Other		293		282
		12,935		12,773
		21,394		21,401
Less: accumulated depreciation, depletion, and amortization		13,799		13,480
		7,595		7,921
Construction work-in-progress		321		406
	\$	7,916	\$	8,327

K. Goodwill and Other Intangible Assets

Goodwill, which is included in Other noncurrent assets on the accompanying Consolidated Balance Sheet, was as follows:

December 31,	2019		2018	
Bauxite	\$	2	\$	2
Alumina		3		3
Aluminum		—		—
Corporate ⁽¹⁾		145		146
	\$	150	\$	151

- (1) The carrying value of Corporate's goodwill is net of accumulated impairment losses of \$742 as of both December 31, 2019 and 2018. As of December 31, 2019, the \$145 of goodwill reflected in Corporate is allocated to two of Alcoa Corporation's three reportable segments (\$48 to Bauxite and \$97 to Alumina) for purposes of impairment testing (see Note B). This goodwill is reflected in Corporate for segment reporting purposes because it is not included in management's assessment of performance by the two reportable segments.

Management performed a quantitative assessment of the Alumina reporting unit in 2019. The estimated fair value of the Alumina reporting unit was substantially in excess of its carrying value, resulting in no impairment. Management performed a qualitative assessment of the Bauxite reporting unit in 2019 and determined that it was not more likely that not that the fair value of the reporting unit was less than its carrying value. Management last performed a quantitative impairment test for the Bauxite reporting unit in 2018. At that time, the estimated fair value of the Bauxite reporting unit was substantially in excess of its carrying value, resulting in no impairment.

Other intangible assets, which are included in Other noncurrent assets on the accompanying Consolidated Balance Sheet, were as follows:

December 31,	2019			2018		
	Gross carrying amount	Accumulated amortization	Net carrying amount	Gross carrying amount	Accumulated amortization	Net carrying amount
Computer software	\$ 240	\$ (216)	\$ 24	\$ 237	\$ (211)	\$ 26
Patents and licenses	25	(8)	17	25	(7)	18
Other intangibles	22	(11)	11	19	(6)	13
Total other intangible assets	\$ 287	\$ (235)	\$ 52	\$ 281	\$ (224)	\$ 57

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

Amortization expense related to the intangible assets in the tables above for the years ended December 31, 2019, 2018, and 2017 was \$19, \$12, and \$12, respectively, and is expected to be approximately \$10 annually from 2020 to 2024.

L. Debt

Long-Term Debt.

December 31,	2019		2018	
6.75% Notes, due 2024	\$	750	\$	750
7.00% Notes, due 2026		500		500
6.125% Notes, due 2028		500		500
Other		84		91
Unamortized discounts and deferred financing costs		(34)		(39)
Total		1,800		1,802
Less: amount due within one year		1		1
Long-term debt, less amount due within one year	\$	1,799	\$	1,801

The principal amount of long-term debt maturing in each of the next five years is \$1 in 2020, \$79 in 2021, and \$1 in each of 2022, and 2023, and \$751 in 2024.

144A Debt. In May 2018, Alcoa Nederland Holding B.V. (ANHBV), a wholly-owned subsidiary of Alcoa Corporation, completed a Rule 144A (U.S. Securities Act of 1933, as amended) debt offering for \$500 of 6.125% Senior Notes due 2028 (the “2028 Notes”). ANHBV received \$492 in net proceeds from the debt offering reflecting a discount to the initial purchasers of the 2028 Notes. The net proceeds, along with available cash on hand, were used to make discretionary contributions to certain U.S. defined benefit pension plans (see Note N). The discount to the initial purchasers, as well as costs to complete the financing, was deferred and is being amortized to interest expense over the term of the 2028 Notes. Interest on the 2028 Notes is paid semi-annually in November and May, which commenced November 15, 2018.

ANHBV has the option to redeem the 2028 Notes on at least 30 days, but not more than 60 days, prior notice to the holders of the 2028 Notes under multiple scenarios, including, in whole or in part, at any time or from time to time after May 2023 at a redemption price specified in the indenture (up to 103.063% of the principal amount plus any accrued and unpaid interest in each case). Also, the 2028 Notes are subject to repurchase upon the occurrence of a change in control repurchase event (as defined in the indenture) at a repurchase price in cash equal to 101% of the aggregate principal amount of the 2028 Notes repurchased, plus any accrued and unpaid interest on the 2028 Notes repurchased.

The 2028 Notes indenture includes several customary affirmative covenants. Additionally, the 2028 Notes indenture contains several negative covenants, that, subject to certain exceptions, include limitations on liens, limitations on sale and leaseback transactions, and a prohibition on a reduction in the ownership of AWAC entities below an agreed level. The negative covenants in the 2028 Notes indenture are less extensive than those in the 2024 Notes and 2026 Notes (see below) indenture and the Second Amended Revolving Credit Agreement. For example, the 2028 Notes indenture does not include a limitation on restricted payments, such as repurchases of common stock and shareholder dividends.

The 2028 Notes rank equally in right of payment with all of ANHBV’s existing and future senior indebtedness, including the 2024 Notes and 2026 Notes; rank senior in right of payment to any future subordinated obligations of ANHBV; and are effectively subordinated to ANHBV’s existing and future secured indebtedness, including under the Second Amended Revolving Credit Agreement, to the extent of the value of property and assets securing such indebtedness.

In September 2016, ANHBV completed a Rule 144A (U.S. Securities Act of 1933, as amended) debt offering for \$750 of 6.75% Senior Notes due 2024 (the “2024 Notes”) and \$500 of 7.00% Senior Notes due 2026 (the “2026 Notes” and, collectively with the 2024 Notes, the “Notes”). ANHBV received \$1,228 in net proceeds from the debt offering reflecting a discount to the initial purchasers of the Notes. The net proceeds were used to make a payment to ParentCo to fund the transfer of certain assets from ParentCo to Alcoa Corporation in connection with the Separation Transaction, and the remaining net proceeds were used for general corporate purposes. The discount to the initial purchasers, as well as costs to complete the financing, was deferred and is being amortized to interest expense over the respective terms of the Notes. Interest on the Notes is paid semi-annually in March and September, which commenced March 31, 2017.

ANHBV has the option to redeem the Notes on at least 30 days, but not more than 60 days, prior notice to the holders of the Notes under multiple scenarios, including, in whole or in part, at any time or from time to time after September 2019, in the case of the 2024 Notes, or after September 2021, in the case of the 2026 Notes, at a redemption price specified in the indenture (up to 105.063% of the principal amount for the 2024 Notes and up to 103.500% of the principal amount of the 2026 Notes, plus any accrued and unpaid interest in each case). Also, the Notes are subject to repurchase upon the occurrence of a change in control repurchase event (as defined in the indenture) at a repurchase price in cash equal to 101% of the aggregate principal amount of the Notes repurchased, plus any accrued and unpaid interest on the Notes repurchased.

The Notes and the 2028 Notes are senior unsecured obligations of ANHBV and do not entitle the holders to any registration rights pursuant to a registration rights agreement. ANHBV does not intend to file a registration statement with respect to resales of or an exchange offer for the Notes or 2028 Notes. The Notes and 2028 Notes are guaranteed on a senior unsecured basis by Alcoa Corporation and its subsidiaries that are guarantors under the Second Amended Revolving Credit Agreement (the “subsidiary guarantors” and, together with Alcoa Corporation, the “guarantors”) (see Credit Facility below). Each of the subsidiary guarantors will be released from their guarantees upon the occurrence of certain events, including the release of such guarantor from its obligations as a guarantor under the Second Amended Revolving Credit Agreement.

The Notes indenture contains various restrictive covenants similar to those described below for the Second Amended Revolving Credit Agreement, including a limitation on restricted payments, with, among other exceptions, capacity to pay annual ordinary dividends. Under the indenture, Alcoa Corporation may declare and make annual ordinary dividends in an aggregate amount not to exceed \$38 in each of the November 1, 2016 through December 31, 2017 time period and annual 2018 (no such dividends were made), \$50 in each of annual 2019 and 2020 (no such dividends were made in 2019), and \$75 in the January 1, 2021 through September 30, 2026 (maturity date of the 2026 Notes) time period, except that 50% of any unused amount of the base amount in any of the specified time periods may be used in the next succeeding period following the use of the base amount in said time period. Additionally, the restricted payments negative covenant includes a general exception to allow for potential future transactions incremental to those specifically provided for in the Notes indenture. This general exception provides for an aggregate amount of restricted payments not to exceed the greater of \$250 and 1.5% of Alcoa Corporation’s consolidated total assets. Accordingly, Alcoa Corporation may make annual ordinary dividends in any fiscal year by an aggregate amount of up to \$250, assuming no other restricted payments have reduced, in part or whole, the available limit. The limits of the restricted payments negative covenant under the Second Amended Revolving Credit Agreement (see Credit Facility below) would govern the amount of ordinary dividend payments Alcoa Corporation could

make in a given timeframe if the allowed amount is less than the limits of the restricted payments negative covenant under the Notes indenture.

Credit Facilities. On October 2, 2019, Alcoa Norway ANS, a wholly-owned subsidiary of Alcoa Corporation, entered into a one-year, multicurrency revolving credit facility agreement for NOK 1.3 billion (approximately \$147) which is fully and unconditionally guaranteed on an unsecured basis by Alcoa Corporation. The revolving credit facility is scheduled to mature on October 2, 2020, unless extended or terminated early in accordance with the provisions of the agreement. Alcoa Norway ANS will pay a quarterly commitment fee of 0.465% on the unused portion of the revolving credit facility, starting on January 2, 2020. The interest rate on outstanding NOK loan balances is 1.55% per annum plus the Norwegian Interbank Offered Rate (NIBOR); the interest rate on outstanding US dollar loans is 1.65% per annum plus LIBOR. At December 31, 2019, there were no amounts drawn or outstanding related to this credit facility.

On October 25, 2019, a wholly-owned subsidiary of the Company entered into a \$120 three-year revolving credit facility agreement secured by certain customer receivables. Alcoa Corporation guarantees the performance obligations of the wholly-owned subsidiaries under the facility, however no assets (other than the receivables) are pledged as collateral. Fees paid upon closure of the agreement were approximately \$1, fees associated with the unused portion of the facility range from 25 to 35 basis points of the unused commitment on a 360 day base year, and fees applied to any used portions of the facility are 85 basis points of the used commitment on a 360 day base year. At December 31, 2019, there were no amounts drawn or outstanding related to this credit facility.

On November 21, 2018, Alcoa Corporation and ANHBV entered into a Second Amendment and Restatement Agreement to the Revolving Credit Agreement dated September 16, 2016 and the Amendment and Restatement Agreement dated November 14, 2017 (the Revolving Credit Agreement as revised by the Amendment and Restatement Agreement, the “Amended Revolving Credit Agreement”), in each case, with a syndicate of lenders and issuers named therein to revise certain terms and provisions of the Amended Revolving Credit Agreement (the Amended Revolving Credit Agreement as revised by the Second Amendment and Restatement Agreement, the “Second Amended Revolving Credit Agreement”). Unless noted otherwise, the terms and provisions described below for the Second Amended Revolving Credit Agreement were applicable to the Amended Revolving Credit Agreement from November 14, 2017 to November 20, 2018.

The Second Amended Revolving Credit Agreement provides a \$1,500 senior secured revolving credit facility (the “Revolving Credit Facility”) to be used for working capital and/or other general corporate purposes of Alcoa Corporation and its subsidiaries. Subject to the terms and conditions of the Second Amended Revolving Credit Agreement, ANHBV may from time to time request the issuance of letters of credit up to \$750 under the Revolving Credit Facility, subject to a sublimit of \$400 for any letters of credit issued for the account of Alcoa Corporation or any of its domestic subsidiaries. Additionally, ANHBV may from time to time request that each of the lenders provide one or more additional tranches of term loans and/or increase the aggregate amount of revolving commitments, together in an aggregate principal amount of up to \$500. At December 31, 2019 and 2018, letters of credit issued under the Revolving Credit Facility were \$17 and \$21, respectively.

The Revolving Credit Facility is scheduled to mature on November 21, 2023, unless extended or earlier terminated in accordance with the provisions of the Second Amended Revolving Credit Agreement. ANHBV may make extension requests during the term of the Revolving Credit Facility, subject to the lender consent requirements set forth in the Second Amended Revolving Credit Agreement. Under the provisions of the Second Amended Revolving Credit Agreement, ANHBV will pay a quarterly commitment fee ranging from 0.200% to 0.425% (previously 0.225% to 0.450%) (based on Alcoa Corporation’s leverage ratio) on the unused portion of the Revolving Credit Facility.

A maximum of \$750 in outstanding borrowings under the Revolving Credit Facility may be denominated in euros. Loans will bear interest at a rate per annum equal to an applicable margin plus, at ANHBV’s option, either (a) an adjusted LIBOR rate or (b) a base rate determined by reference to the highest of (1) the U.S. prime rate as published in the Wall Street Journal (previously the prime rate of JPMorgan Chase Bank, N.A.), (2) the greater of the federal funds effective rate and the overnight bank funding rate, plus 0.5%, and (3) the one month adjusted LIBOR rate plus 1% per annum. The applicable margin for all loans will vary based on Alcoa Corporation’s leverage ratio and will range from 1.50% to 2.25% (previously 1.75% to 2.50%) for LIBOR loans and 0.50% to 1.25% (previously 0.75% to 1.50%) for base rate loans, subject in each case to a reduction of 25 basis points if Alcoa Corporation attains at least a Baa3 rating from either Moody’s Investor Service or BBB- rating from Standard and Poor’s Global Ratings. Outstanding borrowings may be prepaid without premium or penalty, subject to customary breakage costs.

All obligations of Alcoa Corporation or a domestic entity under the Revolving Credit Facility are secured by, subject to certain exceptions (including a limitation of pledges of equity interests in certain foreign subsidiaries to 65%, and certain thresholds with respect to real property), a first priority lien on substantially all assets of Alcoa Corporation and the material domestic wholly-owned subsidiaries of Alcoa Corporation and certain equity interests of specified non-U.S. subsidiaries. All other obligations under the Revolving Credit Facility are secured by, subject to certain exceptions (including certain thresholds with respect to real property), a first priority security interest in substantially all assets of Alcoa Corporation, ANHBV, the material domestic wholly-owned subsidiaries of Alcoa Corporation, and the material foreign wholly-owned

subsidiaries of Alcoa Corporation located in Australia, Brazil, Canada, Luxembourg, the Netherlands, Norway, and Switzerland, including equity interests of certain subsidiaries that directly hold equity interests in AWAC entities. However, no AWAC entity is a guarantor of any obligation under the Revolving Credit Facility and no asset of any AWAC entity, or equity interests in any AWAC entity, will be pledged to secure the obligations under the Revolving Credit Facility. Under the Second Amended Revolving Credit Agreement, each of the mentioned companies shall be released from all obligations under the first priority lien and/or first priority security interest upon (i) Alcoa Corporation attaining at least a Baa3 rating from either Moody's Investor Service or BBB- rating from Standard and Poor's Global Ratings, in each case with a stable outlook or better, (ii) ANHBV delivering the required written notice, and (iii) no default or event of default, as defined in the Second Amended Revolving Credit Agreement, has occurred or is continuing (the date on which such conditions are met, the "Collateral Release Date").

The Second Amended Revolving Credit Agreement includes a number of customary affirmative covenants. Additionally, the Second Amended Revolving Credit Agreement contains a number of negative covenants (applicable to Alcoa Corporation and certain subsidiaries described as restricted), that, subject to certain exceptions, include limitations on (among other things): liens; fundamental changes; sales of assets; indebtedness (see below); entering into restrictive agreements; restricted payments (see below), including repurchases of common stock and shareholder dividends (see below); investments (see below), loans, advances, guarantees, and acquisitions; transactions with affiliates; amendment of certain material documents; and a covenant prohibiting reductions in the ownership of AWAC entities, and certain other specified restricted subsidiaries of Alcoa Corporation, below an agreed level. The Second Amended Revolving Credit Agreement also includes financial covenants requiring the maintenance of a specified interest expense coverage ratio of not less than 5.00 to 1.00, and a leverage ratio for any period of four consecutive fiscal quarters that is not greater than 2.50 to 1.00 (2.00 to 1.00 beginning on and subsequent to the Collateral Release Date, may be increased to a level not higher than 2.25 to 1.00 under certain circumstances). As of December 31, 2019, maximum additional borrowing capacity to remain in compliance with these covenants was \$1,200. As of December 31, 2019 and 2018, Alcoa Corporation was in compliance with all such covenants.

The indebtedness, restricted payments, and investments negative covenants include general exceptions to allow for potential future transactions incremental to those specifically provided for in the Second Amended Revolving Credit Agreement. The indebtedness negative covenant provides for an incremental amount not to exceed the greater of \$1,000 and 6.0% of Alcoa Corporation's consolidated total assets. Additionally, the restricted payments negative covenant provides for an aggregate amount not to exceed \$100 and the investments negative covenant provides for an aggregate amount not to exceed \$400, both of which contain two conditions in which these limits may increase. First, in any fiscal year, the thresholds for the restricted payments and investments negative covenants increase by \$250 and \$200, respectively, if the consolidated net leverage ratio is not greater than 1.50 (previously 1.20) to 1.00 and 1.50 (previously 1.30) to 1.00, respectively, as of the end of the prior fiscal year. Secondly, in regards to both the \$100 and \$250 for restricted payments and the \$200 for investments, 50% of any unused amount of these base amounts in any fiscal year may be used in the next succeeding fiscal year.

The following describes the specific restricted payment negative covenant for share repurchases and the application of the restricted payments general exception (described above) to both share repurchases and ordinary dividend payments.

Alcoa Corporation may repurchase shares of its common stock pursuant to stock option exercises and benefit plans in an aggregate amount not to exceed \$25 during any fiscal year, except that 50% of any unused amount of the base amount in any fiscal year may be used in the next succeeding fiscal year following the use of the base amount in said fiscal year. Additionally, as described above, the Second Amended Revolving Credit Agreement provides general exceptions to the restricted payments negative covenant that would allow Alcoa Corporation to execute share repurchases for any purpose in any fiscal year by an aggregate amount of up to \$100 (see above for conditions that provide for this limit to increase), assuming no other restricted payments have reduced, in part or whole, the available limit.

Also, any ordinary dividend payments made by Alcoa Corporation are only subject to the general exception for restricted payments described above. Accordingly, Alcoa Corporation may make annual ordinary dividends in any fiscal year by an aggregate amount of up to \$100 (see above for conditions that provide for this limit to increase), assuming no other restricted payments have reduced, in part or whole, the available limit. The limits of the restricted payments negative covenant under the Notes indenture (see 144A Debt above) would govern the amount of ordinary dividend payments Alcoa Corporation could make in a given timeframe if the allowed amount is less than the limits of the restricted payments negative covenant under the Second Amended Revolving Credit Agreement.

The Second Amended Revolving Credit Agreement contains customary events of default, including with respect to a failure to make payments under the Revolving Credit Facility, cross-default and cross-judgment default, and certain bankruptcy and insolvency events.

There were no borrowings outstanding at December 31, 2019 and 2018 and no amounts were borrowed during 2019 and 2018 under the Revolving Credit Facility.

M. Preferred and Common Stock

Preferred Stock. Alcoa Corporation is authorized to issue 100,000,000 shares of preferred stock at a par value of \$0.01 per share. At December 31, 2019 and 2018, the Company had no issued preferred stock.

Common Stock. Alcoa Corporation is authorized to issue 750,000,000 shares of common stock at a par value of \$0.01 per share. As of December 31, 2019, and 2018, Alcoa Corporation had 185,580,166 and 184,770,249, respectively, issued and outstanding shares of common stock.

Under its employee stock-based compensation plan, the Company issued shares of 809,917 in 2019, 1,293,336 in 2018, and 2,269,718 in 2017. Also, 25,167,229 shares of common stock were available for issuance as of December 31, 2019, under Alcoa Corporation's employee stock-based compensation plan. The Company issues new shares to satisfy the exercise of stock options and the conversion of stock units.

In October 2018, Alcoa Corporation's Board of Directors authorized a common stock repurchase program under which the Company may purchase shares of its outstanding common stock up to an aggregate transactional value of \$200, depending on cash availability, market conditions, and other factors. Repurchases under the program may be made using a variety of methods, which may include open market purchases, privately negotiated transactions, or pursuant to a Rule 10b5-1 plan. This program does not have a predetermined expiration date. Alcoa Corporation intends to retire the repurchased shares of common stock. In December 2018, the Company repurchased 1,723,800 shares of its common stock for \$50; these shares were immediately retired. No shares were repurchased in 2019.

Dividends on common stock are subject to authorization by Alcoa Corporation's Board of Directors. The Company did not declare any dividends in 2019, 2018, and 2017.

Stock-based Compensation

Stock options and stock units are generally granted in either January or February each calendar year to eligible employees (the Company's Board of Directors also receive certain stock units; however, these amounts are not material). Stock options are granted at the closing market price of Alcoa Corporation's common stock on the date of grant and grade vest over a three-year service period (1/3 each year) with a ten-year contractual term. Stock units cliff vest on the third anniversary of the award grant date and certain of these units also include either a market or performance condition.

The final number of market-based and performance-based stock units earned is dependent on Alcoa Corporation's achievement of certain targets over a three-year measurement period for grants. For market-based stock units, the award will be earned at the end of the measurement period based on the Company's total shareholder return measured against the total shareholder return of the Standard & Poor's 500® Index from January 1 of the grant year through December 31 of the third year in the service period. For performance-based stock units, the award will be earned at the end of the measurement period based on the Company's performance against a pre-established return-on-capital target measured from January 1 of the grant year through December 31 of the third year in the service period.

In 2019, 2018, and 2017, Alcoa Corporation recognized stock-based compensation expense of \$30, \$35, and \$24, respectively, of which approximately 80% to 90% was related to stock units in each period. There was no stock-based compensation expense capitalized in 2019, 2018, or 2017.

Stock-based compensation expense is based on the grant date fair value of the applicable equity grant. For both stock units with no performance or market condition and stock units with a performance condition, the fair value was equivalent to the closing market price of Alcoa Corporation's common stock on the date of grant in the respective periods. For stock units with a market condition, the fair value was estimated on the date of grant using a Monte Carlo simulation model, which generated a result of \$35.70 and \$73.13 per unit in 2019 and 2018, respectively. The Monte Carlo simulation model uses certain assumptions to estimate the fair value of a market-based stock unit, including volatility (42.04% for the Company and 12.64% for the Standard & Poor's 500® Index) and a risk-free interest rate (2.57%) (the assumptions used to estimate the fair value of stock units granted in 2018 were not materially different). For stock options, the fair value was estimated on the date of grant using a lattice-pricing model, which generated a result of \$10.86, \$21.32, and \$12.45 per option in 2019, 2018, and 2017, respectively. The lattice-pricing model uses several assumptions to estimate the fair value of a stock option, including an average risk-free interest rate, dividend yield, volatility, annual forfeiture rate, exercise behavior, and contractual life.

Assumptions used by the Company to estimate the fair value of stock options granted in 2019 are as follows:

- Risk free rate: 2.77% based on a yield curve of interest rates at the time of the grant over the life of the option
- Dividend yield: 0% based on historical dividends paid from the Separation Date and that the Company did not have any immediate plans to pay dividends
- Volatility: 41.74% based on historical and implied volatilities over the term of the option

- Pre- and post-vesting forfeitures: 4% based on historical option forfeiture data
- Exercise behavior: 61% based on a weighted average exercise ratio

Based upon the assumptions used in the determination of the fair value, the lattice-pricing model resulted in an option life of 5.9 years. The assumptions and option life output for 2019 were not materially different from 2018 and 2017.

The activity for stock options and stock units during 2019 was as follows:

	Stock options		Stock units	
	Number of options	Weighted average exercise price	Number of units	Weighted average FMV per unit
Outstanding, January 1, 2019	1,959,927	\$ 28.41	2,305,145	\$ 32.75
Granted	519,900	28.01	1,145,099	27.87
Exercised	(96,712)	18.05	—	—
Converted	—	—	(924,826)	15.22
Expired or forfeited	(136,552)	34.81	(216,309)	35.68
Performance share adjustment	—	—	(181,498)	39.62
Outstanding, December 31, 2019	2,246,563	28.38	2,127,611	36.85

The number of Converted units includes 209,550 shares “withheld” to meet the Company’s statutory tax withholding requirements related to the income earned by the employees as a result of vesting in the units.

As of December 31, 2019, the 2,246,563 outstanding stock options had a weighted average remaining contractual life of 5.40 years and a total intrinsic value of \$3. Additionally, 1,559,040 of the total outstanding stock options were fully vested and exercisable and had a weighted average remaining contractual life of 3.98 years, a weighted average exercise price of \$26.19, and a total intrinsic value of \$3 as of December 31, 2019. Cash received from stock option exercises was \$2, \$23, and \$43 in 2019, 2018, and 2017, respectively, and the total intrinsic value of stock options exercised during 2019, 2018, and 2017 was \$1, \$26, and \$24, respectively.

At December 31, 2019, there was \$29 (pretax) of combined unrecognized compensation expense related to non-vested grants of both stock options and stock units. This expense is expected to be recognized over a weighted average period of 1.60 years.

N. Pension and Other Postretirement Benefits

Defined Benefit Plans

Alcoa sponsors several defined benefit pension plans covering certain employees in the U.S. and 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.

The Company also maintains health care and life insurance postretirement benefit plans covering certain 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. The Company 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.

As of January 1, 2019, the pension benefit plans and the other postretirement benefit plans cover an aggregate of approximately 40,000 and approximately 39,000 participants, respectively.

2019 Plan Actions. In 2019, management initiated the following actions to certain pension and other postretirement benefit plans:

Action #1 – In June 2019, the Company entered into a new, six-year collective bargaining agreement with the National Union of Aluminum Employees of Baie-Comeau in Canada. Under the agreement, all Canadian union employees that are participants in one of the Company’s defined benefit pension plans will cease accruing retirement benefits for future service effective January 1, 2021. This change will affect approximately 700 employees, who are targeted to be transitioned to a

target benefit plan, where the funding risk is assumed by the employees. The Company will contribute approximately 12% of these participants' eligible earnings to the new plan on an annual basis. The Company will also contribute additional contributions of approximately \$2 spread over a three-year period to improve the financial position of the newly established target benefit plan. Participants already collecting benefits or who terminated with a vested benefit under the defined benefit pension plan are not affected by these changes.

Action #2 – In July 2019, the Company entered into a new, six-year collective bargaining agreement with the United Steelworkers representing the employees of Aluminerie de Bécancour Inc. in Canada. Under the agreement, all Canadian union employees that are participants in one of the Company's defined benefit pension plans ceased accruing retirement benefits for future service effective July 21, 2019. This change affected approximately 900 employees, who were transitioned to a member-funded pension plan, where the funding risk is assumed by the employees. The Company will contribute approximately 12% of these participants' eligible earnings to the new plan on an annual basis. To improve the financial positions of both the existing defined benefit pension plan and newly established member-funded pension plan, the Company will contribute approximately \$5 in 2020 to the existing defined benefit pension plan and approximately \$2 spread over a five-year period to the newly established member-funded pension plan. Participants already collecting benefits or who terminated with a vested benefit under the defined benefit pension plan are not affected by these changes.

Action #3 – In October 2019, the Company offered lump sum buyouts to specific participants in its U.S. defined benefit pension plans. As a result, the Company paid approximately \$112 from plan assets on November 30, 2019 to about 1,700 participants and was relieved of the corresponding pension obligation of \$138.

Action #4 – In December 2019, the Company notified certain U.S. retirees that they will be transitioned to a Medicare Exchange plan with a Company-provided contribution, effective January 1, 2021. This change affects approximately 6,000 participants. The change will improve cost predictability and allow participants to elect coverage from a choice of available options.

Action #5 – In December 2019, the Company notified certain U.S. retirees that life insurance will no longer be provided, effective December 31, 2019. This change affects approximately 8,900 participants. As part of this change, Alcoa made a one-time transition payment to the affected retirees totaling \$14 in December 2019.

The following table presents certain information and the financial impacts of these actions on the accompanying Consolidated Financial Statements:

Action #	Number of affected plan participants	Weighted average discount rate as of December 31, 2018	Plan remeasurement date	Weighted average discount rate as of plan remeasurement date	Increase (decrease) to accrued pension benefits liability ⁽¹⁾	Decrease to accrued other postretirement benefits liability	Curtailment charge ⁽²⁾	Settlement charge ⁽²⁾
1	~700	3.85%	May 31, 2019	3.15%	\$ 52	\$ —	\$ 38	\$ —
2	~900	3.80%	June 30, 2019	3.00%	23	—	—	—
3	~1,700	N/A	December 31, 2019	N/A	(26)	—	—	66
4	~6,000	N/A	December 31, 2019	N/A	—	(108)	—	—
5	~8,900	N/A	December 31, 2019	N/A	—	(56)	—	8
	~18,200				\$ 49	\$ (164)	\$ 38	\$ 74

(1) Actions 1 and 2 caused interim plan remeasurements, including an update to the discount rates used to determine the benefit obligations of the affected plans. These amounts include the impacts due to the interim plan remeasurements.

(2) These amounts represent the accelerated amortization of a portion of the existing prior service cost for curtailments and net actuarial loss for settlements and were reclassified from Accumulated other comprehensive loss to Restructuring and other charges, net (See Note D) on the accompanying Statement of Consolidated Operations.

2018 Plan Actions. In 2018, management initiated the following actions to certain pension and other postretirement benefit plans:

Action #1—In January 2018, Alcoa notified all U.S. and Canadian salaried employees, who are participants in three of the Company’s defined benefit pension plans, that they will cease accruing retirement benefits for future service, effective January 1, 2021. This change will affect approximately 800 employees, who will be transitioned to country-specific defined contribution plans, in which Alcoa will contribute 3% of these participants’ eligible earnings on an annual basis. Such contributions will be incremental to any employer savings match the employees may receive under existing defined contribution plans. Participants already collecting benefits under these defined benefit pension plans are not affected by these changes.

Action #2—In January 2018, the Company notified U.S. salaried employees and retirees that it will no longer contribute to pre-Medicare retiree medical coverage, effective January 1, 2021. This change affects approximately 700 participants in one plan.

Action #3—In April 2018, the Company signed group annuity contracts to transfer the obligation to pay the remaining retirement benefits of approximately 2,100 retirees from two Canadian defined benefit pension plans to three insurance companies. The transfer of \$560 in both plan obligations and plan assets, as well as a transaction fee of \$23, was completed on April 13, 2018. The Company contributed \$89 between the two plans to facilitate the transaction and maintain the funding level of the remaining plan obligations. Prior to these transactions, these two Canadian pension plans combined had approximately 3,500 participants.

Action #4—In August 2018, the Company signed a group annuity contract to transfer the obligation to pay the remaining retirement benefits of approximately 10,500 retirees from three U.S. defined benefit pension plans to one insurance company. The transfer of \$287 in both plan obligations and plan assets, as well as a transaction fee of \$10, was completed on August 7, 2018. Additionally, approximately 1,000 plan participants elected to receive lump sum settlements, representing \$75 in plan obligations and \$85 in plan assets. Prior to these two transactions, these three U.S. pension plans combined had approximately 43,400 participants.

Action #5—In August 2018, the Company notified certain U.S. salaried retirees that life insurance will no longer be provided, effective September 1, 2018. This change affects approximately 5,500 participants in one plan. As part of this change, Alcoa made a one-time transition payment to the affected retirees totaling \$23 in September 2018.

The above actions caused the respective plans to be remeasured, including an update to the discount rates used to determine the benefit obligations of the affected plans. The following table presents certain information and the financial impacts of these actions on the accompanying Consolidated Financial Statements:

Action #	Number of affected plan participants	Weighted average discount rate as of December 31, 2017	Plan remeasurement date	Weighted average discount rate as of plan remeasurement date	(Decrease) increase to accrued pension benefits liability	Decrease to accrued other postretirement benefits liability	Curtailed charge (gain) ⁽¹⁾	Settlement charge ⁽¹⁾
1	~800	3.65%	January 31, 2018	3.80%	\$ (57)	\$ —	\$ 5	\$ —
2	~700	3.29%	January 31, 2018	3.43%	—	(7)	(28)	—
3	~2,100	3.43%	March 31, 2018	3.60%	24	—	—	167
4	~11,500	3.70%	July 31, 2018	4.39%	(110)	—	—	230
5	~5,500	3.61%	July 31, 2018	4.35%	—	(86)	—	(56)
	~20,600				\$ (143)	\$ (93)	\$ (23)	\$ 341

(1) These amounts represent the accelerated amortization of a portion of the existing prior service cost or benefit for curtailments and net actuarial loss for settlements and were reclassified from Accumulated other comprehensive loss to Restructuring and other charges. Net (see Note D) on the accompanying Statement of Consolidated Operations.

Obligations and Funded Status

December 31,	Pension benefits		Other postretirement benefits	
	2019	2018	2019	2018
Change in benefit obligation				
Benefit obligation at beginning of year	\$ 5,997	\$ 7,639	\$ 973	\$ 1,218
Service cost	49	60	4	5
Interest cost	226	232	36	34
Amendments	26	—	(150)	(5)
Actuarial losses (gains)	746	(346)	103	(88)
Settlements	(177)	(1,009)	(14)	(57)
Curtailments	—	(22)	—	—
Benefits paid, net of participants' contributions	(379)	(407)	(111)	(140)
Medicare Part D subsidy receipts	—	—	7	7
Foreign currency translation impact	44	(150)	—	(1)
Benefit obligation at end of year	\$ 6,532	\$ 5,997	\$ 848	\$ 973
Change in plan assets				
Fair value of plan assets at beginning of year	\$ 4,610	\$ 5,322	\$ —	\$ —
Actual return on plan assets	763	(129)	—	—
Employer contributions	175	996	—	—
Participant contributions	11	12	—	—
Benefits paid	(379)	(403)	—	—
Administrative expenses	(19)	(31)	—	—
Settlements	(177)	(1,030)	—	—
Foreign currency translation impact	31	(127)	—	—
Fair value of plan assets at end of year	\$ 5,015	\$ 4,610	\$ —	\$ —
Funded status	\$ (1,517)	\$ (1,387)	\$ (848)	\$ (973)
Less: Amounts attributed to joint venture partners	(34)	(33)	—	—
Net funded status	\$ (1,483)	\$ (1,354)	\$ (848)	\$ (973)
Amounts recognized in the Consolidated Balance Sheet consist of:				
Noncurrent assets	\$ 33	\$ 63	\$ —	\$ —
Current liabilities	(11)	(10)	(99)	(105)
Noncurrent liabilities	(1,505)	(1,407)	(749)	(868)
Net amount recognized	\$ (1,483)	\$ (1,354)	\$ (848)	\$ (973)
Amounts recognized in Accumulated Other Comprehensive Loss consist of:				
Net actuarial loss	\$ 3,364	\$ 3,261	\$ 261	\$ 176
Prior service cost (benefit)	5	21	(154)	(4)
Total, before tax effect	3,369	3,282	107	172
Less: Amounts attributed to joint venture partners	42	40	—	—
Net amount recognized, before tax effect	\$ 3,327	\$ 3,242	\$ 107	\$ 172
Other Changes in Plan Assets and Benefit Obligations Recognized in Other Comprehensive Income (Loss) consist of:				
Net actuarial loss (benefit)	\$ 350	\$ 132	\$ 103	\$ (88)
Amortization of accumulated net actuarial loss	(247)	(614)	(18)	(17)
Prior service cost (benefit)	26	(1)	(150)	(62)
Amortization of prior service (cost) benefit	(42)	(13)	—	88
Total, before tax effect	87	(496)	(65)	(79)
Less: Amounts attributed to joint venture partners	2	(5)	—	—
Net amount recognized, before tax effect	\$ 85	\$ (491)	\$ (65)	\$ (79)

At December 31, 2019, the benefit obligation, fair value of plan assets, and funded status for U.S. pension plans were \$4,532, \$3,429, and \$(1,103), respectively. At December 31, 2018, the benefit obligation, fair value of plan assets, and funded status for U.S. pension plans were \$4,246, \$3,160, and \$(1,086), respectively.

Pension Plan Benefit Obligations

	Pension benefits	
	2019	2018
The aggregate projected benefit obligation and accumulated benefit obligation for all defined benefit pension plans was as follows:		
Projected benefit obligation	\$ 6,532	\$ 5,997
Accumulated benefit obligation	6,324	5,792
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	6,014	5,502
Fair value of plan assets	4,463	4,051
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	5,873	5,380
Fair value of plan assets	4,463	4,051

Components of Net Periodic Benefit Cost

	Pension benefits ⁽¹⁾			Other postretirement benefits ⁽²⁾		
	2019	2018	2017	2019	2018	2017
Service cost	\$ 48	\$ 54	\$ 71	\$ 4	\$ 5	\$ 5
Interest cost ⁽³⁾	221	227	244	36	34	38
Expected return on plan assets ⁽³⁾	(325)	(341)	(398)	—	—	—
Recognized net actuarial loss ⁽³⁾	171	198	185	10	13	13
Amortization of prior service cost (benefit) ⁽³⁾	4	8	9	—	—	(6)
Settlements ⁽⁴⁾	73	410	5	8	(56)	—
Curtailements ⁽⁵⁾	38	5	—	—	(28)	—
Special termination benefits ⁽⁶⁾	—	—	3	—	—	—
Net periodic benefit cost ⁽⁷⁾	\$ 230	\$ 561	\$ 119	\$ 58	\$ (32)	\$ 50

(1) In 2019, 2018, and 2017, net periodic benefit cost for U.S pension plans was \$155, \$358, and \$74, respectively.

(2) In 2019, 2018, and 2017, net periodic benefit cost for other postretirement benefits reflects a reduction of \$7, \$8 and \$8, respectively, related to the recognition of the federal subsidy awarded under Medicare Part D.

(3) These amounts were reported in Other expenses, net on the accompanying Statement of Consolidated Operations.

(4) These amounts were reported in Restructuring and other charges, net on the accompanying Statement of Consolidated Operations (see Note D). In 2019, settlements were due to management actions (see Plan Actions above) (\$74) and payment of additional lump sum benefits (\$7). In 2018, settlements were due to management actions (see Plan Actions above) (\$341) and payment of lump sum benefits (\$13). In 2017, settlements were due to payment of lump sum benefits.

(5) These amounts were reported in Restructuring and other charges, net on the accompanying Statement of Consolidated Operations (see Note D). In 2019 and 2018, curtailments were due to management actions (see Plan Actions above).

(6) These amounts were reported in Restructuring and other charges, net on the accompanying Statement of Consolidated Operations (see Note D). In 2017, special termination benefits were due to workforce reductions.

(7) Amounts attributed to joint venture partners are not included.

Amounts Expected to be Recognized in Net Periodic Benefit Cost

	Pension benefits	Other postretirement benefits
	2020	2020
Net actuarial loss recognition	\$ 202	\$ 17
Prior service cost recognition	1	(14)

Assumptions. Weighted average assumptions used to determine benefit obligations for pension and other postretirement benefit plans were as follows:

December 31,	2019	2018
Discount rate—pension plans	3.12%	4.21%
Discount rate—other postretirement benefit plans	3.12	4.25
Rate of compensation increase—pension plans	3.25	3.26

The yield curve model used to develop the discount rate parallels the plans' projected cash flows and has a weighted average duration of 11 years. The underlying cash flows of the high quality corporate bonds included in the model exceed the cash flows needed to satisfy the Company's plan obligations multiple times. If a deep market of high quality corporate bonds does not exist in a country, then the yield on government bonds plus a corporate bond yield spread is used.

The rate of compensation increase is based upon actual experience. For 2020, the rate of compensation increase will be 3.25%, which approximates the five-year average.

Weighted average assumptions used to determine net periodic benefit cost for pension and other postretirement benefit plans were as follows:

	2019	2018	2017
Discount rate—pension plans	3.89%	3.59%	3.61%
Discount rate—other postretirement benefit plans	3.94	3.18	3.30
Expected long-term rate of return on plan assets—pension plans	6.59	6.89	7.47
Rate of compensation increase—pension plans	3.26	3.28	3.61

For 2019, 2018, and 2017, 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. For 2020, management anticipates that 6.28% will be the weighted-average expected long-term rate of return.

In October 2019, the Society of Actuaries (SOA) issued updated base mortality tables (Pri-2012) and their annual update to the mortality improvement scale (MP-2019). These were both considered in developing the Company's updated mortality assumptions for U.S. pension and postretirement benefit obligations recorded at December 31, 2019, in connection with an experience study performed approximately every five years. The study resulted in the use of Pri-2012 base tables with an adjustment to reflect Alcoa's experience and a modified version of the MP-2019 improvement scales.

Assumed health care cost trend rates for U.S. other postretirement benefit plans were as follows (non-U.S. plans are not material):

	2019	2018	2017
Health care cost trend rate assumed for next year	5.5%	5.5%	5.5%
Rate to which the cost trend rate gradually declines	4.5%	4.5%	4.5%
Year that the rate reaches the rate at which it is assumed to remain	2023	2022	2021

The assumed health care cost trend rate is used to measure the expected cost of gross eligible charges covered by the Company's other postretirement benefit plans. For 2020, 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 Company's postretirement benefit plan costs are largely not subject to medical inflation due to the implementation of pre- and post-65 fixed Company-provided contributions for a large portion of the eligible population. In 2015, Medicare eligible U.S. retirees, who were primarily non-bargained, were moved to a Medicare Marketplace with a fixed Company-provided contribution. Similarly, effective January 1, 2021, Alcoa will no longer offer a Company-sponsored postretirement health care plan to certain U.S. bargained Medicare-eligible retirees. Qualifying retirees, both current and future, will be transitioned to a Medicare Marketplace with a fixed Company-provided contribution. As a result of these actions, the effect of a one percentage point change in the assumed health care cost trend rate would not be significant to the Company.

Plan Assets. Alcoa’s pension plan investment policy and weighted average asset allocations at December 31, 2019 and 2018, by asset class, were as follows:

Asset class	Policy range	Plan assets at December 31,	
		2019	2018
Equities	10–60%	40%	36%
Fixed income	10–65%	49	51
Other investments	0–35%	11	13
Total		100%	100%

The principal objectives underlying the investment of the pension plan assets are to ensure that the Company 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. Investment risk is controlled by rebalancing to target allocations on a periodic basis and ongoing monitoring of investment manager performance.

The portfolio includes an allocation to investments in long-duration government debt, long-duration corporate credit, real estate, high yield bonds, emerging market debt, global-listed infrastructure and public and private market equities. The target asset allocation is approximately 30% in equities, approximately 50% in fixed income, and approximately 20% in other investments.

Investment practices comply with the requirements of applicable laws and regulations in the respective jurisdictions, including the Employee Retirement Income Security Act of 1974 (ERISA) in the United States.

The following section describes the valuation methodologies used by the trustees to measure the fair value of pension plan assets. For plan assets measured at net asset value, this refers to the net asset value of the investment on a per share basis (or its equivalent) as a practical expedient. Otherwise, an indication of the level in the fair value hierarchy in which each type of asset is generally classified is provided (see Note O 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 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 net asset value; and (iii) direct investments in long/short equity hedge funds and private equity (limited partnerships and venture capital partnerships) and are valued at net asset value.

Fixed income—These securities consist of: (i) U.S. government debt and 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); and (iv) cash and cash equivalents invested in institutional funds and are valued at net asset value.

Other investments—These investments include, among others: (i) real estate investment trusts valued based on the closing price reported in an active market on which the investments are traded (included in Level 1); (ii) the plans’ share of commingled funds that are invested in real estate partnerships and are valued at net asset value; (iii) direct investments in private real estate (includes limited partnerships) and are valued at net asset value; and (iv) absolute return strategy funds 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 Alcoa 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 either the appropriate level of the fair value hierarchy or net asset value:

December 31, 2019	Level 1	Level 2	Net Asset Value	Total
Equities:				
Equity securities	\$ 612	\$ —	\$ 1,213	\$ 1,825
Long/short equity hedge funds	—	—	8	8
Private equity	—	—	177	177
	\$ 612	\$ —	\$ 1,398	\$ 2,010
Fixed income:				
Intermediate and long duration government/credit	\$ 889	\$ 700	\$ 560	\$ 2,149
Cash and cash equivalent funds	23	—	293	316
Other	—	5	—	5
	\$ 912	\$ 705	\$ 853	\$ 2,470
Other investments:				
Real estate	\$ 208	\$ —	\$ 287	\$ 495
Other	—	—	32	32
	\$ 208	\$ —	\$ 319	\$ 527
Total ⁽¹⁾	\$ 1,732	\$ 705	\$ 2,570	\$ 5,007
December 31, 2018	Level 1	Level 2	Net Asset Value	Total
Equities:				
Equity securities	\$ 662	\$ —	\$ 813	\$ 1,475
Long/short equity hedge funds	—	—	6	6
Private equity	—	—	186	186
	\$ 662	\$ —	\$ 1,005	\$ 1,667
Fixed income:				
Intermediate and long duration government/credit	\$ 925	\$ 697	\$ 327	\$ 1,949
Cash and cash equivalent funds	56	—	325	381
Other	—	14	—	14
	\$ 981	\$ 711	\$ 652	\$ 2,344
Other investments:				
Real estate	\$ 230	\$ —	\$ 318	\$ 548
Other	—	—	32	32
	\$ 230	\$ —	\$ 350	\$ 580
Total ⁽²⁾	\$ 1,873	\$ 711	\$ 2,007	\$ 4,591

- (1) As of December 31, 2019, the total fair value of pension plan assets excludes a net receivable of \$8, which represents securities not yet settled plus interest and dividends earned on various investments.
- (2) As of December 31, 2018, the total fair value of pension plan assets excludes a net receivable of \$19, which represents securities not yet settled plus interest and dividends earned on various investments.

Funding and Cash Flows. It is Alcoa's policy to fund amounts for defined benefit pension plans sufficient to meet the minimum requirements set forth in applicable country benefits laws and tax laws, including ERISA for U.S. plans. From time to time, the Company contributes additional amounts as deemed appropriate. In 2019, 2018, and 2017, cash contributions to Alcoa's defined benefit pension plans were \$173, \$992, and \$106.

Contributions made in 2018 include a combined \$725 of unscheduled contributions to several defined benefit pension plans, including a combined \$620 to three of the Company's U.S. defined benefit pension plans and a combined \$105 to two of the Company's Canadian defined benefit pension plans (inclusive of \$89 for Action# 3 in Plan Actions above). The additional payments to the U.S. plans were discretionary in nature and were funded with \$492 in net proceeds from a May 2018 debt issuance (see Note L) and \$128 of available cash on hand. The primary purpose for issuing debt to fund a portion of the discretionary contributions to the U.S. plans was to reduce near-term pension funding risk with a fixed rate, 10-year maturity instrument.

Alcoa's minimum required contribution to defined benefit pension plans in 2020 is estimated to be \$295, of which \$250 is for U.S. plans. Under ERISA regulations, a plan sponsor that establishes a pre-funding balance by making discretionary contributions to a U.S. defined benefit pension plan may elect to apply all or a portion of this balance toward its minimum

required contribution obligations to the related plan in future years. In 2020, management will consider making such election related to the Company's U.S. plans.

Benefit payments expected to be paid to pension and other postretirement benefit plan participants and expected Medicare Part D subsidy receipts are as follows:

Year ended December 31,	Pension benefits	Gross Other postretirement benefits	Medicare Part D subsidy receipts	Net Other postretirement benefits
2020	\$ 435	\$ 105	\$ 5	\$ 100
2021	435	95	5	90
2022	430	90	5	85
2023	430	90	5	85
2024	425	70	5	65
2025 through 2029	2,020	255	15	240
	\$ 4,175	\$ 705	\$ 40	\$ 665

Defined Contribution Plans

The Company sponsors savings and investment plans in several countries, primarily in Australia and the United States. In the United States, employees may contribute a portion of their compensation to the plans, and Alcoa matches a specified percentage of these contributions in equivalent form of the investments elected by the employee. Also, the Company makes contributions to a retirement savings account based on a percentage of eligible compensation for certain U.S. employees hired after March 1, 2006 that are not able to participate in Alcoa's defined benefit pension plans. The Company's expenses related to all defined contribution plans were \$68 in 2019, \$69 in 2018, and \$65 in 2017.

Member-funded Pension Plan

Effective July 22, 2019, the Company contributes to a member-funded pension plan sponsored by the United Steelworkers for the employees of Aluminerie de Bécancour Inc. in Canada (see Plan Actions above). Alcoa makes contributions to the plan based on a percentage of the employees' eligible compensation. The Company's expenses related to the member-funded pension plan were \$4 in 2019.

O. Derivatives and 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.

Derivatives. Alcoa Corporation is exposed to certain risks relating to its ongoing business operations, including the risks of changing commodity prices, foreign currency exchange rates and interest rates. Alcoa Corporation's commodity and derivative activities include aluminum, energy, foreign exchange and interest rate contracts which are held for purposes other than trading. They are used primarily to mitigate uncertainty and volatility, and to cover underlying exposures. Alcoa Corporation is not involved in trading activities for energy, weather derivatives, or other nonexchange commodity trading activities.

Alcoa Corporation's commodity and derivative activities are subject to the management, direction, and control of the Strategic Risk Management Committee (SRMC), which consists of at least three members, including the chief executive

officer and the chief financial officer. The remaining member(s) are other officers and/or employees of the Company as the chief executive officer may designate from time to time. Currently, the only other member of the SRMC is Alcoa Corporation's treasurer. The SRMC meets on a periodic basis to review derivative positions and strategy and reports to the Audit Committee of Alcoa Corporation's Board of Directors on the scope of its activities.

Several of Alcoa Corporation's aluminum, energy, and foreign exchange contracts are classified as Level 1 or Level 2 under the fair value hierarchy. All of these contracts are designated as either fair value or cash flow hedging instruments. Alcoa Corporation also has several derivative instruments classified as Level 3 under the fair value hierarchy, which are either designated as cash flow hedges or undesignated.

The following tables present the detail for Level 1, 2 and 3 derivatives (see additional Level 3 information in further tables below):

Balance at December 31,	2019				2018			
	Assets		Liabilities		Assets		Liabilities	
Level 1 and 2 derivative instruments	\$	3	\$	33	\$	2	\$	54
Level 3 derivative instruments		74		615		153		289
Total	\$	77	\$	648	\$	155	\$	343
Less: Current		59		67		73		82
Noncurrent	\$	18	\$	581	\$	82	\$	261

Year ended December 31,	Unrealized loss recognized in Other comprehensive (loss) income				Realized gain (loss) reclassified from Other comprehensive (loss) income to earnings			
	2019		2018		2019		2018	
Level 1 and 2 derivative instruments	\$	(14)	\$	24	\$	(26)	\$	(14)
Level 3 derivative instruments		(385)		774		42		(38)
Noncontrolling and equity interest		(38)		5		(38)		(25)
Total	\$	(437)	\$	803	\$	(22)	\$	(77)

The 2019 realized loss of \$26 on Level 1 and 2 cash flow hedges was comprised of an \$18 loss recognized in Sales and a \$8 loss recognized in Cost of goods sold. The 2018 realized loss of \$14 on Level 1 and 2 cash flow hedges was recognized in Sales.

During 2017, Alcoa recognized a realized loss of \$15 on Level 1 and 2 cash flow hedges in Sales. In addition, Alcoa recognized a realized loss of \$82 on Level 3 cash flow hedges comprised of a loss of \$113 recognized in Sales and a gain of \$31 recognized in Cost of goods sold. Alcoa also recognized a loss of \$24 in Other expenses, net, related to mark-to-market derivative instruments of which a loss of \$27 related to Level 1 and 2 instruments, a loss of \$17 related to Level 3 power contracts, a gain of \$3 related to the Level 3 embedded credit derivative, and a gain of \$17 related to the Level 3 financial contract.

Derivative instruments classified as Level 3 in the fair value hierarchy represent those in which management has used at least one significant unobservable input in the valuation model. Alcoa Corporation uses a discounted cash flow model to fair value all Level 3 derivative instruments. These valuation models are reviewed and tested at least on an annual basis. Inputs in the valuation models for Level 3 derivative instruments are composed of the following: (i) quoted market prices (e.g., aluminum prices on the 10-year London Metal Exchange (LME) forward curve and energy prices), (ii) significant other observable inputs (e.g., information concerning time premiums and volatilities for certain option type embedded derivatives and regional premiums for aluminum contracts), and (iii) unobservable inputs (e.g., aluminum and energy prices beyond those quoted in the market). For periods beyond the term of quoted market prices for aluminum, Alcoa Corporation estimates the price of aluminum by extrapolating the 10-year LME forward curve. For periods beyond the term of quoted market prices for the Midwest premium, management estimates the Midwest premium based on recent transactions. Additionally, for periods beyond the term of quoted market prices for energy, management has developed a forward curve based on independent consultant market research. Where appropriate, valuations are adjusted for various factors such as liquidity, bid/offer spreads, and credit considerations. Such adjustments are generally based on available market evidence (Level 2). In the absence of such evidence, management's best estimate is used (Level 3). If a significant input that is unobservable in one period becomes observable in a subsequent period, the related asset or liability would be transferred to the appropriate classification (Level 1 or 2) in the period of such change (there were no such transfers in the periods presented). There were no purchases, sales or settlements of Level 3 derivative instruments in the periods presented.

Level 3 derivative instruments outstanding as of December 31, 2019 are described in the table below:

Description	Designation	Contract Termination	Unobservable Inputs Impacting Valuation	Sensitivity to Inputs
Power contracts				
Embedded derivative that indexes price of power to the LME price of aluminum plus the Midwest premium	Cash flow hedge of forward sales of aluminum	March 2026 December 2029 February 2036	LME price, Midwest premium and MWh per year	Increase in LME price and/or the Midwest premium results in a higher cost of power and a decrease to the derivative asset or increase to the derivative liability
Embedded derivative that indexes price of power to the LME price of aluminum	Cash flow hedge of forward sales of aluminum	September 2027 December 2019	LME price and MWh per year	Increase in LME price results in a higher cost of power and an increase to the derivative liability
Embedded derivative that indexes the price of power to the credit spread between the Company and the counterparty	Not designated	October 2028	Estimated credit spread	Wider credit spread results in a higher cost of power and increase in the derivative liability
Financial contract				
Hedge power prices	Cash flow hedge of future purchases of electricity	July 2021	Power price	Lower power prices result in a lower derivative asset

In addition to the instruments presented above, Alcoa Corporation had three instruments that were not designated as cash flow or fair value hedges that expired prior to December 31, 2019. Alcoa Corporation had a financial contract that expired in August 2017 that hedged anticipated power requirements at one of its smelters. Also, Alcoa Corporation had a natural gas supply contract with an LME-linked ceiling that expired in October 2018. Additionally, Alcoa Corporation had a power contract that expired on March 31, 2019 containing an embedded derivative that indexed the price of power to the LME price of aluminum plus the Midwest premium. At the time this derivative liability was recognized, an equivalent amount was recognized as a deferred charge in Other noncurrent assets on the accompanying Consolidated Balance Sheet. The amortization of this deferred charge was recognized in Other expenses, net on the accompanying Statement of Consolidated Operations as power is received over the life of the contract. Alcoa and the counterparty entered into a new power contract which also contains an embedded derivative expiring March 2026 (see above). Realized and unrealized gains and losses from these three contracts were included in Other expenses, net.

At December 31, 2019, the outstanding Level 3 instruments are associated with seven smelters. At December 31, 2019 and 2018, the power contracts with embedded derivatives designated as cash flow hedges hedge forecasted aluminum sales of 2,347 kmt and 2,508 kmt, respectively. At December 31, 2019 and 2018, the financial contract hedges forecasted electricity purchases of 3,891,096 and 6,348,276 megawatt hours, respectively.

The following table presents quantitative information related to the significant unobservable inputs described above for Level 3 derivative instruments (megawatt hours in MWh):

	December 31, 2019	Unobservable Input	Unobservable Input Range
Asset Derivatives			
Financial contract	\$ 74	Interrelationship of forward energy price and the Consumer Price Index	Electricity (per MWh) 2020: \$62.66 2021: \$51.59
Total Asset Derivatives	\$ 74		
Liability Derivatives			
Power contract	\$ 225	MWh of energy needed to produce the forecasted mt of aluminum	LME (per mt) 2020: \$1,789 2027: \$2,340
Power contracts	373	MWh of energy needed to produce the forecasted mt of aluminum	Electricity Rate of 4 million MWh per year LME (per mt) 2020: \$1,789 2029: \$2,448 2036: \$2,746 Midwest premium (per pound) 2020: \$0.1450 2029: \$0.1625 2036: \$0.1625 Electricity Rate of 11 million MWh per year
Power contract	17	Estimated spread between the 30-year debt yield of Alcoa and the counterparty	Credit spread 2.85%: 30-year debt yield spread 6.30%: Alcoa (estimated) 3.45%: counterparty
Total Liability Derivatives	\$ 615		

The fair values of Level 3 derivative instruments recorded in the accompanying Consolidated Balance Sheet were as follows:

	December 31, 2019	December 31, 2018
Asset Derivatives		
Derivatives designated as hedging instruments:		
Current—financial contract	\$ 57	\$ 70
Noncurrent—power contract	—	41
Noncurrent—financial contract	17	42
Total derivatives designated as hedging instruments	\$ 74	\$ 153
Total Asset Derivatives	\$ 74	\$ 153
Liability Derivatives		
Derivatives designated as hedging instruments:		
Current—power contracts	\$ 47	\$ 46
Noncurrent—power contracts	551	218
Total derivatives designated as hedging instruments	\$ 598	\$ 264
Derivatives not designated as hedging instruments:		
Current—power contract	—	\$ 5
Current—embedded credit derivative	3	4
Noncurrent—embedded credit derivative	14	16
Total derivatives not designated as hedging instruments	\$ 17	\$ 25
Total Liability Derivatives	\$ 615	\$ 289

The following table shows the net fair values of the Level 3 derivative instruments at December 31, 2019 and the effect on these amounts of a hypothetical change (increase or decrease of 10%) in the market prices or rates that existed as of December 31, 2019:

	Fair value asset/(liability)	Index change of + / -10%
Power contracts	\$ (598)	\$ 356
Embedded credit derivative	(17)	2
Financial contract	74	22

The following tables present a reconciliation of activity for Level 3 derivative instruments:

2019	Assets		Liabilities	
	Power contract	Financial contract	Power contracts	Embedded credit derivative
January 1, 2019	\$ 41	\$ 112	\$ 269	\$ 20
Total gains or losses included in:				
Sales (realized)	—	—	(44)	—
Cost of goods sold (realized)	—	(86)	—	—
Other expenses, net (unrealized)	—	—	(2)	(2)
Other comprehensive (loss) income (unrealized)	(41)	52	396	—
Other	—	(4)	(21)	(1)
December 31, 2019	\$ —	\$ 74	\$ 598	\$ 17
Change in unrealized gains or losses included in earnings for derivative instruments held at December 31, 2019:				
Other expenses, net	\$ —	\$ —	\$ 1	\$ 1

2018	Assets		Liabilities	
	Power contract	Financial contract	Power contracts	Embedded credit derivative
January 1, 2018	\$ —	\$ 197	\$ 1,146	\$ 27
Total gains or losses included in:				
Sales (realized)	—	—	(100)	—
Cost of goods sold (realized)	—	(62)	—	—
Other expenses, net (unrealized)	—	—	(19)	(6)
Other comprehensive income (loss) (unrealized)	40	(11)	(745)	—
Other	1	(12)	(13)	(1)
December 31, 2018	\$ 41	\$ 112	\$ 269	\$ 20
Change in unrealized gains or losses included in earnings for derivative instruments held at December 31, 2018:				
Other expenses, net	\$ —	\$ —	\$ (1)	\$ (4)

Derivatives Designated As Hedging Instruments—Cash Flow Hedges

For derivative instruments that are designated and qualify as cash flow hedges, effective on January 1, 2018, the entire amount of unrealized gains or losses on the derivative is reported as a component of Other comprehensive (loss) income. Prior to January 1, 2018, only the effective portion of unrealized gains or losses on the derivative is reported as a component of Other comprehensive (loss) income while the ineffective portion of unrealized gains or losses is recognized directly in earnings immediately. On April 1, 2018, Alcoa Corporation adopted guidance issued by the FASB to the accounting for hedging activities, which included the elimination of the concept of ineffectiveness. Accordingly, there is no longer a requirement to separately measure and report ineffectiveness. In all periods presented, realized gains or losses on the derivative are reclassified from Other comprehensive (loss) income into earnings in the same period or periods during which the hedged transaction impacts earnings. Additionally, gains and losses on the derivative representing hedge components excluded from the assessment of effectiveness are recognized directly in earnings immediately.

Assuming market rates remain constant with the rates at December 31, 2019, a realized loss of \$47 related to power contracts and a realized gain of \$57 related to the financial contract are expected to be recognized in Sales and Cost of goods sold, respectively, over the next 12 months.

Material Limitations

The disclosures with respect to commodity prices and foreign currency exchange risk do not consider the underlying commitments or anticipated transactions. If the underlying items were included in the analysis, the gains or losses on the futures contracts may be offset. Actual results will be determined by several factors that are not under Alcoa Corporation's control and could vary significantly from those factors disclosed.

Alcoa Corporation is exposed to credit loss in the event of nonperformance by counterparties on the above instruments, as well as credit or performance risk with respect to its hedged customers' commitments. Alcoa Corporation does not anticipate nonperformance by any of these parties. Contracts are with creditworthy counterparties and are further supported by cash, treasury bills, or irrevocable letters of credit issued by carefully chosen banks. In addition, various master netting arrangements are in place with counterparties to facilitate settlement of gains and losses on these contracts.

Other Financial Instruments. The carrying values and fair values of Alcoa Corporation's other financial instruments were as follows:

December 31,	2019		2018	
	Carrying value	Fair value	Carrying value	Fair value
Cash and cash equivalents	\$ 879	\$ 879	\$ 1,113	\$ 1,113
Restricted cash	4	4	3	3
Long-term debt due within one year	1	1	1	1
Long-term debt, less amount due within one year	1,799	1,961	1,801	1,863

The following methods were used to estimate the fair values of other financial instruments:

Cash and cash equivalents and Restricted cash. The carrying amounts approximate fair value because of the short maturity of the instruments. The fair value amounts for Cash and cash equivalents and Restricted cash were classified in Level 1 of the fair value hierarchy.

Long-term debt, including amounts due within one year. The fair value was based on quoted market prices for public debt and on interest rates that are currently available to Alcoa Corporation 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.

P. Income Taxes

Provision for income taxes. The components of (Loss) income before income taxes were as follows:

	2019	2018	2017
Domestic	\$ (1,000)	\$ (752)	\$ (686)
Foreign	562	2,377	1,886
Total	\$ (438)	\$ 1,625	\$ 1,200

Provision for income taxes consisted of the following:

	2019	2018	2017
Current:			
Federal	\$ (4)	\$ 5	\$ 3
Foreign	404	757	421
State and local	—	—	—
	400	762	424
Deferred:			
Federal	2	(21)	25
Foreign	13	(9)	143
State and local	—	—	—
	15	(30)	168
Total	\$ 415	\$ 732	\$ 592

Federal includes U.S. income taxes related to foreign income.

A reconciliation of the U.S. federal statutory rate to Alcoa's effective tax rate was as follows (the effective tax rate was a provision on loss in 2019 and a provision on income in 2018 and 2017):

	2019	2018	2017
U.S. federal statutory rate	21.0%	21.0%	35.0%
Changes in valuation allowances	(65.3)	3.4	24.9
Non-deductible losses on foreign divestitures	(22.6)	—	—
Taxes on foreign operations—rate differential	(19.3)	12.6	(10.4)
Noncontrolling interest	(6.8)	1.0	1.4
Global intangible low-taxed income	—	9.9	—
Other	(1.9)	(2.9)	(1.6)
Effective tax rate	(94.9)%	45.0%	49.3%

Certain components of the 2019 restructuring charges resulting from the MRC divestiture and the Avilés and La Coruña facilities curtailment and subsequent divestiture are not deductible for tax purposes. These amounts are \$65 for MRC and \$35 for Avilés and La Coruña combined and are included in Non-deductible losses on foreign divestitures in the above table. See Note C for additional information on the divestiture charges.

In late 2019, AWAB received an extension of its tax holiday related to production at the Alumar refinery. This holiday was due to end December 31, 2022 but was extended to December 31, 2027. The holiday decreases AWAB's tax rate on income generated by the Alumar refinery from 34% to 15.25%, which will result in future cash tax savings. As a result of the extension of the holiday, as well as an updated analysis of the deferred tax assets expected to reverse as described below with respect to the Juruti holiday, AWAB's existing deferred tax assets that are expected to reverse during the holiday period were remeasured at the lower tax rate. In 2019, this remeasurement resulted in both a decrease to AWAB's deferred tax assets and a discrete income tax charge of \$7 (\$4 after noncontrolling interest).

In mid-2017, AWAB received approval for a tax holiday related to the operation of the Juruti (Brazil) bauxite mine. This tax holiday was made effective as of January 1, 2017 (retroactively) and decreased AWAB's tax rate on income generated by the Juruti mine from 34% to 15.25%, which results in future cash tax savings through December 31, 2026. As a result of this income tax rate change, AWAB's existing deferred tax assets that are expected to reverse during the holiday period were remeasured at the lower tax rate. In 2017, this remeasurement resulted in both a decrease to AWAB's deferred tax assets and a discrete income tax charge of \$26 (\$15 after noncontrolling interest). An updated analysis of the deferred tax assets expected to reverse during the holiday period resulted in both an increase to AWAB's deferred tax assets and a discrete income tax benefit of \$5 (\$3 after noncontrolling interest) in 2018.

Deferred income taxes. The components of deferred tax assets and liabilities based on the underlying attributes without regard to jurisdiction were as follows:

December 31,	2019		2018	
	Deferred tax assets	Deferred tax liabilities	Deferred tax assets	Deferred tax liabilities
Tax loss carryforwards	\$ 1,411	\$ —	\$ 1,231	\$ —
Employee benefits	698	—	683	—
Loss provisions	203	—	212	—
Investment basis differences	164	—	162	—
Depreciation	72	438	91	428
Derivatives and hedging activities	154	22	53	39
Tax credit carryforwards	26	—	27	—
Deferred income/expense	11	134	10	103
Other	49	6	87	1
	2,788	600	2,556	571
Valuation allowance	(1,778)	—	(1,684)	—
Total	\$ 1,010	\$ 600	\$ 872	\$ 571

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

December 31, 2019	Expires within 10 years	Expires within 11-20 years	No expiration	Other	Total
Tax loss carryforwards	\$ 333	\$ 323	\$ 755	\$ —	\$ 1,411
Tax credit carryforwards	17	9	—	—	26
Other	—	—	170	1,181	1,351
Valuation allowance	(350)	(318)	(300)	(810)	(1,778)
Total	\$ —	\$ 14	\$ 625	\$ 371	\$ 1,010

Deferred tax assets with no expiration may still have annual limitations on utilization. Other represents deferred tax assets whose expiration is dependent upon the reversal of the underlying temporary difference.

The total deferred tax asset (net of valuation allowance) is supported by projections of future taxable income exclusive of reversing temporary differences and taxable temporary differences that reverse within the carryforward period. The composition of Alcoa's net deferred tax asset by jurisdiction as of December 31, 2019 was as follows:

	Domestic	Foreign	Total
Deferred tax assets	\$ 1,054	\$ 1,734	\$ 2,788
Valuation allowance	(898)	(880)	(1,778)
Deferred tax liabilities	(149)	(451)	(600)
Total	\$ 7	\$ 403	\$ 410

The Company has several income tax filers in various foreign countries. Of the \$403 net deferred tax asset included under the Foreign column in the table above, approximately 90% relates to five of Alcoa's income tax filers as follows: a \$205 deferred tax asset for Alcoa Alumínio S.A. in Brazil; a \$137 deferred tax asset for Alcoa Canada Company, a \$130 net deferred tax asset for AWAB in Brazil; a \$89 deferred tax asset for Española (collectively with Alcoa Canada Company, Alumínio and AWAB, the Foreign Filers) in Spain; and a \$197 net deferred tax liability for AofA.

The future realization of the net deferred tax asset for each of the Foreign Filers was based on projections of the respective future taxable income (defined as the sum of pretax income, other comprehensive income, and permanent tax differences), exclusive of reversing temporary differences and carryforwards. The realization of the net deferred tax assets of the Foreign Filers is not dependent on any tax planning strategies. Alcoa Canada Company is in a three-year cumulative loss position for the period ended December 31, 2019 without a valuation allowance where, in management's judgment, the weight of the positive evidence more than offsets the negative evidence of the cumulative losses. Upon changes in facts and circumstances, management may conclude that Alcoa Canada Company's deferred tax assets may not be realized, resulting in a future charge to establish a valuation allowance. Management has forecasted taxable income for each of the Foreign Filers for the foreseeable future. This forecast is based on macroeconomic indicators and involves assumptions related to, among others: commodity prices; volume levels; and key inputs and raw materials, such as bauxite, alumina, caustic soda, calcined petroleum coke, liquid pitch, energy, labor, and transportation costs. These are the same assumptions utilized by management to develop the financial and operating plan that is used to manage the Company and measure performance against actual results.

The majority of the Alcoa Canada Company net deferred tax assets relate to pension obligations and derivatives. The majority of the other Foreign Filers' net deferred tax assets relate to tax loss carryforwards. The Foreign Filers do not have a history of tax loss carryforwards expiring unused. Additionally, tax loss carryforwards have an infinite life under the respective income tax codes in Brazil and Spain. However, utilization of an existing tax loss carryforward is limited to 30% and 25% of taxable income in a particular year in Brazil and Spain, respectively.

Accordingly, management concluded that the net deferred tax assets of the Foreign Filers will more likely than not be realized in future periods, resulting in no need for a partial or full valuation allowance as of December 31, 2019.

The following table details the changes in the valuation allowance:

December 31,	2019	2018	2017
Balance at beginning of year	\$ (1,684)	\$ (1,927)	\$ (1,755)
Establishment of new allowances ⁽¹⁾	—	(86)	(94)
Net change to existing allowances ⁽²⁾	(101)	312	(33)
Foreign currency translation	7	17	(45)
Balance at end of year	\$ (1,778)	\$ (1,684)	\$ (1,927)

⁽¹⁾ This line item reflects valuation allowances initially established as a result of a change in management's judgment regarding the realizability of deferred tax assets.

⁽²⁾ This line item reflects movements in previously established valuation allowances, which increase or decrease as the related deferred tax assets increase or decrease. Such movements occur as a result of remeasurement due to a tax rate change and changes in the underlying attributes of the deferred tax assets, including expiration of the attribute and reversal of the temporary difference that gave rise to the deferred tax asset.

In 2018, Alcoa immediately established a full valuation allowance of \$86 related to an initial deferred tax asset associated with the Company's equity interest in ElysisTM (see Note H). At inception, the Company contributed certain intellectual property and patents and made an initial cash investment of \$5 to ElysisTM. This deferred tax asset relates to an outside basis difference created by the excess of the tax basis (i.e. fair value) of these assets over the carrying value of the investment in ElysisTM recorded by the Company. The initial purpose of ElysisTM is to advance development of aluminum smelter technology with the ultimate goal of commercialization. After weighing all available positive and negative evidence, management determined it is not more likely than not that the Company will realize the tax benefit of this deferred tax asset. This conclusion was based on the fact that ElysisTM is expected to generate losses for the foreseeable future as ElysisTM incurs expenses during the development stage without a committed future revenue stream. The need for this valuation allowance will be assessed on a continuous basis in future periods and, as a result, a portion or all of the allowance may be reversed based on changes in facts and circumstances.

In 2017, the Company established a valuation allowance of \$94 related to the remaining deferred tax assets in Iceland (an initial allowance was previously established in 2015). This amount was comprised of a \$60 discrete income charge recognized in the Provision for income taxes on the accompanying Consolidated Statement of Operations and a \$34 charge to Accumulated other comprehensive loss. These deferred tax assets relate to tax loss carryforwards, which have an expiration period through 2026, and deferred losses associated with derivative and hedging activities. After weighing all available positive and negative evidence, management determined that it was no longer more likely than not that Alcoa will realize the tax benefit of these deferred tax assets. This conclusion was based on existing cumulative losses and a short expiration period. Such losses were generated as a result of intercompany interest expense under the Company's global treasury and cash management system and the realization of deferred losses associated with an LME-linked embedded derivative in a power contract (see Note O). This interest expense is expected to continue, and additional deferred losses associated with the embedded derivative will be realized in future years. As a result, management estimates that there will not be sufficient taxable income available to utilize the operating losses during the expiration period. The need for this valuation allowance will be assessed on a continuous basis in future periods and, as a result, a portion or all of the allowance may be reversed based on changes in facts and circumstances.

Undistributed net earnings. The cumulative amount of Alcoa's foreign undistributed net earnings deemed to be permanently reinvested was approximately \$1,792 as of December 31, 2019. Alcoa Corporation has several commitments and obligations related to the Company's operations in various foreign jurisdictions; therefore, management has no plans to distribute such earnings in the foreseeable future. Alcoa Corporation continuously evaluates its local and global cash needs for future business operations and anticipated debt facilities, which may influence future repatriation decisions. It is not practicable to estimate the tax liability that might be incurred if such earnings were remitted to the U.S.

Unrecognized tax benefits. Alcoa and its subsidiaries file income tax returns in the U.S. federal jurisdiction and various foreign and U.S. state jurisdictions. With few exceptions, the Company is not subject to income tax examinations by tax authorities for years prior to 2014. For U.S. federal income tax purposes, virtually all of the Company's U.S. operations were included in the income tax filings of ParentCo's U.S. consolidated tax group prior to the Separation Date. Since that time, the Company's U.S. consolidated tax group, comprised of the referenced U.S. operations, has filed U.S. federal income tax returns for the two-month 2016 post-separation period as well as tax years 2017 and 2018, none of which have been examined by the Internal Revenue Service. The U.S. federal income tax filings of ParentCo's U.S. consolidated tax group have been examined for all prior periods through the Separation Date. Foreign jurisdiction tax authorities are in the process of examining income tax returns of several of Alcoa's subsidiaries for various tax years. Excluding the matter discussed below, the period under foreign examination includes the income tax years from 2006 through 2017. For U.S. state income tax purposes, the Company and its subsidiaries remain subject to income tax examinations for the 2015 tax year and forward (as of December 31, 2019, there are no active examinations).

In December 2019, AofA received a statement of audit position (SOAP) from the Australian Taxation Office (ATO) related to the pricing of certain historic third-party alumina sales. The SOAP proposed adjustments that would result in additional income tax payable by AofA of approximately \$144 (A\$212), exclusive of interest and penalties.

The SOAP is currently the subject of an independent review process within the ATO. At the conclusion of this process, the ATO may or may not issue a tax assessment. If an assessment were to be issued, in accordance with the ATO dispute procedures, it is expected that AofA would pay 50% of the disputed tax amount to the ATO. AofA could then pursue all available dispute resolution methods, up to and including the filing of proceedings in the Australian Courts, without the ATO seeking further payment prior to final resolution. If AofA is ultimately successful, any amounts paid to the ATO would be refunded.

Management does not agree with the ATO's position and believes it is more likely than not the Company's tax position will be sustained and, therefore, has not recognized any tax liabilities in relation to this matter. Because the resolution of this matter is uncertain at this time, the Company cannot predict the outcome which may materially affect its financial results.

AofA is part of the Company's joint venture with Alumina Limited, an Australian public company listed on the Australian Securities Exchange. The Company and Alumina Limited own 60% and 40%, respectively, of the joint venture entities, including AofA.

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

December 31,	2019		2018		2017	
Balance at beginning of year	\$	30	\$	10	\$	23
Additions for tax positions of the current year		—		1		1
Additions for tax positions of prior years		—		20		—
Reductions for tax positions of prior years		—		—		(5)
Settlements with tax authorities		—		—		(6)
Expiration of the statute of limitations		—		—		(3)
Foreign currency translation		(1)		(1)		—
Balance at end of year	\$	29	\$	30	\$	10

For all periods presented, a portion of the balance at end of year 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 2019, 2018, and 2017 would be (7)%, 2%, and 1%, respectively, of pretax book (loss) income. In 2018, the Company recorded a charge of \$30 (€26), including \$10 (€9) for interest, in Provision for income taxes on the accompanying Statement of Consolidated Operations to establish a liability for its 49% share of the estimated loss on a disputed income tax matter (see Spain in the Tax section of Note R). Alcoa does not anticipate that changes in its unrecognized tax benefits will have a material impact on the Statement of Consolidated Operations during 2020.

It is the Company'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. In 2019, 2018, and 2017 Alcoa recognized \$2, \$10, and \$1, respectively, in interest and penalties. Due to the expiration of the statute of limitations, settlements with tax authorities, and refunded overpayments, the Company also recognized interest income of \$1, \$1, and \$6 in 2019, 2018, and 2017, respectively. As of December 31, 2019, and 2018, the amount accrued for the payment of interest and penalties was \$14 and \$12, respectively.

U.S. Tax Cuts and Jobs Act of 2017. On December 22, 2017, U.S. tax legislation known as the U.S. Tax Cuts and Jobs Act of 2017 (the TCJA) was enacted. For corporations, the TCJA amends the U.S. Internal Revenue Code by reducing the corporate income tax rate and modifying several business deduction and international tax provisions. Specifically, the

corporate income tax rate was reduced to 21% from 35%. Other significant changes, in general, include the following, among others: (i) a mandatory one-time deemed repatriation of accumulated foreign earnings at either an 8% or 15.5% tax rate, depending on circumstances; (ii) dividends received from foreign subsidiaries can be deducted in full regardless of ownership interest (previously such dividends were fully taxable); (iii) a 21% or 10.5% tax (effective in 2018), depending on circumstances, on a new category of income, referred to as global intangible low tax income (GILTI), related to earnings of foreign entities above a prescribed return on the associated fixed asset base; (iv) a 5% to 10% tax (effective in 2018) on base erosion payments (deductible cross-border payments to related parties) that exceed 3% of a company's deductible expenses; and (v) net operating losses have an unlimited carryforward period (previously 20 years) and no carryback period (previously 2 years), but deductions for such losses are limited to 80% of taxable income (previously 100% of taxable income) beginning with the 2018 tax year.

The Company's preliminary analysis of the provisions of the TCJA resulted in a discrete income tax charge in the Company's 2017 Consolidated Financial Statements of \$22, which was reflected in Provision for income taxes on the accompanying Statement of Consolidated Operations for 2017. The \$22 charge relates specifically to management's reasonable estimate of the corporate income tax rate change, which resulted in the remeasurement of Alcoa's deferred income tax accounts. On a gross basis, the Company reduced its deferred tax assets, valuation allowance, and deferred tax liabilities by \$506, \$433, and \$51, respectively. Upon completion of the analysis around the TCJA provision, management concluded that there was no material impact to the Company's 2017 Consolidated Financial Statements related to both the reduced corporate income tax rate and the other applicable provisions of the TCJA.

In 2018, management completed its analysis of the impact of the tax law changes, including GILTI, that became effective January 1, 2018 under the TCJA related to Alcoa's 2018 Consolidated Financial Statements. The Company made an accounting policy election to include as a period cost the tax impact generated by including GILTI in U.S. taxable income. The inclusion of GILTI in 2018 U.S. taxable income was fully offset by current U.S. tax losses and net operating loss carryforwards as expected. None of the remaining provisions of the TCJA had a material impact on the Company's 2018 Consolidated Financial Statements.

Q. Asset Retirement Obligations

Alcoa records AROs related to legal obligations associated with the standard operation of bauxite mines, alumina refineries, and aluminum smelters. These AROs consist primarily of costs associated with mine reclamation, closure of bauxite residue areas, spent pot lining disposal, and landfill closure. The Company also recognizes AROs for any significant lease restoration obligation, if required by a lease agreement, and for the disposal of regulated waste materials related to the demolition of certain power facilities.

The following table details the carrying value of recorded AROs by major category, of which \$111 and \$122 was classified as a current liability as of December 31, 2019 and 2018, respectively:

December 31,	2019		2018	
Mine reclamation	\$	205	\$	198
Closure of bauxite residue areas		282		231
Spent pot lining disposal		106		113
Demolition		85		76
Landfill closure		39		33
Balance at end of year	\$	717	\$	651

The following table details the changes in the total carrying value of recorded AROs:

December 31,	2019		2018	
Balance at beginning of year	\$	651	\$	725
Accretion expense		22		17
Liabilities incurred		148		63
Payments		(90)		(80)
Reversals of previously recorded liabilities		(12)		(37)
Foreign currency translation and other		(2)		(37)
Balance at end of year	\$	717	\$	651

In 2019, Reversals of previously recorded liabilities were primarily related to the to the divestiture of the Avilés and La Coruña (Spain) facilities. In 2018, Reversals of previously recorded liabilities includes \$36 related to the Portovesme (Italy) smelters, (see Note D).

Liabilities incurred in 2019 includes \$72 related to the closure of the Point Comfort alumina refinery that was recorded in Restructuring and other charges, net, on the accompanying Statement of Consolidated Operations. See Note D for additional information.

R. Contingencies and Commitments

Unless specifically described to the contrary, all matters within Note R are the full responsibility of Alcoa Corporation pursuant to the Separation and Distribution Agreement. Additionally, the Separation and Distribution Agreement provides for cross-indemnities between the Company and Arconic for claims subject to indemnification.

Contingencies

Environmental Matters

Alcoa Corporation participates in environmental assessments and cleanups at several 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.

The following table details the changes in the carrying value of recorded environmental remediation reserves:

Balance at December 31, 2016	\$	324
Liabilities incurred		11
Cash payments		(48)
Reversals of previously recorded liabilities		(10)
Foreign currency translation and other		17
Balance at December 31, 2017		<u>294</u>
Liabilities incurred		19
Cash payments		(25)
Reversals of previously recorded liabilities		(3)
Foreign currency translation and other		(5)
Balance at December 31, 2018		<u>280</u>
Liabilities incurred		73
Cash payments		(17)
Reversals of previously recorded liabilities		(1)
Balance at December 31, 2019	\$	<u>335</u>

At December 31, 2019 and 2018, the current portion of the remediation reserve balance was \$39 and \$44, respectively.

In 2019, the Company incurred liabilities of \$73 which was primarily related to the closure of the Point Comfort alumina refinery that was recorded in Restructuring and other charges, net, on the accompanying Statement of Consolidated Operations. See Note D. The remaining amount was recorded to Cost of goods sold.

In 2018 and 2017, changes to the liability were the result of ongoing remediation work at various sites. The additional accruals were recorded to Cost of goods sold except for \$2 and \$8 in 2018 and 2017, respectively, that were recorded to Restructuring and other charges, net, on the accompanying Statement of Consolidated Operations. See Note D.

The estimated timing of cash outflows on the environmental remediation reserve at December 31, 2019 is as follows:

2020	\$	39
2021 – 2025		187
Thereafter		109
Total	\$	<u>335</u>

The Separation and Distribution Agreement includes provisions for the assignment or allocation of environmental liabilities between Alcoa Corporation and Arconic. In general, the respective parties are responsible for the environmental matters associated with their operations and the properties assigned to each, as well as certain environmental matters with a shared responsibility between the two companies.

Reserve balances at December 31, 2019 and 2018, associated with significant sites with active remediation underway or for future remediation were \$274 and \$214, respectively. In management's judgment, the Company's reserves are sufficient to satisfy the provisions of the respective action plans. The Company's significant sites include:

Poços de Caldas, Brazil—The reserve associated with the 2015 closure of the Alcoa Alumínio S.A. smelter in Poços de Caldas, Brazil, is for remediation of historic spent potlining storage and disposal areas. The final remediation plan is currently under review; such review could require the reserve balance to be adjusted.

Fusina and Portovesme, Italy—Alcoa Corporation's subsidiary Alcoa Trasformazioni S.r.l. has remediation projects underway for its closed smelter sites at Fusina and Portovesme which have been approved by the Italian Ministry of Environment and Protection of Land and Sea (MOE). Work is ongoing for soil remediation at both sites with expected completion in 2020. Additionally, annual payments are made to MOE over a 10-year period through 2022 for groundwater emergency containment and natural resource damages at the Fusina site. A groundwater remediation project at Portovesme will have a final remedial design completed in 2020 which may result in a change to the existing reserve.

Suriname—The reserve associated with the 2017 closure of the Suralco refinery and bauxite mine is for treatment and disposal of refinery waste and soil remediation. The work began in 2017 and is expected to be completed at the end of 2025.

Hurricane Creek, Arkansas—The reserve associated with the 1990 closure of two mining areas and refineries near Hurricane Creek, Arkansas is for ongoing monitoring and maintenance for water quality surrounding the mine areas and residue disposal areas.

Massena, New York—The reserve associated with the 2015 closure of the Massena East smelter by the Company's subsidiary, Reynolds Metals Company, is for subsurface soil remediation to be performed after demolition of the structures. Remediation work is expected to commence in 2020 and will take four to eight years to complete.

Point Comfort, Texas—The reserve associated with the 2019 closure of the Point Comfort alumina refinery is for disposal of industrial wastes contained at the site, subsurface remediation, and post-closure monitoring and maintenance. The final remediation plan is currently under review; such review could require the reserve balance to be adjusted.

Sherwin, Texas—In connection with the 2018 settlement of a dispute related to the previously-owned Sherwin alumina refinery, the Company's subsidiary, Copano Enterprises LLC, accepted responsibility for the final closure of four bauxite residue waste disposal areas (known as the Copano facility). Work commenced on the first residue in 2018 and will take eight to twelve years to complete, depending on the nature of its potential re-use. Work on the next three areas has not commenced but is expected to be completed by 2048, depending on its potential re-use. See Sherwin in the Other section below for a complete description of this matter.

Longview, Washington—In connection with a 2018 Consent Decree and Cleanup Action Plan with the State of Washington Department of Ecology, the Company's subsidiary, Northwest Alloys, accepted certain responsibilities for future remediation of contaminated soil and sediments at the site located near Longview, Washington.

Other Sites—The Company is in the process of decommissioning various other plants and remediating sites in several countries for potential redevelopment or to return the land to a natural state. In aggregate, there are approximately 35 remediation projects at these other sites that are planned or underway. These activities will be completed at various times in the future with the latest expected to be in 2026, after which ongoing monitoring and other activities may be required. At December 31, 2019 and 2018, the reserve balance associated with these activities was \$61 and \$66, respectively.

Tax matters

Spain— In July 2013, following a corporate income tax audit covering the 2006 through 2009 tax years, an assessment was received from Spain's tax authorities disallowing certain interest deductions claimed by ParentCo's Spanish consolidated tax group. In 2015, ParentCo filed an appeal of this assessment to Spain's Central Tax Administrative Court which was denied. Two months later, ParentCo filed an appeal in Spain's National Court (the National Court). The amount of this assessment, including interest, was \$152 (€131) as of June 30, 2018.

In July 2018, the National Court denied ParentCo's appeal of the assessment; however, it required Spain's tax authorities to issue a new assessment, which considers available net operating losses of the former Spanish consolidated tax group from prior tax years that can be utilized during the assessed tax years. Subsequently, Arconic and Alcoa Corporation (collectively, the Companies) estimated the amount of the new assessment, including applicable interest, to be in the range of \$24 to \$59 (€21 to €53) after consideration of available net operating losses and tax credits. Under the Tax Matters Agreement related to the separation Transaction, unfavorable tax outcomes are split by Arconic and Alcoa Corporation 51% and 49%, respectively. Based on a review of the basis on which the National Court decided this matter, Alcoa Corporation management no longer believed that the Companies were more likely than not (greater than 50%) to prevail in this matter. Accordingly, in the third quarter of 2018, Alcoa Corporation recorded a charge of \$30 (€26) in Provision for income taxes to establish a liability for its 49% share of the estimated loss in this matter, representing management's best estimate at the time.

On November 8, 2018, the Companies filed a petition for appeal to Spain's Supreme Court, which was accepted in March 2019 and an appeal was submitted on May 6, 2019.

Separately, in January 2017, the National Court issued a decision in favor of the former Spanish consolidated tax group related to a similar assessment for the 2003 through 2005 tax years, effectively making that assessment null and void. Additionally, in August 2017, in lieu of receiving a formal assessment, the Companies reached a settlement with Spain's tax authorities for the 2010 through 2013 tax years that had been under audit for a similar matter. Alcoa Corporation's share of this settlement was not material to the Company's Consolidated Financial Statements. The ultimate outcomes related to the 2003 through 2005 and the 2010 through 2013 tax years are not indicative of the potential ultimate outcome of the assessment for the 2006 through 2009 tax years due to procedural differences. Also, it is possible that the Companies may receive similar assessments for tax years subsequent to 2013; however, management does not expect any such assessment, if received, to be material to Alcoa Corporation's Consolidated Financial Statements.

Brazil (AWAB)—In March 2013, AWAB was notified by the Brazilian Federal Revenue Office (RFB) that approximately \$110 (R\$220) of value added tax credits previously claimed are being disallowed and a penalty of 50% assessed. Of this amount, AWAB received \$41 (R\$82) in cash in May 2012. The value-added tax credits were claimed by AWAB for both fixed assets and export sales related to the Juruti bauxite mine and São Luís refinery expansion. The RFB has disallowed credits they allege belong to the consortium in which AWAB owns an interest and should not have been claimed by AWAB. Credits have also been disallowed as a result of challenges to apportionment methods used, questions about the use of the credits, and an alleged lack of documented proof. AWAB presented defense of its claim to the RFB on April 8, 2013. If AWAB is successful in this administrative process, the RFB would have no further recourse. If unsuccessful in this process, AWAB has the option to litigate at a judicial level. Separately from AWAB's administrative appeal, in June 2015, new tax law was enacted repealing the provisions in the tax code that were the basis for the RFB assessing a 50% penalty in this matter. As such, the estimated range of reasonably possible loss for these matters is \$0 to \$54 (R\$220). It is management's opinion that the allegations have no basis; however, at this time, the Company is unable to reasonably predict an outcome for this matter.

Other matters

Reynolds—In 2000, ParentCo acquired Reynolds Metals Company (Reynolds, a subsidiary of Alcoa Corporation), which included an alumina refinery in Gregory, Texas. As a condition of the Reynolds acquisition, ParentCo was required to divest this alumina refinery. Under the terms of the divestiture, ParentCo agreed to retain responsibility for certain environmental obligations and assigned to the buyer an Energy Services Agreement (ESA) with Gregory Power Partners (Gregory Power) for purchase of steam and electricity by the refinery.

In January 2016, Sherwin Alumina Company, LLC (Sherwin), a successor owner of the refinery previously owned by Reynolds, filed for bankruptcy due to its inability to continue its bauxite supply agreement. As a result of Sherwin's bankruptcy filing, separate legal actions were initiated against Reynolds by Sherwin and Gregory Power.

Sherwin: This matter sought to determine responsibility for remediation of environmental conditions at the Sherwin refinery site and related bauxite residue waste disposal areas (known as the Copano facility). In May 2018, Reynolds and Sherwin concluded a settlement agreement, which was accepted by the bankruptcy court in June 2018, that assigned to Reynolds all environmental liabilities associated with the Copano facility and assigned to Sherwin all environmental liabilities associated with the Sherwin refinery site. See Sherwin, Texas in Environmental Matters above.

Gregory Power: In January 2016, Gregory Power delivered notice to Reynolds that Sherwin's bankruptcy filing constitutes a breach of the ESA. Since that time, various responses, complaints and motions have been actioned, including the addition of Allied Alumina LLC (Allied) to an amended complaint (Sherwin operated as a subsidiary of Allied). In May 2019, a settlement agreement was reached between Gregory Power, Allied, and Reynolds in which all claims pending against the parties will be voluntarily dismissed. The settlement is conditioned on the execution of various commercial agreements, which have been executed by the parties. On June 2, 2019, the Court entered a Stipulation of Dismissal, formally concluding the litigation. The settlement did not have an impact on the Consolidated Financial Statements.

General. In addition to the matters discussed above, various other lawsuits, claims, and proceedings have been or may be instituted or asserted against Alcoa Corporation, including those pertaining to environmental, safety and health, commercial, tax, product liability, intellectual property infringement, employment, and employee and retiree benefit matters, and other actions and claims arising out of the normal course of business. While the amounts claimed in these other matters may be substantial, the ultimate liability is not readily determinable because of the considerable uncertainties that exist. Accordingly, it is possible that the Company's liquidity or results of operations in a particular 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 financial position of the Company.

Commitments

Purchase Obligations. Alcoa Corporation is party to unconditional purchase obligations for energy that expire between 2028 and 2037. Commitments related to these contracts total \$153 in 2020, \$211 in 2021, \$216 in 2022, \$221 in 2023, \$227 in

2024, and \$2,463 thereafter. Expenditures under these contracts totaled \$146 in 2019, \$169 in 2018, and \$199 in 2017. Additionally, the Company has entered into other purchase commitments for energy, raw materials, and other goods and services, which total \$2,123 in 2020, \$1,583 in 2021, \$1,565 in 2022, \$1,429 in 2023, \$1,276 in 2024, and \$10,393 thereafter.

AofA has a gas supply agreement to power its three alumina refineries in Western Australia beginning in July 2020 for a 12-year period. The terms of this agreement required AofA to make a prepayment of \$500 in two installments, the first of which was made in June 2015 for \$300. The second installment of \$200 was made in April 2016. At December 31, 2019, Alcoa Corporation had a total asset of \$458 (A\$654) which was included in Prepaid expenses and other current assets (\$21) and Other noncurrent assets (\$437) (Note T) on the accompanying Consolidated Balance Sheet. At December 31, 2018, Alcoa Corporation had an asset of \$458 (A\$654), included in Other noncurrent assets (see Note T) on the accompanying Consolidated Balance Sheet related to these prepayments.

Guarantees of Third Parties. As of December 31, 2019, the Company has no outstanding potential future payments for guarantees issued on behalf of a third party. At December 31, 2018, the Company had a maximum potential future payment for guarantees issued on behalf of a third party of \$60. These guarantees related to project financing for the rolling mill in the Kingdom of Saudi Arabia. During 2019, Alcoa Corporation divested its interest in MRC, dissolving the guarantee related to project financing.

Bank Guarantees and Letters of Credit. Alcoa Corporation has outstanding bank guarantees and letters of credit related to, among others, energy contracts, environmental obligations, legal and tax matters, outstanding debt, leasing obligations, workers compensation, and customs duties. The total amount committed under these instruments, which automatically renew or expire at various dates between 2020 and 2023, was \$332 (includes \$100 issued under a standby letter of credit agreement —see below) at December 31, 2019. Additionally, Arconic has outstanding bank guarantees and letters of credit related to the Company in the amount of \$20 at December 31, 2019. In the event Arconic would be required to perform under any of these instruments, Arconic would be indemnified by Alcoa Corporation in accordance with the Separation and Distribution Agreement. Likewise, the Company has outstanding bank guarantees and letters of credit related to Arconic in the amount of \$14 at December 31, 2019. In the event Alcoa Corporation would be required to perform under any of these instruments, the Company would be indemnified by Arconic in accordance with the Separation and Distribution Agreement.

In August 2017, Alcoa Corporation entered into a standby letter of credit agreement, which expires on May 3, 2021 (extended originally in August 2018 and again in May 2019), with three financial institutions. The agreement provides for a \$150 facility, which will be used by the Company for matters in the ordinary course of business. Alcoa Corporation's obligations under this facility will be secured in the same manner as obligations under the Company's Second Amended Revolving Credit Agreement. Additionally, this facility contains similar representations and warranties and affirmative, negative, and financial covenants as the Company's Second Amended Revolving Credit Agreement (see Note L). As of December 31, 2019, letters of credit aggregating \$100 were issued under this facility.

Surety Bonds. Alcoa Corporation 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 bonds, which automatically renew or expire at various dates, mostly in 2020, was \$52 at December 31, 2019. Additionally, Arconic has outstanding surety bonds related to the Company in the amount of \$14 at December 31, 2019. In the event Arconic would be required to perform under any of these instruments, Arconic would be indemnified by Alcoa Corporation in accordance with the Separation and Distribution Agreement. Likewise, the Company has outstanding surety bonds related to Arconic in the amount of \$4 at December 31, 2019. In the event Alcoa Corporation would be required to perform under any of these instruments, the Company would be indemnified by Arconic in accordance with the Separation and Distribution Agreement.

S. Leasing

As a result of the adoption of ASU No. 2016-02, Leases, management recorded a right-of-use asset and lease liability, each in the amount of \$201, on Alcoa's Consolidated Balance Sheet as of January 1, 2019 for several types of operating leases, including land and buildings, alumina refinery process control technology, plant equipment, vehicles, and computer equipment. These amounts are equivalent to the aggregate future lease payments on a discounted basis. The leases have remaining terms of one to 38 years. Lease expense and operating cash flows for the year ended December 31, 2019, includes costs from operating leases of \$78, variable lease payments of \$16, and short-term rental expense of \$6. New leases of \$30 were added during 2019. Further, right-of-use assets totaling \$6 were impaired in 2019 in conjunction with the permanent closure of the Point Comfort alumina refinery (see Note D). The Company does not have material financing leases.

The following represents the aggregate right-of use assets and related lease obligations as of December 31, 2019:

Amounts recognized in the Consolidated Balance Sheet at December 31, 2019:

Properties, plants and equipment, net	\$	154
Other current liabilities		61
Other noncurrent liabilities and deferred credits		100
Total operating lease liabilities	\$	161

The weighted average lease term and weighted average discount rate as of December 31, 2019 were as follows:

Weighted average lease term

Operating leases	4.6 years
------------------	-----------

Weighted average discount rate

Operating leases	5.4%
------------------	------

The future cash flows related to the operating lease obligations as of December 31, 2019 were as follows:

Year Ending December 31,	Operating leases
2020	\$ 67
2021	51
2022	21
2023	12
2024	6
Thereafter	28
Total lease payments (undiscounted)	185
Less: discount to net present value	(24)
Total	\$ 161

Disclosures related to periods presented prior to the adoption of ASU No. 2016-02

The Company adopted ASU No. 2016-02, Leases, on January 1, 2019 using the modified retrospective approach which requires the following disclosure for periods presented prior to adoption. The following table represents minimum annual lease commitments as of December 31, 2018 under long-term operating leases:

Year Ending December 31,	Operating leases
2019	\$ 74
2020	56
2021	42
2022	11
2023	5
Thereafter	21
Total lease payments	\$ 209

T. Other Financial Information**Interest Cost Components**

	2019	2018	2017
Amount charged to expense	\$ 121	\$ 122	\$ 104
Amount capitalized	13	14	17
	\$ 134	\$ 136	\$ 121

Other Expenses, Net

	2019		2018		2017	
Equity loss	\$	49	\$	17	\$	28
Foreign currency losses (gains), net		16		(57)		8
Net gain from asset sales		(3)		—		(116)
Net (gain) loss on mark-to-market derivative instruments (O)		(1)		(25)		24
Non-service costs – pension and OPEB (N)		117		139		85
Other, net		(16)		(10)		(2)
	\$	162	\$	64	\$	27

In 2017, Net gain from asset sales included a \$122 gain related to the sale of Yadkin (see Note C).

Other Noncurrent Assets

December 31,	2019		2018	
Gas supply prepayment (R)	\$	437	\$	458
Prepaid gas transmission contract		281		275
Value-added tax credits		179		210
Goodwill (K)		150		151
Deferred mining costs, net		124		123
Intangibles, net (K)		52		57
Prepaid pension benefit (N)		33		63
Other		156		138
	\$	1,412	\$	1,475

As part of a previous sale transaction of an equity investment, Alcoa maintained access to approximately 30% of the Dampier to Bunbury Natural Gas Pipeline transmission capacity in Western Australia for gas supply to three alumina refineries. At December 31, 2019 and 2018, AofA had an asset of \$281 and \$275, respectively, representing prepayments made under the agreement for future gas transmission services.

The Value-added tax (VAT) credits (federal and state) relate to two of the Company's subsidiaries in Brazil, AWAB and Alumínio, concerning the São Luís refinery. This refinery pays VAT on the purchase of goods and services used in the alumina production process. The credits generally can be utilized to offset the VAT charged on domestic sales of alumina and aluminum. However, there is not a domestic market in Brazil for the sale of alumina and the Company's São Luís smelter has been fully curtailed since April 2015.

In the fourth quarter of 2018, management performed an updated assessment of the future realizability of the state VAT credits amid unfavorable market conditions and a lack of a favorable power contract for the São Luís smelter. As a result, management determined it necessary to establish an allowance on the accumulated state VAT balances and recorded a \$107 charge in Restructuring and other charges, net, (see Note D) on the accompanying Statement of Consolidated Operations. While the Company retains the ability to utilize the state credits in the future, practically only the restart of the São Luís smelter provides the opportunity to monetize these credits. No allowance was established on the federal VAT credits as they can be used to reduce other types of federal tax obligations. The state VAT amounts are expensed to Cost of goods sold as incurred. Management continues to maintain the São Luís smelter assets for the future in case of a potential restart.

Other Noncurrent Liabilities and Deferred Credits

December 31,	2019		2018	
Accrued compensation and retirement costs	\$	110	\$	107
Operating lease obligations (S)		100		—
Deferred alumina sales revenue		52		61
Deferred energy credits		50		—
Other		58		54
	\$	370	\$	222

Deferred energy credits relate to cash received in 2019 for carbon dioxide emission credits from a governmental agency. The terms of the credits require the Company to comply with certain conditions for a period of three years. These deferred credits will be recognized as a reduction to Cost of goods sold once it is determined to be probable the Company will satisfy all conditions. Should the Company not meet all conditions during the three-year period, the credits will be repaid to the governmental agency.

Cash and Cash Equivalents and Restricted Cash

December 31,	2019		2018	
Cash and cash equivalents	\$	879	\$	1,113
Restricted cash		4		3
	\$	883	\$	1,116

Restricted cash amounts are reported in Prepaid expenses and other current assets on the accompanying Consolidated Balance Sheet.

Cash Flow Information

Cash paid for interest and income taxes was as follows:

	2019		2018		2017	
Interest, net of amount capitalized	\$	113	\$	111	\$	100
Income taxes, net of amount refunded		732		507		363

Item 8A. Supplemental Financial Information (unaudited)**Quarterly Data**
(in millions, except per-share amounts)

	First	Second	Third	Fourth	Year
2019					
Sales	\$ 2,719	\$ 2,711	\$ 2,567	\$ 2,436	\$ 10,433
Net loss	\$ (58)	\$ (293)	\$ (147)	\$ (355)	\$ (853)
Net loss attributable to Alcoa Corporation	\$ (199)	\$ (402)	\$ (221)	\$ (303)	\$ (1,125)
Earnings per share attributable to Alcoa Corporation common shareholders ⁽¹⁾ :					
Basic	\$ (1.07)	\$ (2.17)	\$ (1.19)	\$ (1.63)	\$ (6.07)
Diluted	\$ (1.07)	\$ (2.17)	\$ (1.19)	\$ (1.63)	\$ (6.07)
2018					
Sales	\$ 3,090	\$ 3,579	\$ 3,390	\$ 3,344	\$ 13,403
Net income	\$ 340	\$ 131	\$ 195	\$ 227	\$ 893
Net income (loss) attributable to Alcoa Corporation	\$ 195	\$ 10	\$ (6)	\$ 51	\$ 250
Earnings per share attributable to Alcoa Corporation common shareholders ⁽¹⁾ :					
Basic	\$ 1.05	\$ 0.05	\$ (0.03)	\$ 0.27	\$ 1.34
Diluted	\$ 1.04	\$ 0.05	\$ (0.03)	\$ 0.27	\$ 1.33

⁽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.

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

Alcoa Corporation'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 U.S. Securities Exchange Act of 1934, as amended, as of the end of the period covered by this report, and they have concluded that these controls and procedures are effective as of December 31, 2019.

(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.

(c) Attestation Report of the Registered Public Accounting Firm

The effectiveness of Alcoa Corporation's internal control over financial reporting as of December 31, 2019 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.

(d) Changes in Internal Control over Financial Reporting

There have been no changes in internal control over financial reporting during the fourth quarter of 2019 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 executive officers is set forth in Part I Item 1 of this Form 10-K under the caption Information about our Executive Officers. The information required by Item 401 of Regulation S-K regarding directors is contained under the caption Item 1 Election of Directors of Alcoa Corporation's Definitive Proxy Statement for the 2020 Annual Meeting of Stockholders (Proxy Statement), which will be filed with the SEC within 120 days of the end of Alcoa Corporation's fiscal year ended December 31, 2019 and is incorporated herein by reference.

The Company's Code of Conduct, which incorporates a Code of Ethics for the CEO, CFO and Other Financial Professionals, is publicly available on the Company's website at <http://www.alcoa.com> under the section Investors—Corporate Governance—Governance Documents—Code of Conduct. Alcoa Corporation will post any amendments to, or waivers of, its Code of Conduct that apply to its principal executive officer, principal financial officer and principal accounting officer on its website.

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, Corporate Governance—Board Information—Board Meetings and Attendance and Corporate Governance—Board Information—Committees of the Board of the Proxy Statement and is incorporated herein by reference.

Item 11. Executive Compensation.

The information required by Item 402 of Regulation S-K is contained under the captions Item 1 Election of Directors—Non-Employee Director Compensation Program, Executive Compensation (excluding the information under the caption —Compensation Committee Report), and Corporate Governance—Board Information—The Board's Role in Risk Oversight of the Proxy Statement. Such information is incorporated herein 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 Matters—Compensation Committee Interlocks and Insider Participation and Executive Compensation—Compensation Committee Report, respectively, of the Proxy Statement. Such information (other than the Compensation Committee Report, which shall not be deemed to be filed) is incorporated herein 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 is contained under the caption Equity Compensation Plan Information of the Proxy Statement and is incorporated herein by reference.

The information required by Item 403 of Regulation S-K is contained under the captions Beneficial Ownership—Stock Ownership of Certain Beneficial Owners and Beneficial Ownership—Stock Ownership of Directors and Executive Officers of the Proxy Statement and is incorporated herein 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 Corporate Governance —Related Person Transactions of the Proxy Statement and is incorporated herein by reference.

The information required by Item 407(a) of Regulation S-K is contained under the caption Corporate Governance—Board Information of the Proxy Statement and is incorporated herein 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 the Appointment of Independent Auditor (excluding the information under the caption Report of the Audit Committee) of the Proxy Statement and is incorporated herein 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 included in Part II Item 8 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

No.

Description of Exhibit

- 3.1 [Amended and Restated Certificate of Incorporation of Alcoa Corporation \(incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed November 3, 2016 \(File No. 1-37816\)\)](#)
- 3.2 [Amended and Restated Bylaws of Alcoa Corporation, as adopted on December 6, 2017 \(incorporated by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K filed December 8, 2017 \(File No. 1-37816\)\)](#)
- 4.1 [Indenture, dated September 27, 2016, among Alcoa Nederland Holding B.V., Alcoa Upstream Corporation and The Bank of New York Mellon Trust Company, N.A. \(incorporated by reference to Exhibit 10.19 to Amendment No. 4 to the Company's Registration Statement on Form 10 filed September 29, 2016 \(File No. 1-37816\)\)](#)
- 4.2 [Supplemental Indenture, dated as of November 1, 2016, among the entities listed in Annex A thereto, subsidiaries of Alcoa Corporation, Alcoa Corporation, Alcoa Nederland Holding B.V. and The Bank Of New York Mellon Trust Company, N.A. \(incorporated by reference to Exhibit 4.3 to the Company's Current Report on Form 8-K filed November 4, 2016 \(File No. 1-37816\)\)](#)
- 4.3 [Second Supplemental Indenture, dated as of December 9, 2019, among Alcoa Corporation, Alcoa Treasury S.à r.l, Alcoa Nederland Holding B.V., and The Bank of New York Mellon Trust Company, N.A. under the Indenture dated September 27, 2016 \(filed herewith\)](#)
- 4.4 [Indenture, dated May 17, 2018, among Alcoa Nederland Holding B.V., Alcoa Corporation, certain subsidiaries of Alcoa Corporation, and the Bank of New York Mellon Trust Company, N.A., as trustee \(incorporated by reference to Exhibit 4.1 to the Company's Current Report on Form 8-K filed May 17, 2018 \(File No. 1-37816\)\)](#)
- 4.5 [Supplemental Indenture, dated as of December 9, 2019, among Alcoa Corporation, Alcoa Treasury S.à r.l, Alcoa Nederland Holding B.V., and The Bank of New York Mellon Trust Company, N.A. under the Indenture dated May 17, 2018 \(filed herewith\)](#)
- 4.6 [Description of Securities \(filed herewith\)](#)
- 10.1 [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 filed November 4, 2016 \(File No. 1-37816\)\)](#)
- 10.2 [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 filed November 4, 2016 \(File No. 1-37816\)\)](#)
- 10.3 [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 filed November 4, 2016 \(File No. 1-37816\)\)](#)
- 10.4 [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 filed November 4, 2016 \(File No. 1-37816\)\)](#)
- 10.5 [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 filed August 3, 2017 \(File No. 1-37816\)\)](#)

Exhibit**No.****Description of Exhibit**

- 10.6 [Second Amendment and Restatement Agreement, dated as of November 21, 2018, which includes, as Exhibit A thereto, the Revolving Credit Agreement, dated as of September 16, 2016, as amended as of October 26, 2016, as amended and restated as of November 14, 2017, among Alcoa Corporation, Alcoa Nederland Holding B.V., the lenders and issuers from time to time party thereto, and JPMorgan Chase Bank, N.A., as administrative agent for the lenders and issuers \(incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed November 26, 2018 \(File No. 1-37816\)\)](#)
- 10.7 [Amendment No. 1 dated as of August 16, 2019 to the Revolving Credit Agreement dated as of September 16, 2016, as amended as of October 26, 2016, as amended and restated as of November 14, 2017 and as amended and restated as of November 21, 2018, among Alcoa Corporation, Alcoa Nederland Holding B.V., the lenders and issuers from time to time party thereto, and JPMorgan Chase Bank, N.A., as administrative agent for the lenders and issuers \(incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q filed October 31, 2019 \(File No. 1-37816\)\)](#)
- 10.8 [Amended and Restated Charter of the Strategic Council for the AWAC Joint Venture \(incorporated by reference to Exhibit 10.1 to the Company's Current Report on Form 8-K filed November 4, 2016 \(File No. 1-37816\)\)](#)
- 10.9 [Side Letter of November 1, 2016, between Alcoa Corporation and Alumina Limited clarifying transfer restrictions \(incorporated by reference to Exhibit 10.3 to the Company's Current Report on Form 8-K filed November 4, 2016 \(File No. 1-37816\)\)](#)
- 10.10 [Third Amended and Restated Limited Liability Company Agreement of Alcoa World Alumina LLC, dated as of November 1, 2016, by and among Alcoa USA Corp., ASC Alumina, Alumina International Holdings Pty Ltd, Alumina \(USA\) Inc., Reynolds Metals Company, LLC and Reynolds Metals Exploration, Inc. \(incorporated by reference to Exhibit 10.2 to the Company's Current Report on Form 8-K filed November 4, 2016 \(File No. 1-37816\)\)](#)
- 10.11 [Amended and Restated Limited Liability Company Agreement of Alcoa Alumina & Chemicals, L.L.C. dated as of December 31, 1994 \(incorporated by reference to Exhibit 99.4 to Alcoa Inc.'s Current Report on Form 8-K filed November 28, 2001 \(File No. 1-03610\)\)](#)
- 10.12 [Shareholders' Agreement between Alcoa of Australia Limited, Alcoa Australian Pty Ltd and Alumina Limited, originally dated as of May 10, 1996 \(incorporated by reference to Exhibit 10.13 to Amendment No. 2 to the Company's Registration Statement on Form 10 filed September 1, 2016 \(File No. 1-37816\)\)](#)
- 10.13 [Kwinana State Agreement of 1961 \(incorporated by reference to Exhibit 10.7 to Amendment No. 2 to the Company's Registration Statement on Form 10 filed September 1, 2016 \(File No. 1-37816\)\)](#)
- 10.14 [Pinjarra State Agreement of 1969 \(incorporated by reference to Exhibit 10.8 to Amendment No. 2 to the Company's Registration Statement on Form 10 filed September 1, 2016 \(File No. 1-37816\)\)](#)
- 10.15 [Wagerup State Agreement of 1978 \(incorporated by reference to Exhibit 10.9 to Amendment No. 2 to the Company's Registration Statement on Form 10 filed September 1, 2016 \(File No. 1-37816\)\)](#)
- 10.16 [Alumina Refinery Agreement of 1987 \(incorporated by reference to Exhibit 10.10 to Amendment No. 2 to the Company's Registration Statement on Form 10 filed September 1, 2016 \(File No. 1-37816\)\)](#)
- 10.17 [Framework Agreement, dated June 26, 2019, between Saudi Arabian Mining Company \(Ma'aden\) and Alcoa Corporation \(\(incorporated by reference to Exhibit 10.1 to the Company's Quarterly Report on Form 10-Q filed July 31, 2019 \(File No. 1-37816\)\)](#)
- 10.18 [Amendment and Restatement Deed dated June 26, 2019 relating to the Aluminium Project Framework Shareholders' Agreement originally dated December 20, 2009 between Saudi Arabian Mining Company \(Ma'aden\) and Alcoa Corporation \(incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q filed July 31, 2019 \(File No. 1-37816\)\)](#)
- 10.19 [Alcoa Corporation 2016 Stock Incentive Plan \(as Amended and Restated as of May 9, 2018\), \(incorporated by reference to Exhibit 99.1 to the Company's Current Report on Form 8-K filed May 15, 2018 \(File No. 1-37816\)\)*](#)
- 10.20 [Alcoa USA Corp. Deferred Compensation Plan \(incorporated by reference to Exhibit 10.2 to Amendment No. 1 to the Company's Registration Statement on Form 10 filed August 12, 2016 \(File No. 1-37816\)\)*](#)
- 10.21 [Alcoa USA Corp. Nonqualified Supplemental Retirement Plan C \(incorporated by reference to Exhibit 10.3 to Amendment No. 1 to the Company's Registration Statement on Form 10 filed August 12, 2016 \(File No. 1-37816\)\)*](#)

Exhibit**No.****Description of Exhibit**

- 10.22 [Amendment 1 to Alcoa USA Corp. Nonqualified Supplemental Retirement Plan C, effective January 1, 2021 \(incorporated by reference to Exhibit 10.9 to the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed February 23, 2018 \(File No. 137816\)\)*](#)
- 10.23 [Form of Amended and Restated Indemnification Agreement by and between Alcoa Corporation and individual directors or officers, effective August 1, 2017 \(incorporated by reference to Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q filed August 3, 2017 \(File No. 1-37816\)\)*](#)
- 10.24 [Alcoa Corporation Annual Cash Incentive Compensation Plan \(as Amended and Restated\), effective February 21, 2018 \(incorporated by referenced to Exhibit 10 to the Company's Quarterly Report on Form 10-Q filed May 9, 2018 \(File No. 1-37816\)\)*](#)
- 10.25 [Alcoa Corporation Amended and Restated Change in Control Severance Plan, dated July 30, 2019 \(incorporated by reference to Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q filed October 31, 2019 \(File No. 1-37816\)\)*](#)
- 10.26 [Amended and Restated Form of Alcoa Corporation Chief Executive Officer and Chief Financial Officer Executive Severance Agreement, effective as of July 30, 2019 \(incorporated by reference to Exhibit 10.6 to the Company's Quarterly Report on Form 10-Q filed October 31, 2019 \(File No. 1-37816\)\)*](#)
- 10.27 [Amended and Restated Form of Alcoa Corporation Corporate Officer Executive Severance Agreement, effective as of July 30, 2019 \(incorporated by reference to Exhibit 10.7 to the Company's Quarterly Report on Form 10-Q filed October 31, 2019 \(File No. 1-37816\)\)*](#)
- 10.28 [Terms and Conditions for Employee Stock Option Awards \(incorporated by reference to Exhibit 10.30 to the Company's Registration Statement on Form S-1 filed January 18, 2017 \(File No. 333-215606\)\)*](#)
- 10.29 [Terms and Conditions for Employee Restricted Share Units, dated January 24, 2018 \(incorporated by reference to Exhibit 10.29 to the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed February 23, 2018 \(File No. 137816\)\)*](#)
- 10.30 [Terms and Conditions for Employee Stock Option Awards, dated January 24, 2018 \(incorporated by reference to Exhibit 10.30 to the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed February 23, 2018 \(File No. 137816\)\)*](#)
- 10.31 [Terms and Conditions for Employee Special Retention Awards \(Restricted Share Units\), dated January 24, 2018 \(incorporated by reference to Exhibit 10.31 to the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed February 23, 2018 \(File No. 137816\)\)*](#)
- 10.32 [Terms and Conditions for Employee Restricted Share Units, effective October 1, 2019 \(incorporated by reference to Exhibit 10.2 to the Company's Quarterly Report on Form 10-Q filed October 31, 2019 \(File No. 1-37816\)\)*](#)
- 10.33 [Terms and Conditions for Employee Stock Option Awards, effective October 1, 2019 \(incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report on Form 10-Q filed October 31, 2019 \(File No. 1-37816\)\)*](#)
- 10.34 [Terms and Conditions for Employee Special Retention Awards, effective October 1, 2019 \(incorporated by reference to Exhibit 10.4 to the Company's Quarterly Report on Form 10-Q filed October 31, 2019 \(File No. 1-37816\)\)*](#)
- 10.35 [Letter Agreement, dated July 3, 2019, between Tómas M. Sigurðsson and Alcoa Corporation \(incorporated by reference to Exhibit 10.5 to the Company's Quarterly Report on Form 10-Q filed July 31, 2019 \(File No. 1-37816\)\)*](#)
- 10.36 [Letter Agreement, dated December 17, 2018, between John Slaven and Alcoa Corporation \(filed herewith\)\)*](#)
- 10.37 [Alcoa Corporation Non-Employee Director Compensation Policy, effective November 1, 2016 \(incorporated by reference to Exhibit 10.32 to the Company's Registration Statement on Form S-1 filed January 18, 2017 \(File No. 333-215606\)\)*](#)
- 10.38 [Terms and Conditions for Deferred Fee Restricted Share Units Director Awards, effective December 1, 2016 \(incorporated by reference to Exhibit 10.34 to the Company's Registration Statement on Form S-1 filed January 18, 2017 \(File No. 333-215606\)\)*](#)

Exhibit**No.****Description of Exhibit**

- 10.39 [Terms and Conditions for Restricted Share Units Annual Director Awards, effective December 1, 2016 \(incorporated by reference to Exhibit 10.35 to the Company's Registration Statement on Form S-1 filed January 18, 2017 \(File No. 333-215606\)\)*](#)
- 10.40 [Terms and Conditions for Restricted Share Units Annual Director Awards, effective May 9, 2017 \(incorporated by reference to Exhibit 10.3 to the Company's Quarterly Report Form 10-Q filed August 3, 2017 \(File No. 1-37816\)\)*](#)
- 10.41 [Alcoa Corporation 2016 Deferred Fee Plan for Directors, effective November 1, 2016, as amended and restated on December 5, 2018 \(incorporated by reference to Exhibit 10.37 to the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2019, filed February 26, 2019 \(1-37816\)\)*](#)
- 21.1 [List of Subsidiaries \(filed herewith\)](#)
- 23.1 [Consent of PricewaterhouseCoopers LLP \(filed herewith\)](#)
- 31.1 [Certification of Chief Executive Officer required by Securities and Exchange Commission Rule 13a-14\(a\) or 15d-14\(a\) \(filed herewith\)](#)
- 31.2 [Certification of Principal Financial Officer required by Securities and Exchange Commission Rule 13a-14\(a\) or 15d-14\(a\) \(filed herewith\)](#)
- 32.1 [Certification by Roy C. Harvey, President and Chief Executive Officer, required by Rule 13a-14\(b\) or Rule 15d-14\(b\) and Section 1350 of Chapter 63 of Title 18 of the United States Code \(filed herewith\)](#)
- 32.2 [Certification by William F. Oplinger, Executive Vice President and Chief Financial Officer, required by Rule 13a-14\(b\) or Rule 15d-14\(b\) and Section 1350 of Chapter 63 of Title 18 of the United States Code \(filed herewith\)](#)
- 95.1 [Mine Safety Disclosure \(filed herewith\)](#)
- 99.1 [Amended and Restated Grantor Trust Agreement by and between Alcoa Corporation and Wells Fargo Bank, National Association, effective October 24, 2017 \(incorporated by reference to Exhibit 99.1 to the Company's Annual Report on Form 10-K for the year ended December 31, 2017, filed February 23, 2018 \(File No. 137816\)\)](#)
- 101.INS Inline XBRL Instance Document
- 101.SCH Inline XBRL Taxonomy Extension Schema Document
- 101.CAL Inline XBRL Taxonomy Extension Calculation Linkbase Document
- 101.DEF Inline XBRL Taxonomy Extension Definition Linkbase Document
- 101.LAB Inline XBRL Taxonomy Extension Label Linkbase Document
- 101.PRE Inline XBRL Taxonomy Extension Presentation Linkbase Document
- 104 Cover Page Interactive Data File (embedded within the Inline XBRL document)

Certain schedules exhibits, and appendices have been omitted pursuant to Item 601(a)(5) of Regulation S-K. The Company hereby undertakes to furnish copies of any omitted schedule, exhibit, or appendix to the Commission upon request.

* Denotes management contracts or compensatory plans or arrangements required to be filed as Exhibits to this Form 10-K.

Item 16. Form 10-K Summary.

Not applicable.

SECOND SUPPLEMENTAL
INDENTURE

SECOND SUPPLEMENTAL INDENTURE (this “Second Supplemental Indenture”) dated as of December 9, 2019, among ALCOA CORPORATION, a corporation organized under the laws of Delaware (the “Company”), Alcoa Treasury S.à r.l., a *société à responsabilité limitée* organized under the laws of Switzerland (the “Guarantor”), ALCOA NEDERLAND HOLDING B.V. (the “Issuer”) and THE BANK OF NEW YORK MELLON TRUST COMPANY, N.A., as the Trustee, (the “Trustee”) under the indenture referred to below.

WITNESSETH:

WHEREAS the Issuer and the Company have heretofore executed and delivered to the Trustee an Indenture (the “Indenture”) dated as of September 27, 2016 providing for the issuance of 6.75% Senior Unsecured Notes due 2024 and 7.00% Senior Unsecured Notes due 2026 (collectively, the “Notes”);

WHEREAS the Guarantor became a guarantor under the Indenture pursuant to a Supplemental Indenture dated as of November 1, 2016;

WHEREAS on October 25, 2019, the Guarantor changed its legal jurisdiction from Luxembourg to Switzerland;

WHEREAS the Indenture provides that under certain circumstances the Company and the Issuer are required to cause the Guarantors to execute and deliver to the Trustee a supplemental indenture to account for changes as may be required under applicable law to reflect limitations under applicable law; and

WHEREAS pursuant to Section 9.1 of the Indenture, the Trustee, the Issuer, the Company and the Guarantor are authorized to execute and deliver this Second Supplemental Indenture;

NOW THEREFORE, in consideration of the foregoing and for other good and valuable consideration, the receipt of which is hereby acknowledged, the Guarantor, the Issuer, the Company and the Trustee mutually covenant and agree for the equal and ratable benefit of the Holders of the Notes as follows:

1. Capitalized Terms. Capitalized terms used herein without definition shall have the meanings assigned to them in the Indenture.
 2. Ratification of Guarantee. The Guarantor hereby ratifies its agreement, jointly and severally with all the existing Guarantors, to unconditionally guarantee the Issuer’s obligations under the Notes on the terms and subject to the conditions set forth in Article 10 of the Indenture and to be bound by all other applicable provisions of the Indenture and the Notes.
 3. Limitations on obligations of Swiss Guarantors. (a) In the Indenture, where it relates to a Guarantor incorporated or established under the laws of Switzerland (a “Swiss”
-

Guarantor”), any reference to constitutional or organizational documents includes a copy of a certified excerpt from the commercial register, a copy of the certified up-to-date articles of association (evidencing, where relevant, the capacity to enter into obligations of an upstream or cross-stream nature) and, if applicable, a copy of the organizational regulations.

(b) In the Indenture, where it relates to a Swiss Guarantor, a reference to liquidation, bankruptcy, insolvency, reorganization, moratorium or any other proceeding under an applicable law means that such Swiss Guarantor is unable to or admits inability to pay its debts when due (*zahlungsunfähig*), is deemed to or declared to be unable to pay its debts, suspends or threatens to suspend making payments on any of its debts, is over indebted (*überschuldet*), or (i) has initiated against it, (ii) is legally obliged to initiate, or (iii) initiates: (A) bankruptcy proceedings (*Konkurs*), (B) proceedings leading to a provisional or a definitive composition moratorium (*provisorische oder definitive Nachlassstundung*), (C) proceedings leading to an emergency moratorium (*Notstundung*), (D) proceedings for a postponement of bankruptcy pursuant to article 725a of the Swiss Code of Obligations (*Konkursaufschub*) or (E) any proceedings pursuant to article 731b of the Swiss Code of Obligations which leads to its dissolution or liquidation, or any proceeding having similar effects in force at that time.

(c) The Issuer will not use, and the Issuer shall procure that the Subsidiaries shall not use, the proceeds of any Notes in Switzerland unless (i) use in Switzerland is permitted under the Swiss taxation laws in force from time to time or (ii) it is confirmed in a tax ruling by the tax authorities referred to in article 34 of the Swiss Withholding Tax Act (the “Swiss Federal Tax Administration”) that such use of proceeds is permitted, in each case, without payments in respect of the Notes becoming subject to withholding or deduction for Swiss withholding tax as a consequence of such use of proceeds in Switzerland.

(d) For each Swiss Guarantor:

(1) If and to the extent (x) the guarantee under Article 10 of the Indenture or any other indemnity by a Swiss Guarantor under the Indenture guarantees or indemnifies obligations of its (direct or indirect) parent companies (upstream security) or sister companies (cross-stream security) (the “Upstream or Cross-Stream Guaranteed Obligations”) and (y) using payments under the Indenture to discharge the Upstream or Cross-Stream Guaranteed Obligations would constitute a repayment of capital (*Einlagerückgewähr/Kapitalrückzahlung*), a violation of the legally protected reserves (*gesetzlich geschützte Reserven*) or the payment of a (constructive) dividend (*Gewinnausschüttung*) under Swiss corporate law, the payments under the Indenture shall be limited to the maximum amount of the Swiss Guarantor’s freely disposable shareholder equity at the time of enforcement (the “Maximum Amount”); *provided* that such limitation is required under the applicable law at that time; *provided, further*, that such limitation shall not free the Swiss Guarantor from its obligations in excess of the Maximum Amount, but merely postpone the performance date of those obligations until such time or times as performance is again permitted under then applicable law. This Maximum Amount of freely disposable shareholder equity shall be determined in accordance with Swiss law and

applicable Swiss accounting principles, and, if and to the extent required by applicable Swiss law, shall be confirmed by the auditors of the Swiss Guarantor on the basis of an interim audited balance sheet as of that time.

(2) In respect of Upstream or Cross-Stream Guaranteed Obligations, at the time it is required to make a payment under the Indenture, the Swiss Guarantor shall, if and to the extent required by applicable law in force at the relevant time:

(i) use its best efforts to ensure that payment can be used to discharge Upstream or Cross-Stream Guaranteed Obligations without deduction of any taxes imposed under the Swiss Federal Act on the Withholding Tax (*Bundesgesetz über die Verrechnungssteuer*) of October 13, 1965, as amended from time to time (SR 642.21), together with the related ordinances, regulations and guidelines, all as amended and applicable from time to time (“Swiss Withholding Tax”) by discharging such tax liability by notification pursuant to applicable law rather than payment of the tax;

(ii) if the notification procedure pursuant to sub-clause (i) above does not apply, deduct the Swiss Withholding Tax at such rate (currently 35% at the date of the Indenture) as is in force from time to time from any such payment used to discharge Upstream or Cross-Stream Guaranteed Obligations; or deduct Swiss Withholding Tax at the reduced rate resulting after discharge of part of such tax by notification if the notification procedure pursuant to sub clause (i) above applies for a part of Swiss Withholding Tax only, and pay, without delay, any such taxes deducted to the Swiss Federal Tax Administration;

(iii) notify the Trustee that such notification or, as the case may be, deduction has been made, and provide the Trustee with evidence that such notification of the Swiss Federal Tax Administration has been made or, as the case may be, such taxes deducted have been paid to the Swiss Federal Tax Administration; and

(iv) in the case of a deduction of Swiss Withholding Tax, use its best efforts to ensure that any person, which is entitled to a full or partial refund of the Swiss Withholding Tax deducted from such payment, will, as soon as possible after such deduction,

(A) request a refund of the Swiss Withholding Tax under applicable law (including tax treaties), and

(B) pay to the Trustee upon receipt any amount so refunded.

(3) The Swiss Guarantor shall promptly take and promptly cause to be taken any action, including the following:

(i) the passing of any shareholders' resolutions to approve the payment or other performance under Article 10 of the Indenture, which may be required as a matter of mandatory Swiss law in force at the time of the enforcement of the Guarantees or any other indemnity in order to allow a prompt payment;

(ii) preparation of up-to-date audited balance sheet of the Swiss Guarantor;

(iii) confirmation of the auditors of the Swiss Guarantor that the relevant amount represents the Maximum Amount;

(iv) conversion of restricted reserves into profits and reserves freely available for distribution as dividends (to the extent permitted by mandatory Swiss law);

(v) revaluation of hidden reserves (to the extent permitted by mandatory Swiss law);

(vi) to the extent permitted by applicable law, Swiss accounting standards and the Loan Documents, write-up or realize any of its assets that are shown in its balance sheet with a book value that is significantly lower than the market value of the assets, in case of realization, however, only if such assets are not necessary for the Swiss Guarantor's business (*nicht betriebsnotwendig*); and

(vii) all such other measures necessary or useful to allow the Swiss Guarantor to make payments as agreed hereunder with a minimum of limitations.

4. Ratification of Indenture; Supplemental Indentures Part of Indenture. Except as expressly amended hereby, the Indenture is in all respects ratified and confirmed and all the terms, conditions and provisions thereof shall remain in full force and effect. This Second Supplemental Indenture shall form a part of the Indenture for all purposes, and every Holder of Notes heretofore or hereafter authenticated and delivered shall be bound hereby.

5. Governing Law. THIS SECOND SUPPLEMENTAL INDENTURE SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK.

6. Waiver of Jury Trial. EACH OF THE COMPANY, THE ISSUER, THE GUARANTOR, THE HOLDERS AND THE TRUSTEE HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL PROCEEDING ARISING OUT

OF OR RELATING TO THIS SECOND SUPPLEMENTAL INDENTURE, THE INDENTURE, THE NOTES, THE SUBSIDIARY GUARANTEES OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY.

7. Trustee Makes No Representation. The Trustee makes no representation as to the validity or sufficiency of this Second Supplemental Indenture.

8. Counterparts. The parties may sign any number of copies of this Second Supplemental Indenture. Each signed copy shall be an original, but all of them together represent the same agreement. The exchange of copies of this Second Supplemental Indenture and of signature pages by facsimile or .pdf transmission shall constitute effective execution and delivery of this Second Supplemental Indenture as to the parties hereto and may be used in lieu of the original Indenture for all purposes. Signatures of the parties hereto transmitted by facsimile or .pdf shall be deemed to be their original signatures for all purposes.

9. Effect of Headings. The Section headings herein are for convenience only and shall not affect the construction thereof.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties hereto have caused this Second Supplemental Indenture to be duly executed as of the date first above written.

ALCOA TREASURY S.À R.L.

By: Reijer Hendrikus Dekker /s/ Edwin
Name: Edwin Reijer Hendrikus Dekker
Title: Manager

ALCOA NEDERLAND HOLDING B.V.

By: C.A. Bacchi /s/ Renato
Name: Renato C.A. Bacchi
Title: Managing Director

ALCOA CORPORATION

By: C.A. Bacchi /s/ Renato
Name: Renato C.A. Bacchi
Title: Vice President and Treasurer

THE BANK OF NEW YORK MELLON TRUST
COMPANY, N.A., not in its individual capacity but solely as
Trustee

By: M. Kusch /s/ Lawrence
Name: Lawrence M. Kusch
Title: Vice President

SUPPLEMENTAL INDENTURE

SUPPLEMENTAL INDENTURE (this “Supplemental Indenture”) dated as of December 9, 2019, among ALCOA CORPORATION, a corporation organized under the laws of Delaware (the “Company”), Alcoa Treasury S.à r.l., a *société à responsabilité limitée* organized under the laws of Switzerland (the “Guarantor”), ALCOA NEDERLAND HOLDING B.V. (the “Issuer”) and THE BANK OF NEW YORK MELLON TRUST COMPANY, N.A., as the Trustee, (the “Trustee”) under the indenture referred to below.

WITNESSETH:

WHEREAS the Issuer, the Company and the Guarantor have heretofore executed and delivered to the Trustee an Indenture (the “Indenture”) dated as of May 17, 2018, providing for the issuance of 6.125% Senior Unsecured Notes due 2028 (collectively, the “Notes”);

WHEREAS on October 25, 2019, the Guarantor changed its legal jurisdiction from Luxembourg to Switzerland;

WHEREAS the Indenture provides that under certain circumstances the Company and the Issuer are required to cause the Guarantors to execute and deliver to the Trustee a supplemental indenture to account for changes as may be required under applicable law to reflect limitations under applicable law; and

WHEREAS pursuant to Section 9.1 of the Indenture, the Trustee, the Issuer, the Company and the Guarantor are authorized to execute and deliver this Supplemental Indenture;

NOW THEREFORE, in consideration of the foregoing and for other good and valuable consideration, the receipt of which is hereby acknowledged, the Guarantor, the Issuer, the Company and the Trustee mutually covenant and agree for the equal and ratable benefit of the Holders of the Notes as follows:

1. Capitalized Terms. Capitalized terms used herein without definition shall have the meanings assigned to them in the Indenture.
 2. Ratification of Guarantee. The Guarantor hereby ratifies its agreement, jointly and severally with all the existing Guarantors, to unconditionally guarantee the Issuer’s obligations under the Notes on the terms and subject to the conditions set forth in Article 10 of the Indenture and to be bound by all other applicable provisions of the Indenture and the Notes.
 3. Limitations on obligations of Swiss Guarantors. (a) In the Indenture, where it relates to a Guarantor incorporated or established under the laws of Switzerland (a “Swiss Guarantor”), any reference to constitutional or organizational documents includes a copy of a certified excerpt from the commercial register, a copy of the certified up-to-date articles of association (evidencing, where relevant, the capacity to enter into obligations of an upstream or cross-stream nature) and, if applicable, a copy of the organizational regulations.
-

(b) In the Indenture, where it relates to a Swiss Guarantor, a reference to liquidation, bankruptcy, insolvency, reorganization, moratorium or any other proceeding under an applicable law means that such Swiss Guarantor is unable to or admits inability to pay its debts when due (*zahlungsunfähig*), is deemed to or declared to be unable to pay its debts, suspends or threatens to suspend making payments on any of its debts, is over indebted (*überschuldet*), or (i) has initiated against it, (ii) is legally obliged to initiate, or (iii) initiates: (A) bankruptcy proceedings (*Konkurs*), (B) proceedings leading to a provisional or a definitive composition moratorium (*provisorische oder definitive Nachlassstundung*), (C) proceedings leading to an emergency moratorium (*Notstundung*), (D) proceedings for a postponement of bankruptcy pursuant to article 725a of the Swiss Code of Obligations (*Konkursaufschub*) or (E) any proceedings pursuant to article 731b of the Swiss Code of Obligations which leads to its dissolution or liquidation, or any proceeding having similar effects in force at that time.

(c) The Issuer will not use, and the Issuer shall procure that the Subsidiaries shall not use, the proceeds of any Notes in Switzerland unless (i) use in Switzerland is permitted under the Swiss taxation laws in force from time to time or (ii) it is confirmed in a tax ruling by the tax authorities referred to in article 34 of the Swiss Withholding Tax Act (the “Swiss Federal Tax Administration”) that such use of proceeds is permitted, in each case, without payments in respect of the Notes becoming subject to withholding or deduction for Swiss withholding tax as a consequence of such use of proceeds in Switzerland.

(d) For each Swiss Guarantor:

(1) If and to the extent (x) the guarantee under Article 10 of the Indenture or any other indemnity by a Swiss Guarantor under the Indenture guarantees or indemnifies obligations of its (direct or indirect) parent companies (upstream security) or sister companies (cross-stream security) (the “Upstream or Cross-Stream Guaranteed Obligations”) and (y) using payments under the Indenture to discharge the Upstream or Cross-Stream Guaranteed Obligations would constitute a repayment of capital (*Einlagerückgewähr/Kapitalrückzahlung*), a violation of the legally protected reserves (*gesetzlich geschützte Reserven*) or the payment of a (constructive) dividend (*Gewinnausschüttung*) under Swiss corporate law, the payments under the Indenture shall be limited to the maximum amount of the Swiss Guarantor’s freely disposable shareholder equity at the time of enforcement (the “Maximum Amount”); *provided* that such limitation is required under the applicable law at that time; *provided, further*, that such limitation shall not free the Swiss Guarantor from its obligations in excess of the Maximum Amount, but merely postpone the performance date of those obligations until such time or times as performance is again permitted under then applicable law. This Maximum Amount of freely disposable shareholder equity shall be determined in accordance with Swiss law and applicable Swiss accounting principles, and, if and to the extent required by applicable Swiss law, shall be confirmed by the auditors of the Swiss Guarantor on the basis of an interim audited balance sheet as of that time.

(2) In respect of Upstream or Cross-Stream Guaranteed Obligations, at the time it is required to make a payment under the Indenture, the Swiss Guarantor shall, if and to the extent required by applicable law in force at the relevant time:

(i) use its best efforts to ensure that payment can be used to discharge Upstream or Cross-Stream Guaranteed Obligations without deduction of any taxes imposed under the Swiss Federal Act on the Withholding Tax (*Bundesgesetz über die Verrechnungssteuer*) of October 13, 1965, as amended from time to time (SR 642.21), together with the related ordinances, regulations and guidelines, all as amended and applicable from time to time (“Swiss Withholding Tax”) by discharging such tax liability by notification pursuant to applicable law rather than payment of the tax;

(ii) if the notification procedure pursuant to sub-clause (i) above does not apply, deduct the Swiss Withholding Tax at such rate (currently 35% at the date of the Indenture) as is in force from time to time from any such payment used to discharge Upstream or Cross-Stream Guaranteed Obligations; or deduct Swiss Withholding Tax at the reduced rate resulting after discharge of part of such tax by notification if the notification procedure pursuant to sub clause (i) above applies for a part of Swiss Withholding Tax only, and pay, without delay, any such taxes deducted to the Swiss Federal Tax Administration;

(iii) notify the Trustee that such notification or, as the case may be, deduction has been made, and provide the Trustee with evidence that such notification of the Swiss Federal Tax Administration has been made or, as the case may be, such taxes deducted have been paid to the Swiss Federal Tax Administration; and

(iv) in the case of a deduction of Swiss Withholding Tax, use its best efforts to ensure that any person, which is entitled to a full or partial refund of the Swiss Withholding Tax deducted from such payment, will, as soon as possible after such deduction,

(A) request a refund of the Swiss Withholding Tax under applicable law (including tax treaties), and

(B) pay to the Trustee upon receipt any amount so refunded.

(3) The Swiss Guarantor shall promptly take and promptly cause to be taken any action, including the following:

- (i) the passing of any shareholders' resolutions to approve the payment or other performance under Article 10 of the Indenture, which may be required as a matter of mandatory Swiss law in force at the time of the enforcement of the Guarantees or any other indemnity in order to allow a prompt payment;
- (ii) preparation of up-to-date audited balance sheet of the Swiss Guarantor;
- (iii) confirmation of the auditors of the Swiss Guarantor that the relevant amount represents the Maximum Amount;
- (iv) conversion of restricted reserves into profits and reserves freely available for distribution as dividends (to the extent permitted by mandatory Swiss law);
- (v) revaluation of hidden reserves (to the extent permitted by mandatory Swiss law);
- (vi) to the extent permitted by applicable law, Swiss accounting standards and the Loan Documents, write-up or realize any of its assets that are shown in its balance sheet with a book value that is significantly lower than the market value of the assets, in case of realization, however, only if such assets are not necessary for the Swiss Guarantor's business (*nicht betriebsnotwendig*); and
- (vii) all such other measures necessary or useful to allow the Swiss Guarantor to make payments as agreed hereunder with a minimum of limitations.

4. Ratification of Indenture; Supplemental Indentures Part of Indenture. Except as expressly amended hereby, the Indenture is in all respects ratified and confirmed and all the terms, conditions and provisions thereof shall remain in full force and effect. This Supplemental Indenture shall form a part of the Indenture for all purposes, and every Holder of Notes heretofore or hereafter authenticated and delivered shall be bound hereby.

5. Governing Law. THIS SUPPLEMENTAL INDENTURE SHALL BE GOVERNED BY, AND CONSTRUED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF NEW YORK.

6. Waiver of Jury Trial. EACH OF THE COMPANY, THE ISSUER, THE GUARANTOR, THE HOLDERS AND THE TRUSTEE HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY LEGAL PROCEEDING ARISING OUT OF OR RELATING TO THIS SUPPLEMENTAL INDENTURE, THE INDENTURE, THE NOTES, THE SUBSIDIARY GUARANTEES OR THE TRANSACTIONS CONTEMPLATED HEREBY OR THEREBY.

7. Trustee Makes No Representation. The Trustee makes no representation as to the validity or sufficiency of this Supplemental Indenture.

8. Counterparts. The parties may sign any number of copies of this Supplemental Indenture. Each signed copy shall be an original, but all of them together represent the same agreement. The exchange of copies of this Supplemental Indenture and of signature pages by facsimile or .pdf transmission shall constitute effective execution and delivery of this Supplemental Indenture as to the parties hereto and may be used in lieu of the original Indenture for all purposes. Signatures of the parties hereto transmitted by facsimile or .pdf shall be deemed to be their original signatures for all purposes.

9. Effect of Headings. The Section headings herein are for convenience only and shall not affect the construction thereof.

[Remainder of page intentionally left blank]

IN WITNESS WHEREOF, the parties hereto have caused this Supplemental Indenture to be duly executed as of the date first above written.

ALCOA TREASURY S.À R.L.

By: Reijer Hendrikus Dekker /s/ Edwin
Name: Edwin Reijer Hendrikus Dekker
Title: Manager

ALCOA NEDERLAND HOLDING B.V.

By: C.A. Bacchi /s/ Renato
Name: Renato C.A. Bacchi
Title: Managing Director

ALCOA CORPORATION

By: C.A. Bacchi /s/ Renato
Name: Renato C.A. Bacchi
Title: Vice President and Treasurer

THE BANK OF NEW YORK MELLON TRUST
COMPANY, N.A., not in its individual capacity but solely as
Trustee

By: M. Kusch /s/ Lawrence
Name: Lawrence M. Kusch
Title: Vice President

**DESCRIPTION OF THE REGISTRANT'S SECURITIES
REGISTERED PURSUANT TO SECTION 12 OF THE
SECURITIES EXCHANGE ACT OF 1934**

Following is a brief description of the common stock, par value \$0.01 per share (the "Common Stock") of Alcoa Corporation ("Alcoa" or "the Company"), which is the only security of the Company registered under Section 12 of the Securities Exchange Act of 1934, as amended.

The following description of Common Stock is not, and does not purport to be, complete. It is subject to, and qualified in its entirety by reference to, the Company's Amended and Restated Certificate of Incorporation (the "Certificate of Incorporation") and the Amended and Restated Bylaws (the "Bylaws"), each of which is incorporated by reference as an exhibit to the Annual Report on Form 10-K of which this exhibit is also a part. Please review the Company's Certificate of Incorporation and Bylaws and the applicable provisions of the Delaware General Corporation Law (the "DGCL") for additional information.

Authorized Capital Stock

The Company's authorized capital stock consists of 750,000,000 shares of Common Stock and 100,000,000 shares of preferred stock, par value \$0.01 per share ("Preferred Stock").

Common Stock

Dividend Rights

The Company's Board of Directors (the "Board") may from time to time declare, and Alcoa may pay, dividends on its outstanding shares in the manner and upon the terms and conditions provided by law and the Certificate of Incorporation.

Voting Rights

Except as otherwise provided by law or pursuant to the rights of holders of Preferred Stock, holders of Common Stock are entitled to one vote per share on all matters, including the election of directors. Except as otherwise provided by law, the Certificate of Incorporation or the Bylaws, if a quorum is present, matters will be decided by the affirmative vote of a majority of shares present in person or represented by proxy and entitled to vote on the matter. Subject to the rights of holders of Preferred Stock, each director is elected by the vote of the majority of the votes cast with respect to that director's election; provided, however, that if the number of persons nominated to serve as directors exceeds the number of directors to be elected, then each director shall be elected by a plurality of the votes cast.

The Common Stock does not have cumulative voting rights.

Liquidation Rights

Upon any voluntary or involuntary liquidation, dissolution or winding up of Alcoa, after payments to holders of Preferred Stock of amounts determined by the Board, plus any accrued dividends, the Company's remaining assets will be divided among holders of the Common Stock.

Preemptive or Other Subscription Rights

Holders of Common Stock do not have any preemptive or other subscription rights to any securities of the Company.

Conversion and Other Rights

No conversion, redemption or sinking fund provisions apply to the Common Stock, and Common Stock is not liable to further call or assessment by the Company or subject to any restriction on alienability, except as required by law.

Preferred Stock

The rights of holders of Common Stock may be materially limited or qualified by the rights of holders of Preferred Stock that may be issued in the future.

Under the terms of the Certificate of Incorporation, the Board is authorized to issue up to 100,000,000 shares of Preferred Stock in one or more series without further action by the holders of Common Stock. The Board has the discretion, subject to limitations prescribed by Delaware law and by the Certificate of Incorporation, to determine the rights, preferences, privileges and restrictions, including voting, dividend, dissolution, conversion, exchange, and redemption rights, as well as the terms and amount of any sinking fund provided for the purchase or redemption of shares, of each series of Preferred Stock.

The Company has not issued any Preferred Stock.

Anti-Takeover Provisions

Certain Effects of Authorized but Unissued Stock

The Company may issue additional shares of Common Stock or Preferred Stock without stockholder approval, subject to applicable rules of the New York Stock Exchange and Delaware law, for a variety of corporate purposes, including future public or private offerings to raise additional capital, corporate acquisitions, and for employee benefit plans and equity grants, all of which may result in additional dilution to existing holders. The existence of unissued and unreserved Common Stock and Preferred Stock may enable the Company to issue shares that could discourage an attempt to obtain control of the Company by means of a proxy contest, tender offer, merger or otherwise.

Undesignated Preferred Stock

The Company's Certificate of Incorporation authorizes the Board to issue shares of Preferred Stock and set the voting powers, designations, preferences, and other rights related to that Preferred Stock without stockholder approval.

Stockholder Action by Written Consent

Subject to the rights of holders of Preferred Stock, the Certificate of Incorporation and Bylaws provide that stockholders may not act by written consent unless such written consent is unanimous.

Size of Board; Vacancies; Removal

Subject to the rights of holders of Preferred Stock to elect directors, the Bylaws provide that the number of directors on the Board is fixed exclusively by the Board. Generally, vacancies created on the Board resulting from any increase in the authorized number of directors or the death, resignation,

retirement, disqualification, removal from office or other cause will be filled by the affirmative vote of a majority of the Board then in office, even if less than a quorum is present, or by a sole remaining director. Any director appointed to fill a vacancy on the Board will be appointed for a term expiring at the next annual meeting of stockholders and will serve until his or her successor has been elected and qualified.

Subject to the rights of holders of Preferred Stock, any director or the entire Board may be removed from office, with or without cause, by the affirmative vote of stockholders holding at least a majority of the then-outstanding “voting stock” (as defined in the Bylaws) voting as a class.

Advance Notice for Stockholder Proposals and Nominations

The Bylaws contain advance notice procedures with respect to stockholder proposals and the nomination of candidates for election as directors (other than nominations made by or at the direction of the Board or pursuant to the proxy access procedures included therein).

Special Meetings of Stockholders

Subject to the rights of holders of Preferred Stock, the Certificate of Incorporation and Bylaws provide that the chairman of the Board, the chief executive officer, the Board pursuant to a resolution adopted by a majority of the entire Board, or the secretary at the request of stockholders owning at least 25% of the outstanding shares for at least one year, may call a special meeting of stockholders.

Section 203 of the DGCL (Business Combinations with Interested Stockholders)

Section 203 of the DGCL prohibits a Delaware corporation from engaging in a business combination with an “interested stockholder” for a period of three years after the date of the transaction in which the person became an interested stockholder. The term “business combination” is broadly defined to include mergers, consolidations, sales and other dispositions of assets having an aggregate market value equal to 10% or more of the consolidated assets of the corporation, and other specified transactions resulting in financial benefits to the interested stockholder. Under Section 203, an “interested stockholder” generally is defined as a person who, together with affiliates and associates, owns (or within the three prior years did own) 15% or more of the corporation’s outstanding voting stock.

This prohibition is effective unless:

- the business combination or the transaction that resulted in the interested stockholder becoming an interested stockholder is approved by the corporation’s board of directors prior to the time the interested stockholder becomes an interested stockholder;
- upon consummation of the transaction that resulted in the interested stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation, other than stock held by directors who are also officers or by specified employee stock plans; or
- at or after the time the stockholder becomes an interested stockholder, the business combination is approved by a majority of the board of directors and, at an annual or special meeting, by the affirmative vote of at least two-thirds of the outstanding voting stock that is not owned by the interested stockholder.

These restrictions generally prohibit or delay the accomplishment of mergers or other takeover or change-in-control attempts that are not approved by a company’s board of directors. A corporation can elect to have Section 203 of the DGCL not apply to it by expressly providing so in its certificate of incorporation or bylaws; the Company has not made such an election.



201 Isabella St, Suite 500
Pittsburgh, PA 15212 USA

Roy Harvey
President and Chief Executive Officer
[telephone number omitted]

December 14, 2018

John Slaven
[address omitted]

On behalf of the Company, I am pleased to offer you the position of Executive Vice President & Chief Strategy Officer, reporting to Roy Harvey, President and Chief Executive Officer. The following outlines your total compensation package:

Salary:

Annual salary will be USD 390,000, paid on a monthly basis.

Sign-On Cash Bonus:

You will receive a special sign-on cash bonus totaling \$1,000,000, less any applicable tax withholding, payable in three equal installments; the first installment occurring as soon as administratively possible upon hire, the second installment 12 months after your start date, and the third installment occurring 24 months after your start date. Should you voluntarily terminate your employment with Alcoa for any reason prior to the first anniversary after each installment of the Sign-On Cash Bonus, you agree to reimburse Alcoa for that particular installment.

Transfer and relocation:

Alcoa provides a Transfer and Relocation Policy to help facilitate your move to your new location. Should you voluntarily elect to leave Alcoa in the first 24 months of employment, you agree to reimburse Alcoa for the cost incurred for the Transfer and Relocation Policy. You will have 12 months from date of hire to take advantage of this benefit. Details of this Plan will be sent to you separately.

Alcoa's Total Reward program provides many ways for you to be rewarded for your contributions. Key highlights of the program are:

Variable Compensation:

Your 2019 variable compensation target is 75%, or USD 292,500, but the actual payout in 2020 may be higher or lower than the target depending upon your contributions and or the performance of the business, whichever is applicable.

Benefits

You will be eligible to participate in the Alcoa employee benefit plans offered at your location, including health care, life insurance, disability coverage, and retirement plans. Attached is a summary of the benefit plan and additional details will be sent to you shortly after joining Alcoa. The Retirement Savings Plan is a tax qualified 401(k) plan designed to help you save toward retirement. Current company contributions are immediately vested and are:

- 3% of your eligible compensation,
- a match of your deferred pre-tax savings dollar-for-dollar up to 6% of your base pay, and

Annual Equity Awards

- Provided you start on or before January 1, you will be eligible for an annual equity award as part of the normal grant cycle starting in 2019. If hire date is February 1 or later, your 2019 grant will be processed as soon as administratively possible. Your grant will be based on the guidelines for your level which has a current target of USD 1,000,000. The grant is subject to the provisions and normal vesting requirements of the Alcoa Stock Incentive Plan as they may change from time to time. In addition, your 4 years of prior service will count toward retirement eligibility under our Stock Incentive Plan.
-

Currently, your job band is awarded equity in the following manner: 60% as performance-based award, 20% as time-vested Restricted Stock Units (RSU) and 20% time-vested Stock Options. For the performance-based award, Restricted Stock Units are subject to a 3-year performance period and the performance results will impact the final delivered award ranging from 0 to 200% of target. The Board retains the rights to make plan changes at its discretion.

Vacation:

You will be eligible for five weeks of paid vacation per year, in addition to company recognized holidays.

This offer is contingent upon the following conditions:

- Having successfully completed a pre-employment drug screen. You will need to present a photo ID at the time of your screening.
- Providing authorization and release for Alcoa to conduct a comprehensive review of your background, the result of which is satisfactory to Alcoa. The authorization and release will also be valid for subsequent reports during your period of employment with Alcoa.
- Providing us with documentation in the original form establishing both your identity and your employment eligibility in the U.S.
- Signing the attached Employment Agreement.
- Signing the attached Non-Compete Agreement.

John, this is an opportunity to join a great team at a great time in Alcoa's history. I believe that you have the leadership and experience to make a significant contribution to the success of this company and I hope that you will accept this offer to join our team.

To accept our offer, please sign and date the bottom of this letter and return it to me by December 14. If you have any questions, please feel free to contact me.

I look forward to hearing from you soon, and I hope to have the opportunity to officially welcome you to Alcoa!

Sincerely,

/s/ Leigh Ann Fisher

Leigh Ann Fisher
EVP and Chief Administrative Officer

Employment Agreement

I, John Slaven, am pleased to accept your offer of employment dated 12/13/2018 for the position of Executive Vice President & Chief Strategy Officer, on the terms detailed in the offer letter.

Furthermore, I understand Alcoa reserves the right to modify, alter or terminate any of the plans, and in no way does plan participation constitute nor should it be considered a contract for continued employment or guarantee of benefits.

I would like my start date with Alcoa to be: February 1, 2019 , and will fulfill the foregoing conditions before then.

Accepted by:

Date:

/s/ John Slaven
John Slaven

December 17, 2018

After signing above, attach your signed letter and email your signed letter back to me.

SUBSIDIARIES OF THE REGISTRANT

Name	State or Country of Organization
Alcoa - Aluminerie De Deschambault L.P.	Canada
Alcoa Alumínio S.A.	Brazil
Alcoa Canada Co.	Canada
Alcoa Fjarðaál sf	Iceland
Alcoa Holland B.V.	Netherlands
Alcoa Inespal S.L.U.	Spain
Alcoa Nederland Holding B.V.	Netherlands
Alcoa Norway ANS	Norway
Alcoa of Australia Limited ¹	Australia
Alcoa Power Generating Inc. ²	Tennessee
Alcoa Saudi Rolling Inversiones S.L.	Spain
Alcoa Saudi Smelting Inversiones S.L.	Spain
Alcoa Treasury S.a.r.l.	Switzerland
Alcoa USA Corp.	Delaware
Alcoa USA Holding Company	Delaware
Alcoa Warrick LLC	Delaware
Alcoa Wolinbec Company	Canada
Alcoa World Alumina LLC ^{1,3}	Delaware
Alcoa World Alumina Brasil Ltda. ¹	Brazil
AWA Saudi Limited ¹	Hong Kong
Alcoa-Lauralco Management Company	Canada
Alumina Española, S.A. ¹	Spain
Alumínio Espanol, S.L.U.	Spain
Estreito Energia S.A.	Brazil
Luxcoa S.a.r.l.	Luxembourg
RB Sales Company, Limited	Delaware
Reynolds Bécancour, Inc.	Delaware
Reynolds Metals Company, LLC	Delaware
Suriname Aluminum Company, L.L.C. ¹	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 defined in Regulation S-X under the Securities Exchange Act of 1934, as amended.

- 1 Owned directly or indirectly 60% by Alcoa Corporation and 40% by Alumina Limited.
- 2 Registered to do business in Tennessee under the names APG Trading and Tapoco, in New York under the name Long Sault, in Indiana under the name AGC, and the name Tapoco and in Washington under the name of Colockum.
- 3 Registered to do business in Pennsylvania and Texas under the name of Alcoa World Chemicals.

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the Registration Statement on Form S-8 (Nos. 333-214420, 333-214423, 333-218038, and 333-228258) of Alcoa Corporation of our report dated February 21, 2020 relating to the financial statements and the effectiveness of internal control over financial reporting, which appears in this Form 10-K.

/s/ PricewaterhouseCoopers LLP

PricewaterhouseCoopers LLP
Pittsburgh, Pennsylvania
February 21, 2020

CERTIFICATIONS

I, Roy C. Harvey, certify that:

1. I have reviewed this annual report on Form 10-K of Alcoa Corporation;
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, 2020

/s/ Roy C. Harvey

Name: Roy C. Harvey

Title: President and
Chief Executive Officer

CERTIFICATIONS

I, William F. Oplinger, certify that:

1. I have reviewed this annual report on Form 10-K of Alcoa Corporation;
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, 2020

/s/ William F. Oplinger

Name: William F. Oplinger
Title: Executive Vice President and
Chief Financial Officer

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Alcoa Corporation (the "Company") on Form 10-K for the period ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned, in the capacities and on the dates indicated below, hereby certifies pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to his knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 21, 2020

/s/ Roy C. Harvey

Roy C. Harvey

President and Chief Executive 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 solely pursuant to 18 U.S.C. Section 1350 and is not being filed as part of this report.

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Alcoa Corporation (the "Company") on Form 10-K for the period ended December 31, 2019 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned, in the capacities and on the dates indicated below, hereby certifies pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to his knowledge:

1. The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: February 21, 2020

/s/ William F. Oplinger

William F. Oplinger
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 solely pursuant to 18 U.S.C. Section 1350 and is not being filed as part of this report.

Mine Safety Disclosure

At Alcoa Corporation, management strives to work safely in a manner that protects and promotes the health and well-being of the Company's employees, contractors, and the communities in which Alcoa Corporation operates because it is fundamentally the right thing to do. Despite uncertainties and economic challenges, the Company remains committed to living its values and managing risks accordingly.

Alcoa Corporation's health and safety systems are anchored by committed people who are actively engaged and effectively support a safe work environment, safe work methods, and overall production system stability. Each day, people at all levels proactively monitor and intervene to defend against weaknesses that develop in the Company's safety systems by identifying potential hazards and error-likely situations and responding to eliminate or control them.

In the table below, there are disclosures involving the Point Comfort, TX alumina refinery. All citations have been or are being addressed; none constituted an imminent danger.

Dodd-Frank Act Disclosure of Mine Safety and Health Administration Safety Data

Certain of Alcoa Corporation's U.S. facilities are subject to regulation by the Mine Safety and Health Administration (MSHA) under the U.S. Federal Mine Safety and Health Act of 1977 (the "Mine Act"). The MSHA inspects these facilities on a regular basis and issues various citations and orders when it believes a violation has occurred under the Mine Act. Whenever the MSHA issues a citation or order, it also generally proposes a civil penalty, or fine, related to the alleged violation. Citations or orders can be contested and appealed, and as part of that process, are often reduced in severity and amount, and are sometimes dismissed.

Management believes the following mine safety disclosures meet the requirements of section 1503(a) of the Dodd-Frank Wall Street Reform and Consumer Protection Act (the "Dodd-Frank Act").

Mine Safety Data. The table and other data below present mine safety information related to the Company's U.S. facilities subject to MSHA regulation, as required by section 1503(a)(1) of the Dodd-Frank Act. The following data reflects citations and orders received from the MSHA during the year ended December 31, 2019, as reflected in the MSHA system on December 31, 2019, and the proposed penalties received from the MSHA during such period (\$ in full amounts).

Mine or Operating Name/ MSHA Identification Number(1)	Section 104 S&S Citations(3) (#)	Section 104(b) Orders(4) (#)	Section 104(d) Citations and Orders(5) (#)	Section 110(b)(2) Violations(6) (#)	Section 107(a) Orders(7) (#)	Total Dollar Value of MSHA Assessments Pro-posed(8) (\$)	Total Number of Mining Related Fatalities (#)	Received Notice of Pattern of Violations Under Section 104(e) (yes/no)	Received Notice of Potential to Have Pattern Under Section 104(e) (yes/no)	Legal Actions Pending as of Last Day of Period (#)	Legal Actions Initiated During Period (#)	Legal Actions Resolved During Period (#)
Point Comfort, TX Alumina Refinery(2)	1	–	–	–	–	\$ 2,242	–	no	no	1	–	–

- (1) The MSHA assigns an identification number to each mine or operation and may or may not assign separate identification numbers to related facilities. The information provided in this table is presented by mine or operation rather than the MSHA identification number because that is how Alcoa Corporation manages and operates its business, and management believes that this presentation is more useful to investors.
- (2) Under the Interagency Agreement dated March 29, 1979 between the MSHA, the U.S. Department of Labor, and The Occupational Safety and Health Administration, alumina refineries (such as the Company's Point Comfort facility) are subject to MSHA jurisdiction.
- (3) Represents the total number of citations issued under section 104 of the Mine Act, for violations of mandatory health or safety standards that could significantly and substantially contribute to a serious injury if left unabated. This includes the citations listed under the column headed section 104(d).
- (4) Represents the total number of orders issued under section 104(b) of the Mine Act, which represents a failure to abate a citation under section 104(a) within the period prescribed by the MSHA. This results in an order of immediate withdrawal from the area of the mine affected by the condition until the MSHA determines that the violation has been abated.
- (5) Represents the total number of citations and orders issued under section 104(d) of the Mine Act for unwarrantable failure to comply with mandatory health or safety standards.
- (6) Represents the total number of flagrant violations identified under section 110(b)(2) of the Mine Act.
- (7) Represents the total number of imminent danger orders issued under section 107(a) of the Mine Act.
- (8) Amounts represent the total dollar value of proposed assessments received.

During the year ended December 31, 2019, Alcoa Corporation had no mining-related fatalities, and none of the Company's mining operations received written notice from the MSHA of a pattern of, or the potential to have a pattern of, violations of mandatory health or safety standards that are of such nature as could have significantly and substantially contributed to the cause and effect of mine health or safety hazards under section 104(e) of the Mine Act.

The Federal Mine Safety and Health Review Commission (the "Commission") is an independent adjudicative agency that provides administrative trial and appellate review of legal disputes arising under the Mine Act. As of December 31, 2019, Alcoa Corporation had one matter pending before the Commission concerning a retaliation complaint filed by an employee in 2015. On December 17, 2017, this matter was dismissed by an Administrative Law Judge after a trial on the merits; however, the employee appealed this decision to the Commission, where the matter is pending.