

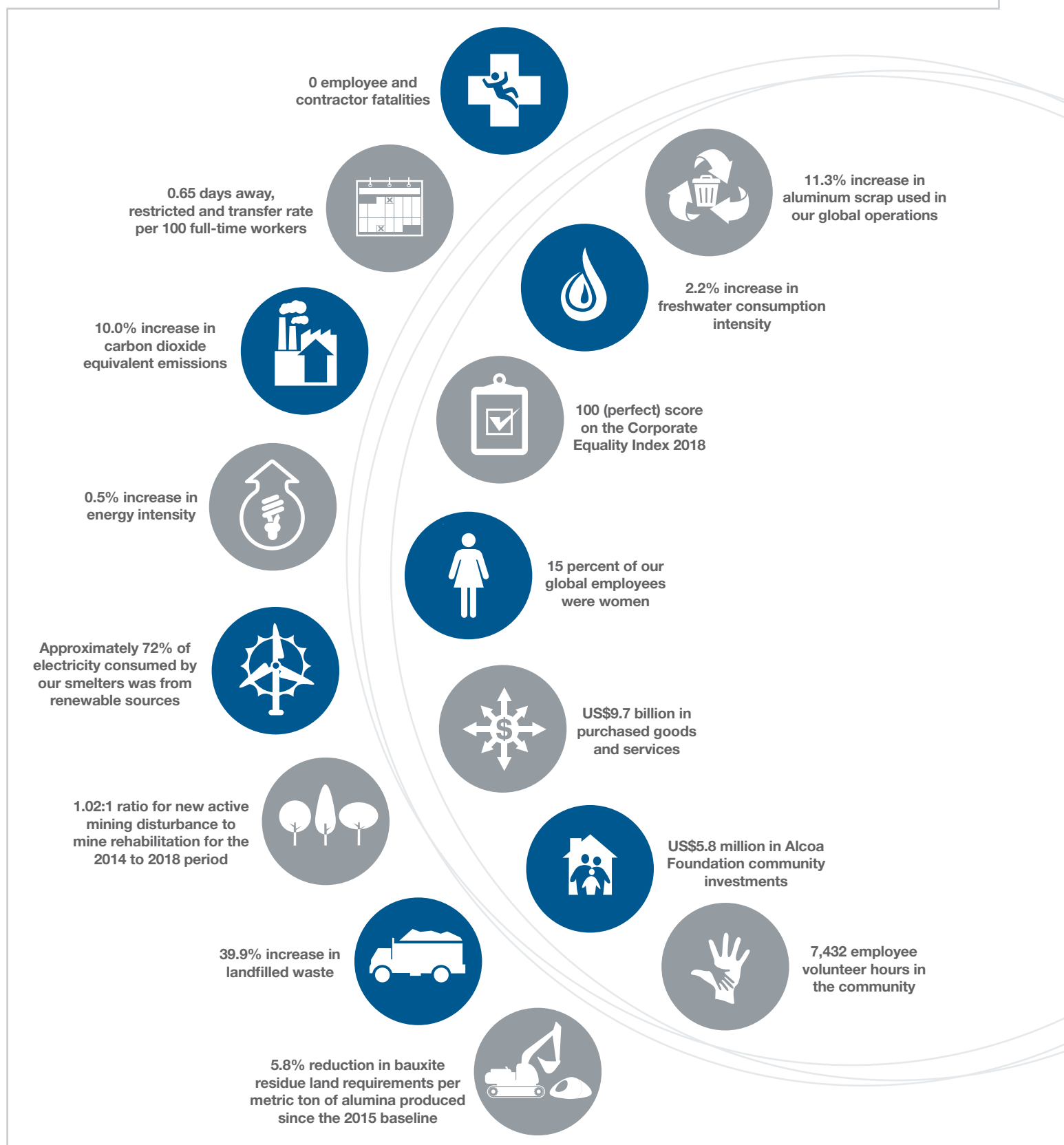


2018 Alcoa  
Sustainability Report





# ALCOA SUSTAINABILITY PERFORMANCE 2018



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## Materiality

Throughout this report, materiality refers to the list of sustainability topics about which Alcoa communicates because they are material for our stakeholders in this context. It should not be confused with materiality for financial reporting or regulatory purposes.

## Forward-looking Statements

This report contains certain 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 that reflect Alcoa’s expectations, assumptions or projections about the future, other than statements of historical fact, are forward-looking statements. Forward-looking statements by Alcoa 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 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. For a discussion of some of the specific factors that may cause Alcoa’s actual results to differ materially from those projected in any forward-looking statements, see risk factors described in our most recent Annual Report on Form 10-K for the fiscal year ended December 31, 2018, filed with the Securities and Exchange Commission on February 26, 2019, in Part I, Item 1A, “Risk Factors.” Alcoa 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.

# FROM THE CEO

Our Alcoa values to *Act with Integrity, Operate with Excellence* and *Care for People* are the foundation upon which our sustainability journey is built, guiding us as we advance our economic, environmental and social performance.

In 2018, we reached a major milestone in that journey—every employee and contractor working at our locations around the world went home to their families at the end of each workday.

The achievement of zero fatalities belongs to our employees, who are empowered to stop work if they believe a situation is unsafe and did so throughout the year. A new safety strategy focused on systems and culture also helped increase the safety of our operations during the year. While the marked improvement in 2018 was a good first step, all Alcoans and our contractors are focused on continuing to make progress on our safety programs and ensure everyone arrives home safely after a good day's work.

In addition to safe workplaces, we are striving to create a trusting and inclusive work environment. In 2018, we launched our global Harassment and Bully-Free Workplace and Equal Employment Opportunity policies. We also formed the Alcoa Human Rights Council, which updated our Human Rights Policy to ensure it continues to meet the needs and expectations of our employees and stakeholders. These actions to enhance our human rights program were based on our most salient priorities.

To guide our locations' efforts, we updated the Alcoa Stakeholder Engagement Framework in 2018. Alcoa Foundation and Instituto Alcoa also continued partnering with local and global organizations to address pressing issues, such as climate change, biodiversity and education.

Our environmental performance in 2018 was a challenge due to capacity restarts, operational instabilities and other factors. As a result, we experienced both absolute and intensity increases in greenhouse gas emissions, energy use, water consumption and waste to landfill. We did reduce the amount of land we require for bauxite residue, and we continued to improve our mine rehabilitation techniques to achieve our long-term goals. We also invested US\$145 million in projects related to our environmental performance that primarily focused on improving bauxite residue management.

To develop a longer-term view of the impact of our operations and ensure our climate strategy continues to address our current challenges and opportunities, our Executive Team commissioned a Climate Strategy Team comprising high-level, cross-functional employees in 2018.





Underscoring our commitment to sustainability is our decision to certify a portion of our value chain against the sustainability standards developed by the [Aluminium Stewardship Initiative](#) (ASI). This effort will enable us to further differentiate our products, which include our SUSTANA™ line of environmentally friendly aluminum products.

For the second consecutive year as Alcoa Corporation, we were included in the Dow Jones Sustainability World and North American Indices. We also were named to the 2019 Bloomberg Gender Equality Index, which recognizes companies committed to transparency in gender reporting and advancing women's equality.

Turning to the future, we will continue to safely and sustainably develop the world's best assets, making us the partner of choice for investors, customers, employees and communities.

I thank our employees for their daily efforts in making Alcoa a more sustainable company and our stakeholders for continuing to challenge and encourage us on our journey.

A handwritten signature in black ink, appearing to read "Roy C. Harvey". The signature is fluid and cursive, with a large, stylized "R" and "H".

Roy C. Harvey  
*President and Chief Executive Officer*  
*Alcoa Corporation*





## Our Company

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# CORPORATE OVERVIEW

Alcoa is a global industry leader in bauxite, alumina and aluminum products. Our company is built on a foundation of strong Values and operating excellence dating back more than 130 years to the world-changing discovery that made aluminum an affordable and vital part of modern life.

**FOUNDED:** November 1, 2016, when Alcoa Inc. separated into Alcoa Corporation and Arconic Inc.

**GLOBAL HEADQUARTERS:**  
Pittsburgh, Pennsylvania, USA

**VALUES:**  
Act with Integrity. Operate with Excellence. Care for People.

2018 REVENUE: **US\$13.4 billion**

2018 NET INCOME: **US\$227 million**

2018 EMPLOYEES: **14,000**

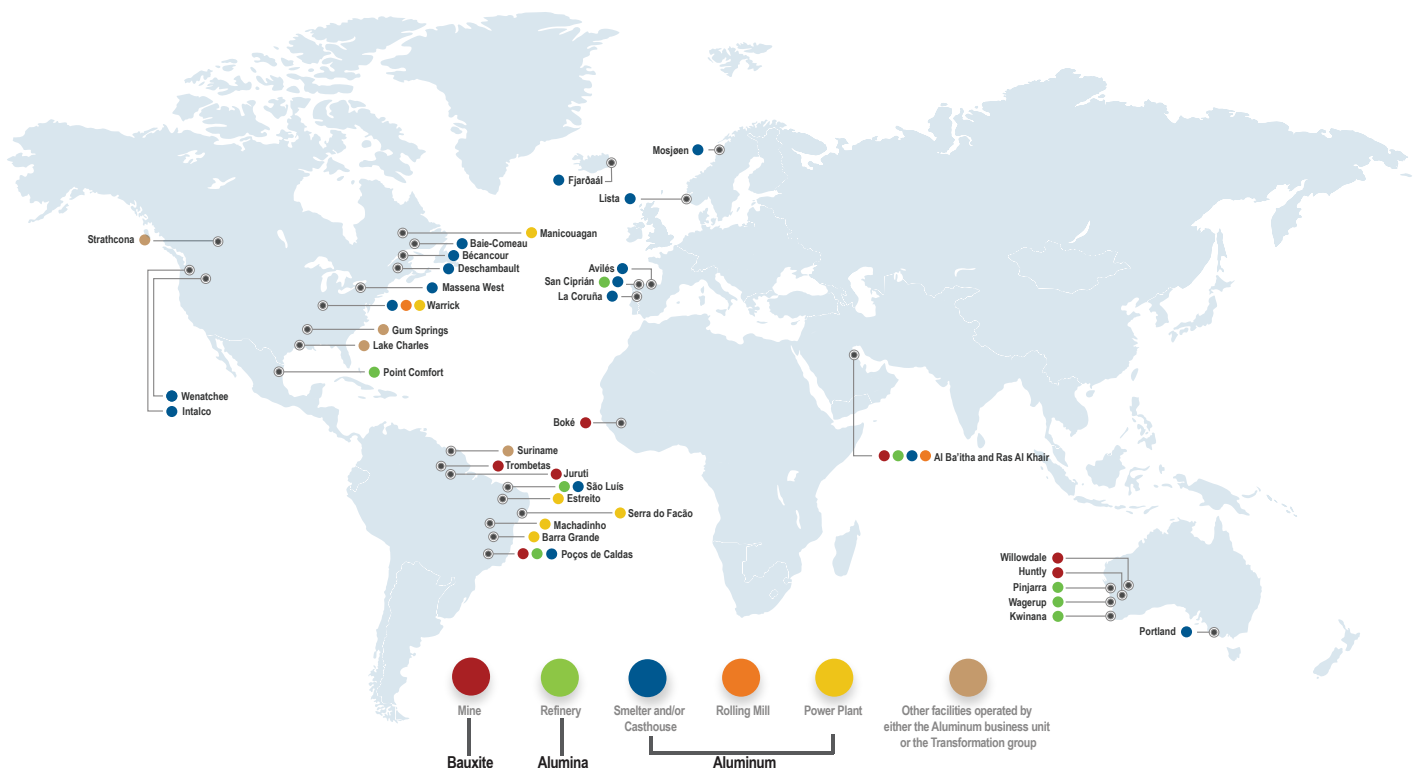
## BUSINESS SEGMENTS

**BAUXITE:** We have ownership in seven active bauxite mines globally and operate four of them in Australia and Brazil. 2018 bauxite production: 45.8 million dry metric tons.

**ALUMINA:** We are a world leader in the production of alumina, operating six refineries in Australia, Brazil and Spain. 2018 alumina production: 12.9 million metric tons.

**ALUMINUM:** This segment includes aluminum smelting, casting and rolling, along with the majority of our energy assets. 2018 primary aluminum production: 2.3 million metric tons.

## ALCOA LOCATIONS



# VALUE CREATION PROCESS

By transforming natural resources into aluminum, we create value for our stockholders, customers, suppliers and the communities where we operate. It is critical to balance the inputs and outputs to maximize the benefits and minimize the negative impacts of our processes.

The following simplified analysis of our value creation process identifies our key inputs, outputs and effects on stakeholders. We used this information to help determine our [material topics](#).

## PRODUCTION PROCESS



**General Aspects Applicable to All Processes**



**Bauxite Mining**  
88% internal consumption,  
12% third-party shipments

### Key Inputs

Financial resources; technology; labor; knowledge and skills; environment, health and safety systems; stakeholder engagement; impact assessment; strong governance; infrastructure	Bauxite reserves; land surface; water; energy
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### Key Outputs

Salaries; taxes; stockholder value; job creation and stable job base; skilled employees; environmental footprint; information to stakeholders	Bauxite; royalties; wastewater; air emissions; noise; rehabilitated land
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### Key Effects

Income stability for families and communities; professional development; local enterprise development; improved quality of life; environmental impact; company license to grow; higher value for stockholders	Revenue generation; potential community relocation; biodiversity disturbance; changes to landscape
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# PRODUCTION PROCESS



## Alumina Refining

32% internal consumption,  
68% third-party shipments



## Aluminum Production

100% third-party shipments



## Energy Generation

### Key Inputs

Bauxite; water; caustic soda; lime; energy	Alumina; energy; aluminum fluoride; coke and pitch; aluminum scrap; water; oils and lubricants; packaging material	Water; coal; land surface; distribution infrastructure
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### Key Outputs

Alumina; bauxite residue; greenhouse gas emissions; other air emissions; noise	Aluminum; greenhouse gas, fluoride, sulfur dioxide and other emissions; spent pot lining; aluminum dross; volatile organic compounds	Electricity; water dam; rehabilitated land; fly ash; greenhouse gas emissions; combustion emissions
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### Key Effects

Revenue generation; changes to landscape; environmental disturbances; research and development opportunities	Revenue generation; potential effects on local vegetation; contribution to climate change; development of recycling industry; product development (alloys); greenhouse gas reduction through product life cycle	Revenue generation; effects on the landscape; contribution to climate change; land disturbance; biodiversity impacts; decoupling from energy market; potential community relocation
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Data are approximate. Alcoa's three business segments are Bauxite, Alumina and Aluminum. The Aluminum business segment consists of aluminum smelting, casting, rolling and energy generation.





## SUSTAINABILITY AT ALCOA

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# SUSTAINABILITY APPROACH

Throughout the world, sustainability drives us to minimize our negative impacts and maximize our value.

It has earned us the credibility and trust to mine bauxite in two of the most protected areas on the planet—the Brazilian Amazon and the jarrah forest in Western Australia. It guides us as we operate in countries with weak or differing laws. It keeps us in good standing with governments and communities to ensure access to bauxite reserves and enhance our long-term license to operate.

In 2018, we implemented a new business strategy across our value chain to grow sustainably, partner locally and lead globally. The strategy encompasses the sustainable value drivers in each of our three business units, and we have aligned our three-pillar sustainability approach to support this effort.

Sustainability Pillar	Business Strategy
Create sustainable value for the communities where we operate, with the aim to maintain our license to operate and grow our business.	Be the partner of choice—for investors, customers, employees and communities—to develop and operate the world’s best assets. We will grow sustainably, partner locally and lead globally.
Enhance the value of our products through differentiation to improve our profitability.	
Minimize our negative environmental impacts and improve our health and safety performance to protect environmental and employee well-being and reduce our long-term risk exposure.	

Helping guide our actions are our new long-term sustainability goals, which cover the environment, our employees and the communities in which we operate. (See the [Strategic Long-term Goals](#) section.)

## Creating Sustainable Value

We actively participate in every community in which we operate around the world. We want these communities to thrive, and we view our presence as an opportunity to help develop and enable economic activity, environmental practices and social programs that will remain after our role ends.

[Alcoa Foundation](#) focuses globally on the countries where we operate and targets its investments on promoting the prevention of, and resilience to, climate change from human activity, as well as the restoration and preservation of biodiversity. Instituto Alcoa, our foundation in Brazil, funds strategic projects focused on education, health, environment, security and job creation in the Brazilian communities where we operate. In addition, our locations use the Alcoa Stakeholder Engagement Framework to work with stakeholders to identify local opportunities for value creation. (See the [Stakeholder Engagement](#) section.)

A good example of delivering shared value is our Fjardaál smelter, which began operation in 2007 in East Iceland. This rural region, which relied heavily upon its fishing industry, was experiencing a declining population prior to Alcoa’s arrival.

The smelter has created more than 500 well-paying direct jobs and approximately 250 contractor positions. The average salary in the region has more than doubled since 2005, and the unemployment rate is below the national average. The population has increased and remains steady, while new infrastructure includes public transportation, a sports hall and a shopping mall. In-depth information and metrics are available on the [East Iceland Sustainability Initiative website](#).

## Enhancing Product Value

The global markets in which we compete are increasingly driven by significant challenges, including population growth, urbanization, climate change and resource scarcity. Inherently sustainable, aluminum helps our customers

address these challenges and capture the opportunities they present.

Aluminum enables safer and more energy-efficient buildings; more fuel-efficient cars, trucks and airplanes; and sustainable food and beverage packaging. It is also infinitely recyclable, reducing energy and resource consumption.

Our SUSTANA line of aluminum products is produced with low carbon emissions and recycled content. This platform allows us to position and differentiate our innovative, value-added products. (See the [Products](#) and [Differentiation Strategy](#) sections.)

We will be certifying a portion of our value chain against the sustainability standards developed by the Aluminium Stewardship Initiative. We have been an active member of ASI since 2015. Our vice president of sustainability serves on the Standards Setting Committee, which is a multi-stakeholder body that defines the industry's sustainability standards.

ASI certification covers a wide range of indicators across the entire value chain in the areas of governance, environmental management and social responsibility. We anticipate having an initial five of our facilities certified by the end of 2019.

## Improving Our Footprint

Despite technological and process advancements, primary aluminum production remains energy- and resource-intensive and also impacts the natural and work-place environments.

Guiding our efforts are our ambitious 2020 and 2030 targets for [emissions](#), [waste](#), [water](#), [mine rehabilitation](#), [diversity and inclusion](#), [safety and health](#), and [stakeholder engagement](#). Our approach and performance for each can be found in the individual sections within this report.

We also serve as stewards of the land, operating in a manner that focuses on minimizing our negative impacts and maximizing ongoing sustainable use. Biodiversity management plans, industry-leading mining and mine rehabilitation processes, and asset management that covers a facility's entire life cycle help us optimize our land and facility management and support our license to operate. (See the [Biodiversity and Mine Rehabilitation](#) and [Facility Stewardship and Transformation](#) sections.)

## Related Information

[Strategic Long-term Goals](#)

# REPORTING AND MATERIALITY

We are committed to transparent and thorough reporting on our sustainability performance.

We base the content of our sustainability reporting primarily on the requirements of the [Global Reporting Initiative's GRI Standards](#) and the feedback from our stakeholders. The information covers all global operations where we have operational control, unless otherwise noted.

We use a four-step analysis to determine our material topics, which we update on a periodic basis.

## Step One

The starting point of our analysis is our [Value Creation Process](#), where we identify the key inputs and outputs of our production processes and their effects on our stakeholders.

## Step Two

We gather information from different stakeholders on their interests and concerns using the following, among others:

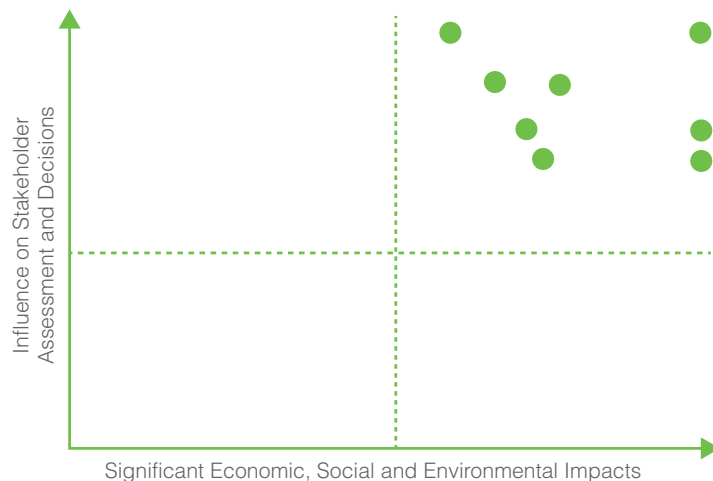
- Outcomes from the Alcoa Stakeholder Engagement Framework process at the location level, which includes community consultation forums;
- Formal and informal customer feedback and sustainability questionnaires;
- Key issues identified by industry organizations;
- Ongoing engagement with governmental and non-governmental organizations (NGOs);
- Issues evaluated by leading sustainability ranking organizations, such as the [Dow Jones Sustainability Indices](#) and [CDP](#);
- Regulatory developments and trends in the various regions where we operate;
- Media coverage; and
- External standards and initiatives that we follow or endorse, including the [Aluminum Stewardship Initiative](#), [United Nations Global Compact](#), [Business Roundtable Principles of Corporate Governance](#), [International Organization for Standardization](#), [International Aluminium Institute Sustainability Principles](#) and [Recommendations of the Task Force on Climate-related Financial Disclosures](#).

## Step Three

Our leadership discusses how sustainability can support the company's strategic priorities, as well as how changes in our business and industry can influence our sustainability strategy as well as our products and processes.

## Step Four

We prioritize stakeholder input and our key business challenges using the following matrix.



We have identified the eight topics in the upper right quadrant as material, and they form the basis for our sustainability reporting. Topics that fall in the other quadrants are reported through other channels, such as our [Annual Report](#).



## 2018 MATERIAL TOPICS

Material Topic	Boundary
Economic Performance	Communities surrounding our operating locations, stockholders, lenders, financial analysts and investors globally
Greenhouse Gas Emissions	Global, especially communities surrounding our operating locations, and government agencies and NGOs
Energy	Communities surrounding our operating locations, government agencies and NGOs
Water	Communities surrounding our operating locations (especially those in water-stressed regions of the world), government agencies and NGOs
Waste	Communities surrounding our operating locations, government agencies and NGOs
Biodiversity	Communities surrounding our operating locations, government agencies and NGOs
Health and Safety	Employees, communities surrounding our operating locations and government agencies focused on health and safety in <a href="#">each country</a> in which we operate
Local Communities	Communities surrounding our operating locations and NGOs

## Assurance

[First Environment](#) provided limited assurance on our total 2018 Scope 1 and Scope 2 greenhouse gas emissions data (under the ISO 14064, Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions) and verified the accuracy of the energy data used as a basis for the calculation of these emissions. First Environment also provided limited assurance on our Scope 3 emissions for six categories— purchased goods and services; fuels and energy related activities; waste generated in operations; business travel; product transportation and distribution (downstream); and processing of intermediate products sold to customers. (View the [limited assurance verification statement](#).)

We also have developed an environmental product declaration (EPD) covering the ECOLUM™ family of aluminum cast products. The information has been certified by UL, a third-party assessor. ([Read the EPD](#).)

In addition, 80 percent of our operating plants are certified against the ISO 14001:2015 Environmental Management Systems standard, and 33 percent are certified against the OHSAS 18001:2007 Occupational Health and Safety Management System standard.

For the remaining information, we rely on our stringent internal controls and management systems to ensure what we report is accurate and representative of our operations.

# STRATEGIC LONG-TERM GOALS

Our sustainability approach is driven by—and measured against—our strategic long-term goals, which help us further integrate sustainability into our business processes to minimize our environmental impacts and maximize our value.

We review and update these goals on a periodic basis to ensure we are focused on the sustainability issues and strategic priorities relevant to our current operations. Through periodic interactions, we also evaluate if our stakeholders feel these goals are sufficiently aggressive.

Following our most recent review in 2017, we began implementing an updated set of goals in 2018. The table below summarizes the progress we achieved against these new goals during the year.

Many of the goals contain a quantifiable target. For others, we do not yet have enough information to determine a quantitative goal. We will continue gathering the information that we need to determine appropriate 2025 and 2030 targets and will finalize them by 2020.

## STRATEGIC LONG-TERM GOALS

Goal	Performance Achieved through Year-end 2018
From a 2015 baseline, reduce the intensity of our GHG footprint (direct and indirect emissions) from our smelting operations by 15 percent by 2025 and 20 percent by 2030. <a href="#">More</a>	8.1 percent decrease
Define and implement a program focused on enhancing water-use efficiency at locations in water-scarce areas by 2020; define specific water-use reduction targets for 2025 and 2030. <a href="#">More</a>	Updated our assessment of water-related risks at our operating locations
Optimize our portfolio of economically viable placement opportunities for by-product materials (from waste to value) by 2020; define specific objectives to be achieved by 2025 and 2030. <a href="#">More</a>	Sold 140,420 metric tons of coproducts and by-products
From a 2015 baseline, reduce bauxite residue land requirements per metric ton of alumina produced by 15 percent by 2030. <a href="#">More</a>	5.8 percent reduction
Maintain a corporate-wide running five-year average ratio of 1:1 or better for active mining disturbance (excluding long-term infrastructure) to mine rehabilitation. <a href="#">More</a>	1.02:1 ratio
Zero fatalities and serious injuries (life-threatening or life-altering injuries and illnesses). <a href="#">More</a>	Zero fatalities and three serious injuries



STRATEGIC LONG-TERM GOALS

Goal	Performance Achieved through Year-end 2018
Attain an inclusive everyone culture that reflects the diversity of the communities in which we operate. <a href="#">More</a>	Developed a trusting workplaces program in 2018 that included the launch of two global policies— Harassment and Bully-Free Workplace Policy and Equal Employment Opportunity Policy.
Reassess the implementation of key stakeholder engagement tools by 2020; define shared value creation opportunities to be implemented by 2025 and 2030. <a href="#">More</a>	Updated the Alcoa Stakeholder Engagement Framework, launched the Human Rights Council and developed an enhanced supplier sustainability program.

Related Information

[Sustainability Approach](#)  
[Reporting and Materiality](#)

# OPPORTUNITIES, CHALLENGES AND RISKS

Inherently lightweight, durable and infinitely recyclable, aluminum is well-positioned to capture opportunities that address climate change, urbanization, mobility and other global megatrends. The challenge is doing so without

negating the positive impact, as primary aluminum production is energy- and resource-intensive and a major emitter of greenhouse gases.

## Key Opportunities

We have significant opportunities to grow our business and further embed sustainability within our operations and those of our business partners. This is supported by our reputation as a sustainability leader and our holistic approach to doing business the right way.

### Growth in Aluminum Demand

With an annual growth rate of 4 percent in 2018 and growth projected at 2 to 3 percent for 2019, global demand for aluminum continues to increase at one of the highest rates among base metals. Stricter emissions and fuel-efficiency regulations and consumer demand for more sustainable products have positioned aluminum as a metal of choice to reduce weight and increase recyclability without compromising performance.

We are well-positioned to capitalize on this growth. We are a recognized sustainability leader within our industry, and this reputation facilitates access to additional resources we require to grow. Our operations are also strategically located near the world’s growth markets.

### Product and Process Differentiation

We have opportunities to differentiate our products from the competition by leveraging key attributes that are important to our customers. For example, our SUSTANA line of aluminum products (See the [Products](#) section) reduces the carbon impact of our customers’ supply chains, helping them achieve their sustainability goals.

The next step in our product differentiation is ASI certification. This will demonstrate that our bauxite, alumina and aluminum have been mined and produced following internationally approved standards addressing governance, environmental management and social responsibility.

On the production side, we have opportunities to reduce our environmental footprint through process improvements and advanced technologies. We also have taken a leadership position in transforming coproducts and by-products from our operations into commercially viable products, thereby reducing our waste footprint. (See the [Waste](#) section.)



## Key Challenges

While capturing the opportunities, we must address the challenges.

### Aluminum Pricing

A persistent challenge is fluctuation in the price of aluminum due to factors beyond our control. Pricing can be impacted by macroeconomic developments that affect demand, such as an economic slowdown that would negatively impact the construction or automotive industry.

Pricing also can be influenced by excess supply on the global market. For example, China increased its exports of semi-fabricated and fabricated products in recent years as production capacity exceeded domestic demand.

Based on data provided by CRU, we estimate that China produces 57 percent of the world's primary aluminum, with 87 percent of this production powered by electricity produced at coal-fired plants. We also estimate the country emits more than 65 percent of the world's greenhouse gases that result from aluminum production.

### Exposure to Carbon Markets

The industry's heavy carbon footprint and the signing of the [2016 Paris Agreement](#) on climate change have increased interest in strengthening regulations for carbon emissions. Many countries have instituted or are considering emissions trading systems, carbon offsets, carbon taxes and other carbon-pricing initiatives to voluntarily mitigate climate change and build climate resilience. We have been participating in the carbon markets in Europe and Canada and will draw from this experience as other initiatives are introduced around the world.

We are also coordinating with industry associations, such as the International Council for Mining and Metals (ICMM) and the International Aluminium Institute (IAI), to respond to increasing expectations with improved management systems.

### Increased Regulatory and Social Scrutiny

At the beginning of 2019, another mining company's tailings dam in Brazil collapsed, causing significant loss of life and environmental damage. The disaster escalated regulatory scrutiny of the country's mining industry as a whole and raised concerns among various stakeholders. Our challenge is to ensure our practices are best-in-class, we remain ahead of regulations and we actively manage our facilities, including our tailings dams and bauxite residue storage areas.

Unauthorized bauxite mining in Malaysia by other operators is also increasing scrutiny of the industry. Small-scale firms using sub-standard mining practices in that country have damaged the land, waterways and air, as well as local food supplies. To address the situation, Malaysia has issued bauxite mining regulations that are at a global standard, but enforcement is still in the preliminary stages.

### Sustainability Challenges

Sustainability challenges that we face within our own operations include:

- Eliminating fatalities and mitigating the risk of injury for employees and contractors in our operations;
- Reducing our greenhouse gas emissions;
- Minimizing our freshwater use and improving the quality of the wastewater we discharge;
- Reducing our reliance on non-renewable natural resources;
- Maximizing opportunities to reuse or recycle all production coproducts and by-products and eliminating landfill disposal of our wastes;
- Mitigating impacts to land and biodiversity;
- Attracting, retaining and developing employees, especially in regions of the world where there is intense competition for talent and limited talent with sufficient skills;
- Integrating our sustainability practices and expectations into our supply chain; and
- Enhancing our partnership with the communities where we operate and our engagement with all stakeholders.

*Details on how we are approaching these challenges can be found throughout this sustainability report.*

## Risk Management

Our risk-management process is structured around the [Integrated Framework for Enterprise Risk Management](#) from the Committee of Sponsoring Organizations of the Treadway Commission and uses the International Organization for Standardization's ISO 31000 (risk management) as a guideline.

We use the process to identify and evaluate a broad spectrum of risks. It is structured using our key business drivers and organizational goals to ensure that all aspects of the company have been covered. Business drivers include our reputation, brand, earnings and operating margins. Organizational goals include excellence in stewardship of the environment, health and safety, a consistently fair representation of financial information, organic growth and more.

The identified risks are grouped into categories and presented to management to determine how they should be prioritized. Our process is multi-dimensional and focuses on several aspects, including likelihood of occurrence,

level of impact and mitigating factors. Each is considered in assessing and prioritizing risk, with more emphasis placed on likelihood and impact.

The collaborative process by which risks are identified, evaluated and managed ensures that senior management remains aware and vigilant in managing key risks that could impact the company. The Alcoa Board of Directors maintains oversight of our risk management, and our management reports on specific risks on a periodic basis.

A discussion of our significant risks can be found in our [Annual Report on Form 10-K](#) for the year ended December 31, 2018. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may materially adversely affect us in future periods.

*Any forecast set forth in this section speaks as of the date it was originally presented. Alcoa is not updating or affirming any of the forecasts as of today's date. The provision of this information shall not create any implication that the information has not changed since it was originally presented.*



# SUSTAINABLE DEVELOPMENT GOALS

We have made significant progress against our own goals as well as many of the [United Nations Sustainable Development Goals](#) (SDGs).

The SDGs where we can have the biggest impact are aligned with the [European Aluminium initiative](#) to link the

industry's strategic sustainability ambitions closer to the SDGs. The exception is our inclusion of Goal 15: Life on Land due to its relevance to our mining operations.

Here are some key actions and achievements against these goals in 2018.



- Alcoa Foundation funded [a project in Suriname](#) that created school gardens and a related educational component that uses the gardens for lessons on ecological gardening, basic school subjects like math and science, and life skills.
- Alcoa Foundation partnered with the National Wildlife Federation to implement an environmental literacy program using a unique green STEM methodology in 24 schools in Alcoa communities in Australia, Norway and the United States. More than 11,000 students and 800 educators participated in this program in 2018.
- More than 6,800 students and 250 teachers participated in the Ecologia e Ação (ECOIA) environmental education program funded by Instituto Alcoa in Brazil.
- Our partnership with training partner [SENAI](#) in Juruti provided residents in this remote Amazonian region access to nearly 90 professional and technical courses.
- In Australia, our four-year apprenticeship program continued to be a pathway to a trade certificate in a variety of vocations.
- Alcoa Foundation provided funding for the purchase of an automated plasma-cutting machine using CNC programming for the Centro Integrado de Formación Profesional de Avilés (Integrated Vocational Training Center of Avilés) in Spain.



- We formed the Alcoa Human Rights Council and updated our [Human Rights Policy](#).
- We set a 2018 target to have women at all levels comprise 15.1 percent of our global workforce and linked this goal to our annual incentive compensation formula for our leaders. We achieved 14.9 percent.
- We launched two global policies—Harassment and Bully-Free Workplace Policy and Equal Employment Opportunity Policy.
- We introduced a tool that ensures our job postings are gender neutral and without bias.
- We were named to the [2019 Bloomberg Gender-Equality Index](#), which recognizes companies committed to transparency in gender reporting and advancing women's equality.



- Approximately 72 percent of the electricity consumed by our smelters was from renewable sources.
- We signed two additional long-term wind power purchase agreements in 2018 in Norway.
- According to Bloomberg data, we were one of the world's 10 top clean-energy buyers in 2018.



- We paid US\$1.7 billion in labor costs.
- We spent US\$9.7 billion with suppliers globally.
- We built upon our top-level risk assessment of our human rights practices that we conducted in 2017 and cascaded the process down to prioritized locations in Brazil and Spain.
- We enhanced our procurement sustainability program to include human rights in the supplier screening process.
- With the support of Alcoa Foundation, World Resources Institute (WRI) Brasil launched the first phase of a two-year program to provide technical assistance for implementing climate-smart agroforestry practices to smallholder farmers and rural producers, particularly women, in Juruti.
- We launched a procurement tool to track local spend with the aim of establishing targets.



- We found alternative uses for 140,420 metric tons of coproducts and by-products.
- We achieved a 5.8 percent reduction in land storage requirements for bauxite residue since 2015.
- We consumed 425,088 metric tons of aluminum scrap in our global operations.
- Alcoa Foundation again provided financial support to [The Recycling Partnership](#) and had representation on the organization's board of directors.
- Our Centers of Excellence—mining, refining and aluminum—advanced industry knowledge and supported continuous improvement in our operations.
- Our SUSTANA line of products were produced with low carbon emissions or recycled aluminum content.



- We updated our long-term GHG emissions goal: From a 2015 baseline, reduce the intensity of our GHG footprint (direct and indirect emissions) from our smelting operations by 15 percent by 2025 and 20 percent by 2030.
- We announced a joint venture with Rio Tinto called [ELYSIS](#) to scale up and commercialize a revolutionary Alcoa-invented smelting technology innovation that emits oxygen and eliminates all direct greenhouse gases from the traditional smelting process.
- We commissioned an internal Climate Strategy Team to ensure our climate change strategy continues to address our current challenges and opportunities.
- American Forests and Alcoa Foundation entered the second year of a three-year partnership to enhance biodiversity and combat climate change in 13 locations around the globe. The projects will restore at-risk tree species and help cities address climate change by engaging 4,500 volunteers in tree plantings.
- Alcoa Foundation supported a World Resources Institute project aimed at developing tools and guidance that will enable aluminum companies to set science-based GHG emission-reduction targets.



- We established a mine rehabilitation goal to maintain a corporate-wide running five-year average ratio of 1:1 or better for active mining disturbance (excluding long-term infrastructure) to mine rehabilitation.
- We rehabilitated 923 hectares (2,281 acres) of mining land.
- We began developing biodiversity action plans for our Alumar refinery in Brazil, San Ciprián refinery in Spain and Baie-Comeau smelter in Canada.
- Alcoa Foundation continued funding three environmental projects across the Peel-Harvey Catchment in Australia.
- The foundation also partnered with the Soil Conservation of Iceland to launch an effort to restore wetlands in East Iceland to develop and improve wildlife habitats while counteracting carbon emissions.



## 17 PARTNERSHIPS FOR THE GOALS



- Through our [Global Supplier Sustainability Program](#), we assessed and helped improve the sustainability of key suppliers.
  - We developed an enhanced supplier sustainability program that will improve the management of our supply chain risk profile in emerging economies through the use of supplier scorecards covering environment, labor practices and ethics.
  - Supported by Instituto Alcoa, the Juruti Sustainability School in Brazil is educating approximately 40 civic, government and business leaders about long-term goals for their region based on the UN SDGs. An outcome of the initiative will be a proposal for the Juruti 2030 Plan.
  - We continued implementing a separate third-party supplier due-diligence program to further manage risk in our supply chain related to the areas of anti-bribery and corruption, trade compliance, child and slave labor, criminal history, human trafficking and conflict minerals.
  - Alcoa Foundation invested US\$5.8 million in global and community programs through partnerships with reputable NGOs.
  - We continued to be an active participant in the Aluminium Stewardship Initiative.
  - We were again named to the Dow Jones Sustainability Index.
-





ENHANCING PRODUCT VALUE



# PRODUCTS

Aluminum is the element of possibility.

It is lightweight, durable and infinitely recyclable. It is used to make airplanes, cars, trucks, buses, trains and buildings more energy-efficient, helping reduce greenhouse gas emissions over their life cycles. It enables lighter, fully recyclable food and beverage packaging, reducing waste.

In partnership with our customers, we continue to enhance the sustainability of our products. Our Centers of Excellence—mining, refining and aluminum—advance our knowledge and ensure continuous improvement through technology and engineering, best practice sharing and core operation standards.

## Bauxite

We are one of the world's largest producers of bauxite ore. Because our high-quality and reliable bauxite is mined responsibly, it helps reduce supply chain risk for any downstream user.

The sustainability of our mining operations begins with engaging stakeholders to develop a rehabilitation plan before operations commence. We minimize operational impacts and use innovative techniques to restore diversity or prepare former mine lands for future beneficial use. See the [Mine Rehabilitation](#) section for more information.



Bauxite

**“Constellium has put in place a responsible purchasing policy that requires our key suppliers to be evaluated for their sustainability performance. Alcoa is one of our key suppliers of primary aluminum in different forms and has been assessed by our third-party consultant, Ecovadis. Alcoa earned Gold Supplier status, which means that its performance is among the top 5 percent of companies in the sector. In particular, Alcoa has achieved benchmark performance in environmental and fair business practices. As it shows Alcoa’s commitment to sustainable development, this achievement is important for Constellium and our customers and is aligned with our strategy.”**



### Catherine Athènes

Director, Group Sustainability  
Director, Public Affairs Europe  
Constellium

## Alumina

Outside of China, we are the world's leading producer of alumina, which is refined from bauxite ore. Our sustainability challenges in refining are water usage, particularly in our three Western Australia refineries, and bauxite residue management. Information on how we are addressing each can be found in the [Water](#) and [Waste](#) sections.



Alumina



# Aluminum

## Smelting

Smelting alumina to produce molten aluminum is an energy-intensive process that emits greenhouse gases when using current best-available technology. We have achieved significant success in reducing our energy usage and emissions, and we are an industry leader in developing technology and implementing process controls to further reduce impacts from smelting. See the [Energy](#) and [Climate Protection](#) sections for details.



Molten aluminum

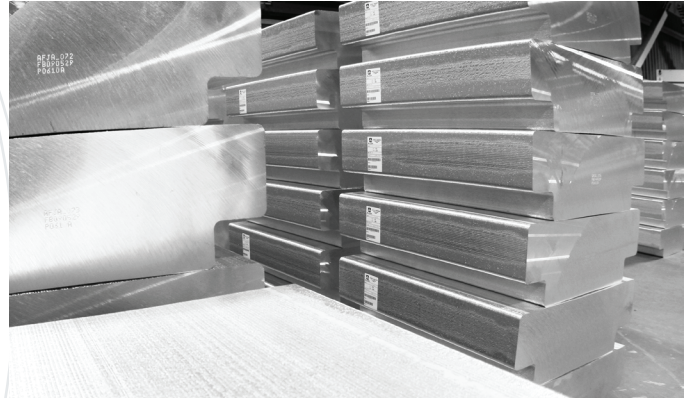
## Casting

Our global network of casthouses produces a complete portfolio of primary aluminum products, including billet, foundry ingot, rolling slab, rod, powder, and high purity and P1020 ingot.

Our SUSTANA line of environmentally friendly aluminum products includes ECOLUM cast products, which are produced at Alcoa smelters that run on renewable power and generate no more than 2.5 metric tons of carbon dioxide equivalents ( $\text{CO}_{2e}$ ) per metric ton of aluminum produced—75 percent better than the industry average. The 2.5 metric tons of  $\text{CO}_{2e}$  encompasses direct and indirect emissions from smelting and casting, including from the energy consumed. The total footprint, which adds in emissions from the mining and refining phases, is well below 4 metric tons of  $\text{CO}_{2e}$  per metric ton of aluminum produced. Each ECOLUM product is issued a certificate of origin that verifies its carbon emissions.

We also have developed an environmental product declaration covering the ECOLUM family of cast products. The EPD, which is registered with [UL](#), provides further information and validation of the products' total footprint. ([View the EPD.](#)) The EPD offers the possibility of achieving points in the [LEED](#)®

and [BREEAM](#)® frameworks for sustainable building projects, which is normally achieved only by using products with recycled content. This is especially useful for applications where primary metal is preferred to secondary metal.



ECOLUM T-bar billet

Another offering in the SUSTANA line is ECODURA™ billet, which can be used in building and construction products. The billet has a minimum of 50 percent recycled content, not including internal scrap or primary remelt, and is produced with up to 95 percent less energy than virgin aluminum. ECODURA products also can contribute points toward LEED and BREEAM certifications.

Another product family—Alcoa Specialty Alloys—offers higher strength and better thermal performance for new lightweighting solutions. Products include SupraCast™, EZCast™, VersaCast® and EverCast™ alloys.

## Rolling

Our flat-rolled aluminum is used for food and beverage containers. We play a role in increasing the recycling of used beverage containers, and we use this scrap material in the production of our aluminum. See the [Recycling](#) section for additional information.



Aluminum coil

# DIFFERENTIATION STRATEGY

Our focus on sustainable and responsible practices differentiates us among operators and provides additional value for customers. We also engage with our host communities to create long-term sustainable value.

We mine bauxite in areas of high biodiversity interest, such as the Brazilian Amazon and Western Australian jarrah forest. We do so by using advanced practices through all stages, from mine planning to closure, and our mine rehabilitation methods are considered best-in-class in the industry by experts in the field.

Our alumina refineries lead in energy efficiency, and we continue developing better storage practices for bauxite residue while also pursuing alternative uses for the material. Approximately 72 percent of the electricity consumed by our smelters is from renewable sources, enabling us to offer a line of low-carbon products for customers who value sustainability.

In 2018, we launched a new joint venture company called ELYSIS to advance and commercialize an Alcoa-developed technology that produces oxygen and eliminates all direct greenhouse gases from the traditional smelting process. It is the most significant innovation in the aluminum industry in more than a century. ELYSIS is working to develop this discovery to commercial scale so it can be available for either retrofits or new smelters beginning in 2024.

In addition to helping address many of the challenges facing society today—climate change, mobility, housing and more—our products help reduce supply chain risks for our customers. This is possible because we operate our plants with strong controls and against the highest governance, environmental, health and safety standards in the industry.

We initiated our path toward differentiation with our SUSTANA line of environmentally friendly aluminum products, which are manufactured using low-carbon energy sources or have high recycled aluminum content. (See the [Products](#) section for details.)

We are now taking the next step in differentiation with the third-party certification of our supply chain against the

Aluminium Sustainability Initiative standards. (See the [Sustainability Approach](#)

section.) ASI certification is the leading practice in product differentiation for customers concerned with sustainability.

Our commitment to make differentiation valuable for our customers also includes our participation in other industry initiatives, such as the European Aluminium's [Sustainability Roadmap Towards 2025](#). Launched in 2015, this initiative sets voluntary targets for the European aluminum industry in the areas of responsible production, innovative applications and socio-economic contribution. We report our performance against the targets on a periodic basis through the European Aluminium website.



Our vice president of sustainability also chairs the European Aluminium's Sustainability Committee, which holds responsibility for the roadmap. She also serves on the organization's External Advisory Board, which supports, stimulates and provides high-level guidance to the European aluminum industry.



# RECYCLING

Aluminum can be recycled infinitely without losing its properties, making it the sustainable choice in many of the markets we serve.

According to the [International Aluminium Institute's](#) analysis, approximately 75 percent of all primary aluminum ever produced is still in productive use due to its strength, product life and recyclability. Producing primary aluminum from recycled content consumes about 8 percent of the energy required to make virgin aluminum and emits 92 percent fewer greenhouse gases.

We recycle aluminum in our casting and rolling operations, using both internal and purchased scrap. We also have closed-loop processes in place with customers, where aluminum scrap from their operations is returned to us for reuse. The recycled content excludes all internally generated scrap and re-melted primary ingot.



*Aluminum scrap*

In our primary aluminum casthouses, we use purchased third-party and closed-loop scrap to produce our ECODURA billet. Part of our SUSTANA line of aluminum products, ECODURA billet has a minimum of 50 percent recycled content and is produced with up to 95 percent less energy than virgin aluminum.

In 2018, we consumed 425,088 metric tons of aluminum scrap in our global operations, which was 11.3 percent higher than prior year.

We continued to focus on increasing the recycled content in the flat-rolled aluminum produced at our Warrick Operations in the United States, reaching 30.4 percent recycled content in 2018. We anticipate significantly increasing this amount due to equipment upgrades and other initiatives planned for 2019 and 2020.

Our recycling efforts extend beyond our own operations to include partnerships with established recycling initiatives. In the United States, Alcoa Foundation continues to engage with [The Recycling Partnership](#) through financial support and representation on the organization's board of directors. The organization uses public-private partnerships to improve recycling at the local level.

The foundation renewed its participation in 2018 by making an additional three-year commitment to the organization's [All In On Recycling Challenge](#). Alcoa Corporation also contributes expertise as a member company.

With Alcoa Foundation and Alcoa Corporation support, The Recycling Partnership has expanded its reach to 490 additional communities across the United States, bringing its cumulative total to more than 1,070 communities. Its work in 2018 eliminated an estimated 67,000 metric tons of carbon dioxide, saved 975,000 cubic meters (258 million gallons) of water and collected more than 27,000 metric tons of recyclables.



*The Recycling Partnership in Denver*  
Photo credit: The Recycling Partnership



## Coproducts and By-products

In addition to recycling aluminum scrap, we actively seek to recycle or reuse our coproducts and by-products. In 2018, we set a target to optimize our portfolio of economically viable placement opportunities for by-product materials (from waste to value) by 2020 and define specific objectives to be achieved by 2025 and 2030.

See the [Waste](#) section for additional information on our coproducts and by-products.



*Anode butts, a by-product of the smelting process*





Creating Sustainable Value  
in Communities



# SHARED VALUE CREATION

One of the three pillars of our sustainability strategy is to create value for the communities where we operate.

A key component of this pillar is stimulating economic activity at the local and regional levels to enable improved quality of life for our employees and neighbors. We do this by providing stable, fair-paying jobs, procuring goods and services from local suppliers when possible, paying income and other taxes, and investing in community infrastructure and initiatives.



Alcoa employee volunteers

Guiding our value-creation efforts with local and regional stakeholders are our [Values, Ethics and Compliance Program](#) and [Human Rights Policy](#). These are also the foundation of our efforts to provide a higher quality of life and well-being for our employees, professional development opportunities and a work environment that is inclusive and shaped by industry-leading health and safety programs.

Our long-term goal for sustainable value creation is to reassess the implementation of key stakeholder engagement tools by 2020 and define shared value creation opportunities to be implemented by 2025 and 2030. We advanced this goal in 2018 through the following initiatives:

- We updated the Alcoa Stakeholder Engagement Framework to ensure we continue to actively interact with our stakeholders to achieve mutual success. (See the [Stakeholder Engagement](#) section.)

- After benchmarking and assessing our existing program, we initiated the development of a new Supplier Sustainability Program. (See the [Supply Chain](#) section.)
- We launched the Alcoa Human Rights Council to enhance the structure of our human rights programs and ensure long-term compliance with the U.N. Guiding Principles on Business and Human Rights. (See the [Human Rights](#) section.)

Sharing the value created by our presence helps communities thrive and earns us access to the resources we require to manufacture our products.

## 2018 ALCOA ECONOMIC VALUE

	Australia	Europe	North America	South America	Total
Labor Costs (US\$ billions)	0.5	0.3	0.8	0.1	<b>1.7</b>
Procurement Spend (US\$ billions)	1.8	2.6	4.1	1.2	<b>9.7</b>
Income Taxes (US\$ millions)	397.5	71.7	(12.0)	50.2	<b>507.4</b>
Employee Volunteer Hours	2,000	2,104	2,624	704	<b>7,432</b>

*Labor costs include compensation and benefits for employee services rendered plus employee expenses for external training, transfer and relocation, expatriate costs, workers' compensation, travel, recognition and rewards, medical expenses, meals, recruitment, transportation, education, work clothes and other employee-related expenses. Income tax amounts are net of income tax refunds received and exclude various other taxes, such as sales taxes, excise duties, levies and local taxes not based on income.*

## 2018 ALCOA FOUNDATION INVESTMENTS

Millions of U.S. dollars

Australia	1.0
Europe	1.0
North America	1.6
South America	1.0
Global Outreach	1.2
<b>Total</b>	<b>5.8</b>

*Europe includes Africa.*

Complete details on our 2018 financial performance can be found in the [Alcoa Annual Report](#).



## Taxes

In addition to the economic activity we stimulate at the local and regional levels, we also contribute to the communities where we operate through a variety of tax payments.

Our corporate tax policies and strategy closely follow our financial and ethical policies and guidelines. In addition, our finance and code of conduct policies provide robust guidelines for our tax professionals to follow.

We observe all applicable tax rules and regulations in the jurisdictions where we have a tax presence. We work closely with local governments to ensure transparency, and we participate in current audit initiatives to shorten audit cycles and reduce tax risk. We have a number of tax procedures to ensure our senior management understands the tax consequences of all material company

transactions, audit settlements and other material tax matters globally.

Our tax professionals partner with our business and resource units to provide proactive, efficient tax services to:

- Satisfy all income tax reporting and filing obligations in accordance with laws and regulations at a competitive cost;
- Develop and implement tax strategies to support business unit goals and maximize stockholder value;
- Mitigate tax risk through thoughtful implementation and documentation, proactive involvement in legislation and engagement in transparent, current audit programs with local governments; and
- Assist in developing sustainable, arms-length pricing on intercompany transactions.

## Quarter-century Commitment for Sustainable Communities

What does a CAD\$1 million investment annually mean to three communities in Canada where Alcoa has a presence? Improved quality of life, sustainable development, and educational and career opportunities for young people.

In 2011, the Alcoa Sustainable Communities Funds pledged to invest

CAD\$1 million each year for 25 years, split among the Baie-Comeau, Bécancour and Deschambault-Grondines/Portneuf regions. A unique governance structure fully engages the communities, and funded projects begin with ideas submitted during citizen forums. Each regional sustainable development committee prioritizes the ideas, which are implemented by citizens and local organizations from each community.

Projects in 2018 included:

- Pedagogical Cultural Project, which is introducing new teaching methods to make greater use of cultural organizations in the Baie-Comeau region. This allows students to experience educational activities outside of the classroom.
- Baie-Comeau Grand Air Water Festival (Festival Eau Grand Air), which is a large-scale event that promotes culture, tourism and economic development with a view to sustainable development.

- Deschambault Public Market, which is a cultural icon that connects visitors with locally produced products and food.
- Development, restoration and protection of the Grondines marshes and promotion of their ecological value.
- Two projects for local schools identified during a Bécancour youth forum—a new school park at the Terre-des-Jeunes School and the necessary infrastructure (benches, lighting, recycling bins and more) to enable public use of the Harfang-des-Neiges School's outdoor facilities.
- Expansion of the Bécancour Biodiversity Center, which raises awareness and educates young people and adults about the existence and conservation of Québec's biological species.

Since its creation in 2011, the Alcoa Sustainable Communities Funds has supported more than 90 major projects.



Deschambault Public Market

## Transfer of Knowledge and Best Practices

As a sustainability leader, we continuously seek opportunities to assess and influence the sustainability of our suppliers (see the [Supply Chain](#) section) and partners.

We review and monitor the compliance programs of significant joint ventures where we are not the controlling shareholder. Under this program, a steering committee composed of senior Alcoa executives provides oversight to local teams charged with reviewing and monitoring the ethics and compliance practices of the joint venture.

These reviews are conducted in collaboration with the joint venture partner and focus on key compliance program components, including:

- Commitment from senior management;
- Oversight, autonomy and resources for compliance;
- Code of conduct, anti-corruption and other compliance policies and procedures; and
- Ethics training, confidential reporting and investigations.

Our teams work with our partners to ensure alignment around the compliance programs for the joint venture and develop plans to close any identified gaps. As part of the process, we also share our best practices.

In November 2018, we created the role of senior vice president for strategic alliances to manage and develop our key strategic relationships.

# STAKEHOLDER AND COMMUNITY ENGAGEMENT

We believe it is important to have transparent and regular communications with identified stakeholders to ensure a mutual understanding of issues, concerns and opportunities.

We define a stakeholder as any person or organization that impacts, or is impacted by, our activities. This includes stockholders, employees, customers, suppliers, government representatives and regulators, non-governmental organizations, local communities and the media.

Our stakeholder relationships are both formal and informal. With customers, suppliers, governments, employees and stockholders, we typically have formalized, contractual or even legally mandated channels for engagement. Our interaction with other stakeholders is typically less formalized and requires attention to ensure that it is maintained on a regular basis.

At the location level, our operations are guided by the Alcoa Stakeholder Engagement Framework. Updated in 2018, the framework ensures that we are actively interacting with our stakeholders to achieve mutual success. It provides a systematic process to first identify appropriate stakeholders and then engage with them in the

most effective manner, ensuring transparent and ongoing dialogue. At the end of 2018, all of our locations had implemented the updated framework.

**“The mining activity and all other actions developed by Alcoa in Juruti, with their strong social, environmental and economic impact, are often misunderstood due to the population’s lack of information. Alcoa’s dialogues with the government and community sectors have simplified and clarified its activities and aligned the knowledge of the region’s citizens. That is why I consider it necessary to carry out more communication actions like this.”**

**Jose Maria Melo**

Municipal Government Secretary  
Juruti, Brazil



**“It is very gratifying to participate on the community relations advisory board for Alcoa’s Poços de Caldas location. As a teenager, I had contact with the company through one of its programs. It was an important moment for me, and the project that I was involved in is still working today. I am very happy that Alcoa is not only concerned with making community investments but also ensuring those investments generate income and benefits for the community through mutual collaboration. I wish all companies had such a positive conscience.”**

**Lucas Arruda**

City Councilor  
Poços de Caldas, Brazil



As part of this framework, our locations are encouraged to form community consultation forums comprising a relevant cross-section of local stakeholders. These forums provide an opportunity for regular two-way communication between Alcoa representatives and interested community members on topics of mutual interest.

We also engage with stakeholders, primarily local communities and non-governmental organizations, through Alcoa Foundation and Instituto Alcoa. The method of engagement varies by location. Some do so through their community consultation forum, while others consult with employees, local leaders, institutions or regional associations.

Our locations in Australia, for example, collaborate with respected non-profit and community organizations to identify local needs and opportunities. The locations then invest in partnerships and initiatives aligned with our Australian strategic focus areas of sustainable environment, community health and safety, community capacity and resilience, and tomorrow’s workforce and leaders.



Approximately 50 percent of Alcoa Foundation's annual budget is used for local initiatives in the areas of education, environment, governance and community enhancement. The remaining 50 percent is dedicated to global

signature partnerships and programs focused on climate change and biodiversity.

The following key issues were raised by, or discussed with, stakeholders in 2018.

## 2018 STAKEHOLDER ISSUES

Location	Issue	Action
Anglesea, Australia	<p>Following the permanent closure of our Anglesea operations in 2015, there has been significant interest in the future of the site, including the decommissioning, remediation and land planning processes currently underway.</p> <p>Key issues raised by some community members include the future location of the Anglesea Bike Park (currently on Alcoa freehold land); the possible retention of the industrial stack for future repurposing; the proposed residential and accommodation precinct; and concerns about the method to demolish the power station.</p>	<p>Community engagement continues to be a key component of the Anglesea project. The strategic engagement program aims to keep the local community and key stakeholders informed of, and engaged in, our activities to ensure feedback from the community is considered in decision making.</p> <p>During 2018, we held 11 public meetings (six community consultation network meetings and five community drop-in sessions) with a total attendance of more than 600 people. We also published 20 newspaper advertorials, sent three letters to 1,200 residents and businesses, conducted one-on-one briefings, received public submissions and facilitated a dedicated online engagement platform.</p> <p>We provided the <a href="#">Alcoa Freehold Concept Master Plan Anglesea</a> to the Department of Environment, Land, Water and Planning in March 2018. The plan incorporated stakeholder feedback on the <a href="#">draft concept master plan</a>, which was released in January 2018 for consultation (see the <a href="#">Phase 4 Community Engagement Report</a>).</p> <p>Our community engagement program will continue in 2019.</p>
Kwinana, Australia	<p>Since the Western Australian Planning Commission (WAPC) adopted the Kwinana air-quality buffer in September 2010, there has been litigation and questions relative to the legitimacy of the buffer and land uses in the area.</p> <p>In 2018, the matter was referred to the WAPC as part of an improvement plan process. The WAPC provided advice to the Minister for Planning.</p>	<p>We support compatible development in the Mandogalup area. However, we maintain that there needs to be adequate separation between industry and residential development.</p> <p>During 2018, we engaged with the Department of Planning, City of Kwinana, the WAPC and the Minister for Planning's advisors and other interested stakeholders, including local landholders.</p> <p>In April 2019, the Minister for Planning approved an improvement plan for the Mandogalup area that will be released for public consultation.</p>
Western Australian Bauxite Operations	<p>As part of our ongoing work to establish the potential viability of mining around Dwellingup, we continued our phase-two feasibility study. This includes community consultation and an environmental impact assessment.</p>	<p>We collaborated with local government to form a stakeholder consultation group called Dwellingup Futures that comprises local and state government, industry and community group representation. The first meeting was held in November 2018.</p> <p>The group's objective is to create a vision and plan for the future of Dwellingup, where different sectors, industries and land users can coexist for the long-term benefit of the town, region and state.</p> <p>We continue to communicate one-on-one with interested community members.</p>

Location	Issue	Action
Western Australian Bauxite and Alumina Operations	<p>In response to the expiration of the 2014 Australian Workers' Union (AWU) Australian Enterprise Bargaining Agreement (EBA), we sought to negotiate a new, modern agreement to enable more efficient and productive operation of our Western Australian mines and refineries and to improve our ability to respond to market conditions.</p> <p>In March 2018, following more than 12 months of unsuccessful negotiations and industrial action early in the year, we applied to the Fair Work Commission (FWC) for a mediated negotiation process and to have the 2014 EBA terminated. AWU members initiated an extended period of industrial action in August.</p> <p>The termination application was heard by the FWC in September. In December, the FWC ruled to terminate the expired EBA. The AWU subsequently announced its intention to appeal the decision.</p>	<p>Our direct engagement with AWU members included good faith negotiations and mediated conciliation meetings, briefings and written communications. We twice put new proposed EBAs to an employee vote, both of which were not approved.</p> <p>There was extensive communication throughout the year to inform employees of the status of the issue. We also engaged stakeholders, including local, state and federal government representatives, suppliers, community partners and the media. Indirect communication included media statements, newspaper advertorials and the publication of an opinion article in the <a href="#">Australian Financial Review</a> by Alcoa of Australia's chairman and managing director.</p> <p>In February 2019, we asked AWU members to vote on a new proposed EBA. This proposal was voted down. We continue to work to reach a new agreement.</p> <p>In April 2019, the Full Bench of the FWC upheld the AWU's appeal and sent the matter back for redetermination by the same FWC deputy president who had heard the original application to terminate.</p>
Juruti, Brazil	The Juruti City Council continued requesting information on the operations of our Juruti mine, with some council members taking a negative position on the mine in council meetings and social media.	We continued sending clarifying information when requested and reiterated our offer for council members to tour the site and have a meeting with mine leadership to receive detailed information regarding our operations. None accepted the invitation.
Juruti, Brazil	A federal deputy voiced concern about the regulated practice of local police removing people who were living illegally on Alcoa-owned land in the Juruti region.	The regional court in Santarém mandated the removal of the squatters. We engaged with the deputy and the municipal government, agreeing to donate land to the municipality for a government housing program for those living illegally on Alcoa-owned land.
Juruti, Brazil	Following a visit and public hearing, the federal Public Ministry recommended that Alcoa cease mining operations in the Lago Grande region in Santarém. The Federal Court of Santarém ruled in favor of the recommendation and prohibited Alcoa from carrying out any activity in the region.	We clarified to the ministry and court that we have not conducted any mining activity in the area since 2008. We immediately suspended community relations activities in the area upon learning of the Public Ministry's recommendation. We engaged the National Institute of Colonization and Agrarian Reform (Incra) to serve as an intermediary with the community to ensure understanding of our position.
Juruti, Brazil	<p>The Association of Communities of the Juruti Velho Region (ACORJUVE) was unable to secure environmental approval for the removal and use of valuable wood from our mining operations that was stored on association land. Some of this wood has been deteriorating due to its exposure to the elements.</p> <p>Wood is an important source of revenue for the communities, and failure to obtain this permit is negatively affecting the local economy.</p>	We have participated in meetings with the environmental agency and ACORJUVE. We also have kept the community informed as to the volume and value of the wood, which is owned by the association.

Location	Issue	Action
São Luis, Brazil	Residents of neighboring communities expressed concern about our Alumar location hiring professionals who do not live in the area to construct a bauxite residue storage area.	<p>We held a meeting with leaders from the 11 communities surrounding our Alumar operations to discuss the project's schedule and contracting. We also conducted 11 community meetings, which had an average attendance of 400 people, to discuss the participation and prioritization of residents in the project. We created an online community to post job opportunities and collect resumes.</p> <p>Approximately half of the project's labor requirements were filled by area residents. The remaining positions were filled by people who had skills or knowledge that was not available in the local workforce.</p>
Bécancour, Canada	<p>The collective bargaining agreement for the Aluminerie de Bécancour (ABI) smelter expired in November 2017. After the union rejected management's best and final proposal for a new collective bargaining agreement, ABI locked out unionized employees on January 11, 2018 to avoid unnecessary safety hazards and protect the asset due to instability that developed during the negotiations. ABI reduced operations to one of three potlines, which was operated by the site's management personnel.</p> <p>In December 2018, ABI proceeded to curtail half of the one operating potline to ensure continued safety and maintenance in light of recent retirements and departures of salaried employees.</p>	<p>On May 4, 2018, ABI management communicated to the Ministry of Labor that it was ready to begin new negotiations. The ministry appointed a mediator, who facilitated negotiations between ABI management and union leadership. No agreement was reached by the end of 2018.</p> <p>ABI management has kept key community stakeholders abreast of the issue, addressed concerns and expressed its objective to improve the facility for the long-term.</p>
Avilés and La Coruña, Spain	In October 2018, we announced the collective dismissal process for our smelters in Avilés and La Coruña, which were the least productive of our smelters due to their inherent structural issues.	<p>Per Spanish law, we conducted a mandatory consultation period with the workers' representatives.</p> <p>In January 2019, the workforce ratified an agreement that calls for the curtailment of the two smelters' remaining combined operating capacity of 124,000 annual metric tons. The casthouses at both plants and the paste plant at La Coruña will remain in operation.</p> <p>A social plan preserves a portion of the jobs at the two facilities and includes retirement packages and potential relocation to our San Ciprián facility, also in Spain.</p> <p>Both smelters are being maintained in restart condition through June 30, 2019, in the event third parties have interest in assuming ownership of the facilities.</p>



Location	Issue	Action
Warrick Operations (Indiana, USA)	<p>For the past several years, Alcoa-owned Liberty Mine has provided fuel for the Warrick Power Plant. This plant provides power and utilities to the Warrick Operations site, which includes a smelter and rolling mill.</p> <p>In 2017, we applied for a permit to expand the mining operations. The permit was approved by the state of Indiana, but nearby homeowners and the city of Boonville appealed the permit in 2018. The cities of Boonville and Chandler also instituted ordinances to ban mining outside of their city limits. The dispute resulted in legal action between Alcoa, Boonville and a homeowners group named Save Our Homes.</p>	<p>We initiated and held extensive discussions with homeowners and officials from both city governments. After a few discussions and assurances, Chandler repealed its ordinance. To resolve issues with Boonville and Save Our Homes, we worked through multiple meetings and discussions to draft an agreement that keeps Liberty Mine as a valuable option for the Warrick Power Plant's fuel supply and also establishes additional protections for homeowners.</p> <p>We agreed to maintain an extended no-blasting buffer zone, institute an expedited insurance claims process if any property damage occurs, install additional seismographic monitoring, reimburse certain costs and take several other actions. In return, Boonville agreed to repeal its ordinance, and all parties agreed to withdraw permit appeals and pending litigation. The agreement was finalized in March 2019.</p> <p>Feedback from the homeowners group has been positive, with members expressing their appreciation at being able to engage with us to have their concerns addressed.</p> <p>Although we will purchase coal from independently owned mines in 2019, having the ability to mine our own coal reserves is a critical part of Warrick's strategy for the future.</p>

## Non-governmental Organization Engagement

Non-governmental organizations provide significant value to society. We partner with these institutions to support and advance their work in the areas of climate change and biodiversity in the communities in which we operate.

Examples of recent partnerships can be found throughout the report.

## Memberships

The following are some of the organizations in which we are a member or participant:

- [Aluminium Association of Canada](#);
- [Aluminium Stewardship Initiative](#);
- [Australian Aluminium Council](#);
- [Brazilian Aluminum Association](#);
- [European Aluminium](#);
- [International Aluminium Institute](#); and
- [The Aluminum Association](#).

Through these organizations, we engage with numerous stakeholders on issues important to the aluminum industry.

# CASE STUDY

## Restore, Protect, Prevent: Four Projects Improve St. Lawrence River

Fish are spawning, birds are multiplying and shorelines are improving along stretches of the St. Lawrence River in Quebec, Canada, after the completion of four restoration, protection and prevention projects in 2018 with funding from Alcoa Foundation.

[Stratégies Saint-Laurent](#) (SSL) and four priority intervention zone (ZIP) committees,



*Rehabilitation work around Comeau Creek's estuary  
Photo credit: Comité ZIP de la Rive Nord de l'Estuaire*

which are non-governmental organizations that specialize in the St. Lawrence River and its surrounding ecosystems, implemented the projects in the three Quebec communities where Alcoa operates—Deschambault-Grondines, Bécancour and Baie-Comeau.

Their efforts, along with Alcoa and community volunteers, accomplished the following:

- Creation of a wetland to increase the presence of bird species and micro-fauna in the estuary zone of Comeau Creek, which is designated an important bird area. The project created a new habitat for nearly 100 bird species.
- Improved connectivity between the lake habitats and spawning grounds for yellow perch in the Saint-Pierre Lake subzone to help maintain the biodiversity of this portion of the river. Four priority streams received new culverts and profiled embankments.

- Introduction of water-level control structures, stream shaping and spawning-conducive shrubs in the Île Valdor wetlands. Previously, yellow perch migrating to the wetlands to spawn in the spring were trapped when the connection to the St. Lawrence River disappeared.
- Improved shoreline quality in the Deschambault-Grondines section of the St. Lawrence River through bank cleanup and eradication of invasive Japanese knotweed. The revitalized riverbanks will attract animal species that live in and near the river.

“This type of partnership demonstrates both Alcoa’s commitment to the environment and the expertise of our network to deliver quality projects,” said Jacques Durocher, president of SSL. “The correlation of these forces generates initiatives that can really contribute to the preservation and restoration of this great ecosystem, the St. Lawrence.”

# HUMAN RIGHTS

At Alcoa, values have always been the foundation of our company. They govern the way we act and operate and how we interact with our customers, communities and each other. Respect for, and commitment to, human rights is embedded in that foundation.

We believe that commitment extends beyond having a policy on human rights. We strive to ensure this commitment is exemplified by our actions and those of each employee, supplier and business partner. Upon notification of any potential violations to our policy, we act quickly and decisively.

Our Human Rights Policy operates in conjunction with the following:

- The [Alcoa Code of Conduct](#) and our employee training, both of which cover human rights;
- Our [Supplier Standards](#), which explicitly indicate respect of human rights;
- Internal and third-party supplier assessment programs for new and existing suppliers (see the [Supply Chain](#) section); and
- Our [Integrity Line](#) for employees, suppliers and the general public to report ethical and human rights violations.

As part of our ongoing commitment to human rights, we transitioned our Human Rights Working Group into the Alcoa Human Rights Council during 2018. The council has sponsorship at the executive level and includes representatives from each business and key resource unit.

The council's mission is to ensure compliance with applicable [United Nations Guiding Principles for Business and Human Rights](#) and the [International Labor Organisation's fundamental conventions](#), respond to external perspectives and enhance programming based on our most salient priorities. This included updating our Human Rights Policy, which was completed in early 2019. ([View the policy.](#))

Throughout 2018, we built upon our top-level risk assessment of our human rights practices that we conducted in 2017 and cascaded the process down to locations in Brazil and Spain. These location assessments are the first step toward implementing a due diligence process in 2019. Results from the Brazil assessment, which was completed in 2018, confirmed our 2017 high-level assessment findings. We have incorporated these findings into the working plan of the Alcoa Human Rights Council.

Human rights due diligence is a key priority of the council to ensure systematic and measurable processes are executed with the right frequency and content for our operations.



# OUR PEOPLE

We are on a mission to build a stronger everyone culture—where our Values drive everyday decisions, and each employee's development matters.

## Diversity, Inclusion and Engagement

We seek to provide a trusting workplace that is safe, respectful and inclusive of all individuals and that reflects the diversity of the communities in which we operate.

Whether on the shop floor or in our offices, the intent of equality, diversity and inclusion is to ensure that everyone has access to the same opportunities and fair treatment while feeling valued and accepted. This is the foundation for an everyone culture, where employees feel confident and inspired to speak up and do their best work.

We define diversity and inclusion as:

- Diversity: The blend of visible and non-visible characteristics of our employees.
- Inclusion: The degree to which employees feel they can be their authentic selves.

In 2018, we focused on the areas needing greatest improvement from our July 2017 diversity and inclusion survey. These included “I have the opportunity to grow and develop” and “I have access to the same opportunities and fair treatment as others.”

We developed a trusting workplaces program in 2018 that included the launch of two global policies—Harassment and Bully-Free Workplace Policy and Equal Employment Opportunity Policy. Our leaders deployed the program globally to all employees via a video message to define our expectations of, and encourage dialogue on, a trusting workplace. We also piloted respect training at three of our operating locations—Willowdale mine in Australia and Warrick Operations and Intalco Works in the United States—to better prepare our leaders and human resources (HR) personnel to foster trusting workplaces.

To further support trusting workplaces and fulfill our requirements under the CEO Action for Diversity and Inclusion pledge, we conducted unconscious bias training

for employees at our Warrick Operations, which is our largest U.S. operating location. We also conducted training for our global operating committee members and our corporate employees in Pittsburgh, Pennsylvania, USA. We will continue working to raise awareness and mitigate unconscious bias in 2019.

**“As a member of the LGBTQ community, I appreciate how Alcoa is pushing its culture toward inclusiveness. In 2018, all of the company's business unit presidents came to my country, and all of them made it a point to talk about the benefits of having an inclusive, respectful and empowered workplace. As a direct consequence of that, I've seen all the other leaders following this path. The more they do it, the more we feel comfortable being ourselves. Brazil is a conservative country, but Alcoa and its employees are showing that we have room for everybody.”**



**Paulo Eduardo Belato**  
Environment, Health and Safety Analyst  
Alcoa Corporation  
Poços de Caldas, Brazil

During two weeks in 2018, more than 60 diversity and inclusion events took place worldwide across our Aluminum business unit to emphasize the value of new ideas, processes and backgrounds. Separately in Brazil, the annual Diversity Week at all locations included daily discussions and activities that covered a range of topics, such as LGBTQ, ethnicity and gender diversity.

In 2018, we launched a global HR system that offers increased survey functionality. This will enable us to introduce new engagement indices in 2019—short, focused surveys that target topics like employee experience, inclusion and trusting workplaces.

We hold leaders accountable for diversity and inclusion, and we link their performance to our annual incentive

compensation. In 2018, we continued focusing our diversity target on increasing the number of women in our global workforce. To increase target visibility and accountability, our diversity scorecard now reports at the location and resource unit level, which is where the majority of our hiring decisions are made.

Our 2018 diversity target, which represented 10 percent of our annual incentive compensation formula for our leaders, was to have women at all levels comprise 15.1 percent of our global workforce. We achieved 14.9 percent, which was short of our goal but 0.6 percent higher than 2017.

We received a perfect score of 100 on the Human Rights Campaign Foundation's Corporate Equality Index 2018, earning the designation as a Best Place to Work for LGBTQ Equality. A new honor was being named to the [2019 Bloomberg Gender-Equality Index](#), which recognizes companies committed to transparency in gender reporting and advancing women's equality. In addition, Mark Hodgson, manager of our Pinjarra refinery in Australia, was named 2018 Network Leader of the Year—Pride in Diversity at the Australian LGBTI Inclusion Awards.

## 2018 GLOBAL WOMEN

Level	Percent
All	15
Board	33
Executive	24
Professional	28
Operational/Administrative	9

*Our global women calculation is based on all categories of employees, including full and part-time permanent, full and part-time apprentice, and graduate employees. Executive refers to a different level than the executive team.*

## 2018 EMPLOYEES BY EMPLOYMENT CONTRACT AND TYPE

	Contract		Type	
	Permanent	Temporary	Full-time	Part-time
Male	11,953	569	11,887	66
Female	2,047	175	1,884	163
<b>Total</b>	<b>14,000</b>	<b>744</b>	<b>13,771</b>	<b>129</b>

*Permanent employees include all categories. Temporary workers are employed as casual or limited-term workers with a contract of limited duration that often terminates along with a specific event (e.g., end of a project, a permanent employee returning from leave or the completion of a stated period of time).*

# CASE STUDY

## Out and Accepted

Eight people represented Alcoa in 2014 when we became the first mining and resources company to march in Western



Nyomi Taylor

Australia's pride parade to support the region's LGBTQ community. In 2018, approximately 100 employees took part, including some to support their coworker Nyomi Taylor.

After two years of struggling to find happiness in her life after the birth of her first child in 2013, Ms. Taylor identified as lesbian and soon after came out to her mainly male coworkers.

"I've been working with these guys for many years and had open discussions on a whole range of topics, including relationships, so I felt comfortable coming out to them almost immediately," said Ms. Taylor, a senior electrical/instrument technician at our Kwinana refinery who now prefers not to put a label on

her sexuality. "When I started talking about my girlfriend, they treated me like anyone else who was with a new person."

Many of these coworkers quickly joined the location's Employees at Alcoa for Gay, Lesbian, Bisexual and Transgender Equality (EAGLE) chapter to show their support.

"I can come to work and not worry about what I say about my personal life," said Ms Taylor. "I know that my input won't be dismissed and that I won't face any bias because I'm dating a woman rather than a man. There are still challenges in Australian society, and it's going to be a slow process that requires putting more information out there to change minds."

## 2018 EMPLOYEES BY REGION AND EMPLOYMENT STATUS

	Permanent	Temporary
Asia/Australia	3,909	107
Europe/Middle East/Africa	3,177	369
North America	5,421	268
South America	1,493	0

## 2018 TURNOVER RATE

Percent

Male	7.6
Female	10.0
<b>Total</b>	<b>7.9</b>

## Talent Acquisition

We are creating a nimbler and more productive workforce by attracting the best talent with the skills, values and ideals that align with our culture.

We use a modern, efficient approach that simplifies and streamlines talent acquisition, allowing our hiring managers, HR personnel, employees and prospective candidates to collaborate quickly and easily.

This approach has been furthered with the implementation of our global HR system, which provides an internal listing of all career opportunities globally. This makes it easier for our employees to apply for positions or refer someone.

At the location level, we seek to hire local candidates when possible. We engage with universities to identify top local talent, and we offer internships and apprenticeships to help develop the local workforce.

We continued to focus on the diversity of our candidate pool in 2018, introducing a tool that ensures our job postings are gender neutral and without bias. We also invested in better sourcing capability and talent market intelligence by implementing an online portal with real-time labor market insights to support a range of strategic initiatives covering talent. These include forecasting for the future workforce, finding talent pools and building better recruiter expertise on local talent and skills.

## People Development

We believe people development should support our company's strategic priority of reducing complexity while being more agile.

We advanced this vision in 2018 by focusing on how we engage, assess and grow our people through our People Development Program (PDP) and the implementation of our global HR system.

After replacing our three-times-a-year review process with frequent check-ins and untracked manager coaching, we went one step further in 2018 and eliminated performance ratings. Rather than assessing employees on a single rating, we now consider each employee's full contribution and unique performance narrative, which consists of tangible examples of an employee's performance against our four contribution factors. All employees and their managers now engage in a dialogue around these factors, which are:

- Performance against goals;
- Demonstration of Alcoa behaviors;
- Impact to the business and team; and
- Use of development for success.

**“My experience with the new PDP has been very positive. My manager and I are located in different areas of the country, so having regularly scheduled check-ins to review activities and evolving priorities is invaluable. In a dynamic business, the PDP approach is very useful, because goals and priorities can be shifted throughout the year as business development opportunities emerge.”**



### DeWayne Todd

Global Director, Energy and Demand Response  
Alcoa

Another focus of the PDP in 2018 was equipping employees and managers with the skills they needed to successfully implement this new assessment approach. Through interactive webinars, tools and resources, employees learned how to drive check-in discussions, while managers learned how to provide ongoing coaching and support to their employees.



In 2018, we continued to focus on new ways to engage and develop our global workforce.

Our Aluminum business unit held talent workshops that were focused on personalized career development. This included closing skill gaps, building upon existing strengths and creating individualized action plans to support career development.

Our Bauxite business unit focused on lead team development at multiple locations across the globe. Using a group approach, leadership teams came together to align, share best practices and improve coaching skills.

Curriculum like our Leadership Fundamentals Program offered participants the opportunity to apply classroom learning to relevant workforce issues. One cross-functional team worked on better integrating indigenous people into our workforce.

We continued to support several other group-based programs that focus on building business acumen and leadership skills while ensuring our employees have a chance

to connect with others from across the globe. These include the location-based program for our front-line supervisors called Advancing Supervisory Excellence; our focus on our technical talent in the year-long Technical Leadership Excellence program; the Alcoa Management Essentials program in collaboration with the University of Pittsburgh; and the Transformational Leadership Development Program for executive development that we launched in 2018.

All employees and many Alcoa contractors have access to AlcoaLearn, our global online learning management system. In 2018, the system had more than 17,600 active employee and contractor accounts for tracking training and accessing online learning. It housed more than 9,200 online courses and supported the administration of nearly 19,100 instructor-led training sessions for a total of almost 670,000 recorded training hours during the year. We also supported employee participation in professional certification, leadership development and other external training programs not tracked through our learning management system.

# CASE STUDY

## Changing the Diversity Paradigm

Employees involved in making aluminum, from mining to refining and smelting, historically have skewed male due to cultural norms and outdated perceptions. We are changing that paradigm.



Angela Phillips

At our Juruti mine in the Brazilian Amazon, women comprised 21.7 percent of the workforce at the end of 2018 compared to 17.3 percent when the mine opened in 2009. The steady growth of women holding leadership and operational positions has been enabled through the direct engagement of our Bauxite business unit's leadership and the involvement of the Alcoa Women's Network. The mine routinely sets gender balance goals for headcount, recruitment and selection processes, and development and internship programs. Women are also encouraged to rotate into positions where females have had limited presence.

"Alcoa promotes an environment of inclusion and does not differentiate between gender, race, color or religion," said Mônica Paiva, supervisor of the mine's beneficiation plant. "This is promoted through programs,

training, lectures and discussions, with leadership reinforcing how important diversity is in the mining environment."

In Australia, the Women in Operations (WIO) program is helping top female talent take on operational and leadership roles within our bauxite and alumina operations. The 16-month program includes personal development, networking with leaders, external training and mentoring. The first 27 women graduated in 2018.

"WIO provided me with the skills and confidence I needed to take on a new role in operational leadership," said Angela Phillips, group leader at the Wagerup refinery. "Before the program, I would never have contemplated changing my career from human resources training into a line leadership role where I would be leading an all-male team."

## 2018 EMPLOYEE TRAINING

	Per Full-time Equivalent
Average hours of training and development	42
Average amount spent on training and development	US\$1,068

Data are for formal classroom hours and tuition reimbursement.

In recognition of their significant contributions and importance to our long-term future, more than 10 percent of eligible employees benefited from the discretionary special quarterly stock and cash awards and the Element Award in 2018.

In 2018, we linked 30 percent of our annual incentive compensation plan to non-financial metrics that were focused on achieving significant aspects of our sustainability targets, up from 20 percent in 2017.

While our diversity results were slightly under the target, we did improve our gender balance during the year. The safety payout exceeded the target due to our strong performance that reflected organizational focus and prioritization. A variety of operational upsets negatively impacted our carbon dioxide emissions, preventing us from achieving that target.

## 2018 SUSTAINABILITY INCENTIVE COMPENSATION TARGETS

Category	Percent of Annual Incentive Compensation Plan Formula	Payout (Percent)
Safety	15	26.3
Diversity	10	8.0
Environment (carbon dioxide reductions)	5	0

For additional compensation information and data, see the [Shared Value Creation](#) section of this report and the Compensation Discussion and Analysis in our [2019 Proxy Statement](#).

## Compensation

To attract, retain, motivate and engage our employees, we provide compensation that is competitive within the relevant labor market.

We recognize an employee's full contribution through our total rewards approach, seeking to align a value proposition that results in satisfied, engaged and productive employees who contribute to the overall success of the company and drive results.

Total rewards encompass both financial and non-financial components. Financial components include:

- Performance pay, which is driven by location priorities and typically focused on the achievement of both financial and non-financial targets;
- You Make a Difference Award, which is given to employees who exceed their usual work requirements or show exemplary demonstration of our Values;
- Special quarterly cash and stock awards, which are discretionary awards designed to recognize significant contribution and retain talent closer to the time of contribution;
- Core long-term incentive program, which maintains competitiveness for attraction and retention of leadership talent;
- The recently introduced Element Award, which is designed to truly differentiate by providing long-term incentives to high-contributing employees critical to the long-term success of our company; and
- Annual incentive compensation plan, which is designed to reward individual contribution and meaningfully differentiate based on individual contributions.

# SAFETY AND HEALTH

Our aspiration is to work safely, all of the time, everywhere. We attend to health and safety before any other priorities, putting the protection of human life above all else. Underscoring our commitment is our [Care for People Value](#).

Our work can be dangerous and involves many types of operations. It is imperative that we have a pervasive health and safety culture and strong systems that equip our people with the skills, knowledge, controls and protection they require to avoid injuries and illnesses and, most importantly, fatalities.

Each day, we strive for what we believe is the ambitious yet attainable goal of zero fatalities and life-threatening or life-altering injuries and illnesses.

## Safety

We achieved zero employee and contractor fatalities in 2018, which is a major milestone in our health and safety journey.

We document any incident that has the potential to cause either a fatal or serious injury, which is known as an FSIP. We had 421 reported FSIPs during 2018, which was a 3 percent decrease compared to 2017. While we are not satisfied with a high number of these events, we view them as a good indicator that our locations are focused on identifying these events even if no injuries have occurred.

On an ongoing basis, our Executive Team and other senior leaders review a very small subset of our FSIPs to ensure corrective actions are taken and our controls are effective. These FSIPs are those that could have resulted in a fatality or life-threatening injury.

Our OneAlcoa: United for Safety initiative, where we have integrated temporary workers, contractors and visitors into our safety programs and data, had a positive impact on our traditional safety rates during 2018. After experiencing significant increases in 2017 due to a recalibration of our data to include these groups, we achieved declines in our lost workday and total recordable incident rates in 2018.

Our days away, restricted and transfer rate increased, but all of our rates remained significantly below the most recent U.S. manufacturing averages.

An extensive update of our safety data to account for incident reclassifications and other factors has resulted in changes from prior reporting. Comprehensive safety data are provided in the [Appendix](#).

## FATALITIES

*Employees/all contractors*

	Global	Australia	Europe	North America	South America
2014	<b>0/1</b>	0	0	0/1	0
2015	<b>2/1</b>	0/1	0	2/0	0
2016	<b>0/1</b>	0	0	0	0/1
2017	<b>0/3</b>	0	0/1	0	0/2
2018	<b>0</b>	0	0	0	0

## FATAL AND SERIOUS INJURIES/ILLNESSES

*Employees and all contractors*

	FSI Actuals (Events resulting in a fatal or serious injury/illness)	FSI Potentials (Near-miss events)	Total FSI Events
2014	14	789	<b>803</b>
2015	5	698	<b>703</b>
2016	5	300	<b>305</b>
2017	5	433	<b>438</b>
2018	3	421	<b>424</b>

*Data changes from prior reporting are due to recordkeeping audits and injury classification reviews. A serious injury/illness is any incident that is life-threatening or life-altering.*

## DAYS AWAY, RESTRICTED AND TRANSFER RATE

*Employees and all contractors*

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>0.34</b>	2.2	0.81	0.20	0.45	0.07
2015	<b>0.33</b>	2.2	0.46	0.29	0.39	0.09
2016	<b>0.29</b>	1.8	0.49	0.15	0.26	0.22
2017	<b>0.62</b>	1.8	0.85	0.53	0.82	0.23
2018	<b>0.65</b>		0.88	0.53	0.93	0.28

*The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Days away, restricted and transfer rate includes lost workday cases plus cases that involve days of restricted duty and job transfer per 100 full-time workers.*



## LOST WORKDAY RATE

Employees and all contractors

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>0.11</b>	1.0	0.37	0.02	0.09	0.00
2015	<b>0.12</b>	1.3	0.23	0.07	0.13	0.04
2016	<b>0.15</b>	0.8	0.31	0.08	0.11	0.12
2017	<b>0.25</b>	0.7	0.49	0.11	0.20	0.17
2018	<b>0.19</b>		0.35	0.08	0.20	0.11

The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Lost workday rate represents the number of injuries and illnesses resulting in one or more days away from work per 100 full-time workers.

## TOTAL RECORDABLE INCIDENT RATE

Employees and all contractors

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>1.12</b>	4.0	1.85	0.57	1.83	0.35
2015	<b>1.12</b>	3.8	1.33	0.79	1.61	0.37
2016	<b>1.11</b>	3.2	1.43	0.78	1.38	0.48
2017	<b>1.56</b>	2.9	1.97	1.16	2.38	0.47
2018	<b>1.55</b>		2.21	1.24	2.23	0.57

The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Total recordable incident rate includes days away, restricted and transfer cases plus cases that involve days of medical treatment or other recordables per 100 full-time workers.

In 2018, we transitioned our safety strategy to two pillars—systems and culture—and began developing tools and programs to support each.

## Systems

### Safety Standards

We launched a significant effort to update and expand our safety standards to ensure they remain best-in-class and reflected the safety requirements of our current operations. Around 75 internal and external safety professionals were involved with reviewing, benchmarking, updating and creating standards over the year-long project. We revised 14 existing standards and created 11 new standards that we published in late 2018.

We also developed and implemented the Alcoa Distracted Driving Prevention Policy in 2018. The policy prohibits our employees from using mobile electronic devices and wireless voice/data communications devices while operating a motor vehicle. The policy also covers contractors and visitors while they are on Alcoa property.

## ALCOA SAFETY STANDARDS

Updated	New
Business Travel Safety	Fatigue Risk Management
Confined Space Entry	Chemical Management and Burn Prevention
Contractor Safety	Haul Truck Safety
Crane Safety	Exploration and Drilling
EHS Management System	Permit to Work
Fall Control	Management of Change
Fatal & Serious Injury Prevention	Process Hazard Analysis
Free-Moving Mobile Equipment	Blasting and Explosives Management
High-Voltage Electrical Safety	Lab Safety
Lockout/Tagout/Verification	Hazardous Deliveries
Low-Voltage Electrical Safety	Port Operations
Machine Guarding	
Molten Metal	
Railroad Safety	

### Risk-based Audit

We transitioned our periodic risk-based assessments at the location level to risk-based audits that place less emphasis on reviewing paperwork and more focus on observing people and processes on the floor to assess the actual risk to our employees, contractors and the environment.

An audit team trained in risk identification and mitigation collaborates with location personnel to identify a site's critical risks. Team members then spend up to 80 percent of their time on the shop floor, talking with and observing employees and contractors as they conduct specific tasks related to those risks. The remaining time is spent reviewing checklists, standards, permits and other documentation to ensure compliance.

### Root-cause Analysis

We developed a more formal and standardized process for investigating FSI actuals and a small subset of FSIPs to ensure root causes are identified, addressed and communicated.

After evaluating nearly 40 analysis methodologies, we selected one that worked well with our existing tools and culture. The tool allows us to evaluate, prioritize and address the critical causes and drivers behind an incident, as well as report the findings to all locations using the same methodology.

## Environment, Health and Safety (EHS) Management System

Our ISO-certified corporate EHS management system provides a universally recognized management framework for our EHS risk evaluation, planning, objective setting and operational control activities at all locations covering both employees and contractors. In 2018, seven of our locations were also certified to the Occupational Health and Safety Management System specification (OHSAS 18001).

### Ongoing Initiatives

Ongoing programs and initiatives include:

- **Critical risk management:** Each location is responsible for developing a registry of all safety hazards and either eliminating the hazards or implementing controls to prevent and mitigate the risks associated with the hazards. Our corporate safety group and each business unit provide global oversight and verification.
- **Critical 6 plus 1:** The hazards registry starts with tasks associated with our six most critical hazard categories that could cause a fatal or serious injury—mobile equipment, crane safety, confined space, fall control, lock/tag/verify and electrical. A seventh critical hazard is specific to each production process—haul trucks (mining), chemical burns (refining), molten metal (smelting/casting) and machine guarding (rolling).
- **Worker on Foot initiative:** Anytime a vehicle is in an area, no one on foot can be in that same area and vice

versa. This goes beyond pedestrians to cover employees working in the area.

- **Human performance:** Locations must work toward certification in a core operating standard based on human performance, which teaches employees how to anticipate and recognize error and error-likely situations to predict, reduce, manage and prevent fatalities and injuries from occurring.
- **EHS onboarding system:** Our onboarding system is available to acclimate new EHS managers, plant managers and vice presidents of operations to our EHS culture.
- **Stop work:** All of our employees are empowered to stop their work or that of a colleague or contractor if they believe the situation is unsafe or if they are unsure of the potential outcome. To recognize such proactive efforts, we present those who stop work with the Alcoa STOP coin.

### Culture

We continued strengthening our safety culture in 2018 by planning and implementing actions to further demonstrate that safety comes first—before production, before cost, before everything. We are striving for a culture of transparency and agility, where we openly and actively share both our good ideas and our setbacks; where we put the well-being of every Alcoan, temporary worker, contractor and visitor before any departmental or personal consideration; and where we show with our actions that safety is more important than other business imperatives.

## CASE STUDY

### Initiative Keeps Mobile Equipment, Workers Separated

Keeping mobile equipment and workers separated is a constant challenge in a busy manufacturing setting. In the finishing department at our Warrick Operations facility in Indiana, a worker-on-foot initiative has done just that.

Vehicles such as heavy fork trucks are constantly moving in and out of the department, where large aluminum coils are coated, trimmed or slit into finished widths for can sheet customers. Workers on the shop floor who are focused on their tasks may be unaware that a fork truck or other vehicle has entered their work zone, increasing the risk of being struck.

To minimize this risk, the department installed automated gates at the entrances to a number of individual production areas in 2018. A mobile equipment operator now must gain permission from a line operator to enter a work zone. Before that access is given and the gate is opened, all workers must move to a designated safe zone and remain there until the vehicle has exited the area.

The new process gives workers complete control over the presence of mobile equipment in their work zone.



Electronic gate

## Culture Assessment

To gain a better understanding of our current safety culture and identify opportunities to strengthen employee commitment to an FSI-free workplace, we conducted a number of focus groups in 2018.

Identified strengths included stop criteria, toolbox meetings and human performance. Respondents indicated that opportunities for improvement were reporting, following up on identified safety issues and leadership spending time on the plant floor.

## Safety Leadership Standard

We developed a safety leadership standard to help managers throughout the company understand their roles and responsibilities in fostering a supportive safety culture. The standard includes requirements for reporting and responding to safety incidents, having leadership presence on the plant floor and forming safety committees.

# Health

Our health vision is to prevent future occupational disease through our exposure controls, support personal health and well-being through our workplaces and culture, and operate in a manner that does not negatively impact the health of our communities.

To achieve this vision, we developed a new health framework in 2018 that is based on the following four pillars:

- Health hazard controls to prevent occupational disease;
- Health status and fitness for work to ensure an employee's health status is compatible with assigned work;
- Community and public health, which facilitates our social license to operate; and
- Personal health and well-being.

Guiding our efforts are internal global health standards that often are more stringent than those specified by applicable law. We also proactively identify and respond to emerging health-related trends in our industry, and we have a long-standing relationship with the Health Committee of the [International Aluminium Institute](#).

## Health Hazard Controls

The health hazards inherent in our operations may include chemical, physical (noise, ergonomic, radiation, heat and vibration) biological and other types of hazards. Our locations have spent decades implementing processes, procedures, equipment and technologies to mitigate these

risks and have made significant progress. In 2018, we deployed our enhanced risk-based assessment templates for all health focus areas to support our locations in their efforts to eliminate their specific health hazards.

Our most prevalent health hazard is noise due to the quantity, scale and nature of the equipment and processes used throughout our operations. We have strict standards regarding the use of hearing protection and continually explore solutions for reducing noise and its magnitude.

Our mandatory global requirement for quantitative fit testing of hearing protection continued to mature throughout 2018, with the focus moving from users of ear plugs to users of ear muffs. All employees who use mandatory hearing protection must be quantitatively fit tested on a minimum three-year cycle. We expect to complete the first cycle at the end of 2019.

In 2018, we conducted quantitative fit testing of hearing protection on 90 percent of the targeted employees against a goal of 100 percent.

## Health Status and Fitness for Work

Our focus within this pillar is on addressing the ability of employees to safely perform their assigned work activities. This is enabled by our occupational medicine services, fatigue and shiftwork practices, substance use and abuse programs, worker's compensation management, rehabilitation and return-to-work approach, and emergency medical response capabilities.

Regardless of a location's size, all employees have access to occupational medicine services. These include regulatory or Alcoa-driven chemical surveillance evaluations, fitness-for-duty assessments, hearing evaluations, lung-function testing, work-related injury and illness evaluation and treatment, substance use and abuse testing, job-related immunizations and wellness.

In 2018, we developed a prototype of a new medical evaluation process that improves focus and efficiency. We began piloting the process within our Alumina business unit and expect to implement it across the entire company in 2019.

## Community and Public Health

Our community and public health initiatives require us to be attuned to the interests and needs of the communities in which we operate against the backdrop of local or national regulatory obligations.



We are mindful of the relevance of potential environmental emissions on the communities in which we operate and strive to reduce any such impacts to the lowest possible level.

We continuously monitor the occurrence of disease outbreaks and emerging infectious diseases in proximity to our operating locations to offer support and guidance in risk avoidance to our local medical and health professionals, as well as expatriates and business travelers. In 2018, we were successful in seamlessly transitioning to a new travel/medical/security partner that assists our efforts in this area. We also conducted comprehensive reviews of the hospital and healthcare capabilities, including emergency medical support, serving our locations in Brazil, Norway and Spain.

Other focus areas within this pillar include product stewardship, the European Union's REACH regulation, our safety data sheet authorship and management system, and response to customer and consumer concerns related to

our products as well as aluminum and health. Our locations also invest in programs and initiatives aimed at improving individual health and wellness in the communities in which they operate.

## Personal Health and Well-being

Programs focused on personal health and well-being among our employees originate at the location level. These grassroots efforts can include biometric screenings, nutrition programs, wellness competitions and more. In the U.S., a wellness program coordinated via our third-party administrator also motivates our employees toward improved personal health.

A second component of this pillar is traveler and expatriate health. We continue to train and educate our workforce on the merits of complying with our comprehensive global standard addressing this topic. Our new travel/medical/security partner also enables a best-in-class model for assuring the health and safety of all Alcoans wherever in the world they may live or travel.

## Protecting Youth Health and Well-being

Two Alcoa projects half a world apart had the same goal—protect the health and well-being of young people.

Suicide is the leading cause of death among Australians ages 15 to 24, and a partnership between Alcoa of Australia and [Youth Focus](#) worked to address the issue through education and awareness.

Hundreds of teenagers and young adults from communities supporting our Western Australian operations participated in workshops, community forums and counseling services during 2018 to better understand mental health challenges, the signs and symptoms of depression and anxiety, and ways to resolve issues to prevent suicide. Free public forums were also hosted for employees, parents, caregivers, teachers and community members interested in improving youth mental health.

“As a community, we need to arrest these suicide statistics by ensuring young people feel comfortable and confident to start conversations about mental health with their friends and peers,” said Chris Harris, Youth Focus general manager for community engagement.

In São Luís, Maranhão, Brazil, a partnership between Alcoa Institute and Plan International Brazil has the goal of reducing

the incidence of teenage pregnancies and sexually transmitted diseases (STDs) in five communities.

The Teenagers Multiplying Health project trains and empowers adolescents to share their knowledge on sexual and reproductive rights, gender equality, STDs, HIV/AIDS and teenage pregnancy with their peers and adults. In the initial phase, the program trained 60 teenagers who educated nearly 3,500 children and adolescents, 100 parents and 50 healthcare professionals. The second phase will involve training an additional 100 teenagers in 2019.

“This partnership has been very important for the lives of hundreds of girls and boys, who now act consciously about their sexuality and seek to educate their friends and community members,” said Guilherme Mendes, retention and reactivation accounts manager for Plan International Brazil.



*Teenagers Multiplying Health project*

# SUPPLY CHAIN

Our suppliers are important partners in our sustainability journey.

Our sustainability approach covers the entire life cycle of a product, making it critically important for our suppliers and those who serve them to conduct business in a responsible, ethical and sustainable manner.

In 2018, our Global Supplier Sustainability Program allowed us to assess and support the improvement of the sustainability of specific suppliers that were included in the program based on their overall contribution to our carbon footprint and a range of other criteria. These included whether they possessed preferred status, were a single source of supply, provided regulated commodities or were based in emerging or high-risk countries.

The program consisted of four components:

- Communicate expectations: We clearly defined our sustainability expectations and communicated them through discussions and our [Supplier Standards](#).
- Assess supplier: We formally evaluated the maturity of our key suppliers' sustainability programs against our

expectations and determined where improvements were needed.

- Develop and educate: For suppliers that we determined to be emerging or lagging in sustainability, we provided education and tools to develop and improve their programs. We also required action plans and demonstrated improvements in the development of their sustainability programs.
- Monitor: We reassessed suppliers in the emerging and lagging categories. Those that did not demonstrate annual improvements were subject to a review by our procurement and sustainability lead teams and faced the risk of losing our business.

## 2018 SUPPLIER SUSTAINABILITY ASSESSMENT RESULTS

*Percent of Key Suppliers*

Leading:	24
Active:	52
Emerging:	20
Lagging:	4

## GLOBAL SUPPLIER SUSTAINABILITY PROGRAM—SUPPLIER ASSESSMENT CRITERIA

Supplier Sustainability Focus Area	Assessment Topics
Suppliers develop and implement a sustainability program that includes environmental, social, economic and ethical aspects; such programs are published publicly; suppliers cascade same to their supply base.	<ul style="list-style-type: none"><li>• Labor practices</li><li>• Health and safety programs</li><li>• Business ethics policies</li><li>• Community commitment programs</li><li>• Risk management (financial management and security of supply)</li><li>• Publicly disclosed policies and procedures</li><li>• Cascade principles and policies to supply base</li></ul>
Suppliers integrate sustainability into their business strategy and support it through their values and culture	<ul style="list-style-type: none"><li>• Value systems</li><li>• Participation in sustainability indexes or reporting frameworks</li><li>• Incorporation of sustainability into market strategy</li><li>• Live cycle advantages/disadvantages of key products</li></ul>
Suppliers measure performance and establish quantifiable environmental goals; progress on environmental goals publicly disclosed	<ul style="list-style-type: none"><li>• Environmental goals and metrics</li><li>• Recycling programs</li><li>• Measurement systems</li><li>• Public disclosure/third-party assessment</li></ul>

In 2018, we developed an enhanced supplier sustainability program to further support our overarching sustainability objectives. Launched in January 2019, the new program will improve the management of our supply chain risk profile in emerging economies through the use of supplier scorecards covering environment, labor practices and ethics. The program will address both new suppliers and those with a lagging or emerging score in our 2018 assessment.

We use a separate third-party supplier due-diligence program to further manage risk in our supply chain related to the areas of anti-bribery and corruption, trade compliance, child and slave labor, criminal history, human trafficking and conflict minerals. This existing program involves suppliers with an Alcoa spend higher than US\$50,000 per year that are based in a high-risk country and those with an Alcoa spend above US\$1 million per year but are not based in a high-risk country.

We are also an active participant in the [Aluminum Stewardship Initiative](#), which will help further embed sustainability into our supply chain.

In 2018, we were awarded Gold supplier classification from EcoVadis, a leading business sustainability rating agency for supply chain management. Gold status indicates that Alcoa is among the top 5 percent of companies in our industry and a leader in the sustainability categories of environment, labor practices, fair business practices and sustainable procurement.



## Procurement Spend

In 2018, we purchased US\$9.7 billion in goods and services from thousands of suppliers around the world.

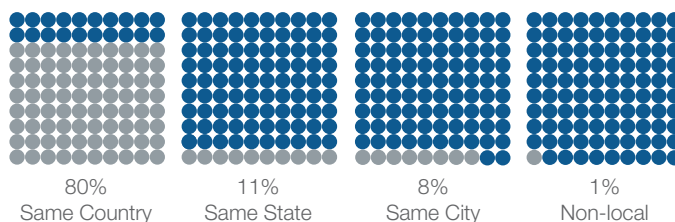
### 2018 SPEND BY REGION

Region	Procurement Spend (Billions of U.S. dollars)	Supply Base Composition (Percent of total supply base)
Australia	1.8	18.5
Europe	2.6	26.8
North America	4.1	42.3
South America	1.2	12.4
<b>Total</b>	<b>9.7</b>	<b>100.0</b>

We also launched a procurement tool that allows us to track local spend not only by amount but also by how close suppliers are located to the Alcoa shipping address. The latter data are categorized by number of shipments to the same city, same state (U.S. only), same country and non-local (outside of the country in which the Alcoa facility is located).

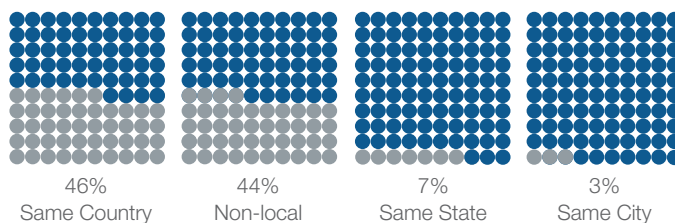
Having this localized data will facilitate setting future goals related to local procurement and also help us analyze the environmental impact of transporting products from suppliers to our facilities.

### 2018 NUMBER OF SHIPMENTS



### 2018 SPEND

(U.S. dollars)



## Related Information

[Supplier Standards](#)

[Ethics and Compliance](#)

[Human Rights Policy](#)





Improving Our Footprint



# CLIMATE PROTECTION

We have a strong history of leadership in reducing greenhouse gases in the aluminum industry.

Carbon dioxide represents most of our GHG emissions, with our smelters being the largest emitters. As such, our long-term goal is to reduce the intensity of our GHG footprint (direct and indirect emissions) from our smelting operations by 15 percent by 2025 and 20 percent by 2030 from a 2015 baseline. We achieved an 8.1 percent reduction from the baseline through 2018.

Our total 2018 CO<sub>2e</sub> emissions equaled 25.2 million metric tons, of which 17.9 million metric tons were direct emissions. This represents a 10.0 percent increase in total emissions and a 24.3 percent increase in intensity compared to 2017. The increase primarily was driven by the restart of our Warrick smelter in the United States and various process instability issues throughout the global smelting and refining organizations. In 2019, all locations will focus on improving process stability and performance.

Our Scope 3 (supply chain) emissions in 2018 were 38.0 million metric tons of CO<sub>2e</sub> for six categories—purchased goods and services; fuels and energy-related activities; waste generated in operations; business travel; product transportation and distribution (downstream); and processing of intermediate products sold to customers.

## CARBON DIOXIDE EQUIVALENT EMISSIONS INTENSITY

Metric tons of CO<sub>2e</sub> per metric ton of production

	Refining	Smelting (IPCC, 4th TAR)	Total (IPCC, 4th TAR)
2014	0.55	6.42	<b>7.46</b>
2015	0.54	6.21	<b>7.23</b>
2016	0.54	5.34	<b>6.36</b>
2017	0.53	4.39	<b>5.39</b>
2018	0.52	5.71	<b>6.70</b>

Data are for Scope 1 and Scope 2 emissions. The total represents the combined impact of refining and smelting operations indexed to metric tons of primary aluminum production (refining is included at a ratio of 1.9 metric tons of alumina to 1.0 metric tons of smelted aluminum). These two processes and their associated power supply represent 85 percent of our total GHG emissions. Calculations of these emission intensities conform to the IAI Aluminium Sector Greenhouse Gas Protocol using 100-year global warming potentials provided by the Intergovernmental Panel on Climate Change (IPCC). The phrase "4th TAR" stands for Fourth Technical Assessment Report.

## CARBON DIOXIDE EQUIVALENT EMISSIONS

Million metric tons

	Direct (Scope 1)	Indirect (Scope 2)	Total
2014	24.0	10.4	<b>34.4</b>
2015	22.8	8.8	<b>31.6</b>
2016	17.7	8.0	<b>25.7</b>
2017	16.5	6.4	<b>22.9</b>
2018	17.9	7.3	<b>25.2</b>

Of our 25.2 million metric tons of CO<sub>2e</sub> emissions in 2018, 23.9 million metric tons were associated with carbon dioxide, 1.2 million metric tons were associated with perfluorocarbon (CF<sub>4</sub> & C<sub>2</sub>F<sub>6</sub>), 52,500 metric tons were associated with methane, 38,200 metric tons were associated with nitrous oxide and 5,800 metric tons were associated with sulfur hexafluoride (SF<sub>6</sub>). There were no significant hydrofluorocarbon emissions. We had 6,100 metric tons of biogenic CO<sub>2e</sub> emissions from the combustion of biodiesel. These emissions are not included in the total 2018 CO<sub>2e</sub> emissions. Of our 2018 direct GHG emissions, 28 percent were covered under an emissions-limiting regulation or program.

We engaged [First Environment](#) to provide limited third-party assurance on our 2018 carbon emissions data. The company's verification statement is available in the [appendix](#).

We are analyzing the recommendations from the [Task Force on Climate-related Financial Disclosures](#) to identify how we can provide additional information and transparency on our climate protection efforts and performance.

## Climate Strategy

Our climate strategy in 2018 encompassed five pillars that reflected our challenges and opportunities. Our strategy and performance again led to Alcoa being named to the Dow Jones Sustainability Index during the year.

To better focus our efforts and prioritize action, our Executive Team commissioned a Climate Strategy Team in 2018. This cross-functional team of high-level employees will review our climate strategy during 2019 to ensure it continues to address our current challenges and opportunities.

## Reduction in Energy Consumption

The quantity of our GHG emissions is directly related to the type and amount of energy that we consume. We are working to increase our use of low-impact energy sources

and also improve the energy efficiency of our operations. A full discussion of our energy strategy can be found in the [Energy](#) section.

To ensure our salaried managers and leaders remain engaged in this issue, we connected 5 percent of our 2018 annual incentive compensation to carbon dioxide emission reductions through process upgrades and improved energy efficiency. Due to a variety of plant instability issues, we achieved zero percent.

## Carbon Reduction

Through programs aimed at reducing specific GHG emissions, we made significant progress in reducing our carbon footprint as part of our former parent company. Curtailment or closure of facilities, some of which were among our highest emitters, also contributed to our emissions reductions.

We continually evaluate the technological limits within our current operations, including our oldest smelters. With this information, we can evaluate new or existing technology-based solutions to help achieve our GHG reduction goals and also take us to the next level of reductions. The latest example of our efforts is the revolutionary [ELYSIS](#) process, which eliminates direct GHG emissions from the traditional smelting process.



Through the International Aluminium Institute and Alcoa Foundation, we will be partnering with the World Resources Institute in 2019 to better understand the barriers associated with setting and attaining science-based targets in the aluminum sector. This work will help us understand potential emission-reduction opportunities to transition to a low-carbon economy.

## Carbon Offsets and Credit Trading

Countries around the world are moving at different speeds toward strengthening regulations for carbon emissions. Our experience with the carbon markets in Europe and Canada will inform our approach to future pricing mechanisms used to reduce carbon emissions.

We anticipate that Phase 4 of the European Union's Emission Trading Scheme, which covers the period 2021 to 2030, will have a direct impact on both our carbon and energy pricing. In the United States, we anticipate that the rollback of the Clean Power Plan will delay the impact for our coal-fired Warrick power plant in Indiana. In addition, legislative changes under consideration in the states of Washington and New York in 2019 may have future impacts on our smelters there.

We are working to better understand opportunities to offset our emissions through projects like the United Nations' [Reducing Emissions from Deforestation and Forest Degradation in Developing Countries \(REDD+\) program](#).

## Products

We are developing greener products to help our customers deliver more sustainable products to society and also realize the value of the carbon-free energy in our value chain. An example is our SUSTANA line of aluminum products, which we produce with low carbon emissions or recycled content. (See the [Products](#) section.)

We are also active in the development of standards that incorporate carbon measures into the value of products. The Corporate Average Fuel Economy (CAFE) standards in the United States, for example, are encouraging automakers to use lightweight materials, such as aluminum, to meet more stringent fuel-efficiency requirements.

## Advocacy

Through industry associations and direct contact, we engage with global stakeholders on the issue of GHGs to ensure fair and effective policies and regulations. These stakeholders include elected officials, government agencies and NGOs.

As an active member of the Standards Setting committee of the [Aluminum Stewardship Initiative](#), we helped develop industry standards that include GHG emissions. We are also working through organizations like the



[Aluminium Association of Canada](#), [Australian Aluminium Council](#), [European Aluminium](#), [International Aluminium Institute](#) and [The Aluminum Association](#) to inform the industry's approach to, and engagement on, carbon regulation.

During 2018, we continued to engage with government representatives, legislators, NGOs and other stakeholders in the U.S. state of Washington on carbon legislation and ballot initiatives. We interacted with stakeholders in the European Union (EU) on the revision of the [Emission Trading Scheme Directive](#), [Clean Energy for All Europeans](#) package and [A Clean Planet for All 2050](#) vision. We continued discussions with the Quebec government regarding its cap and trade program for 2024 to 2030, and we engaged with the government in Australia on the impacts of climate policy and regulations.

Alcoa Foundation is engaging with governmental organizations and NGOs to advocate the prevention of, and resilience to, climate change. In Iceland, for example, the foundation is funding a project that will restore around 60 hectares (150 acres) of wetlands that had been drained under an old government program to increase available farmland. Drained wetlands are the country's largest emitter of CO<sub>2</sub> due to the gases released from decomposing plant and animal material in the now-exposed soil.

## Related Information

[Energy](#)

# ENERGY

Energy is a critical resource for our operations, particularly our energy-intensive refining and smelting processes.

Securing low-cost and long-term energy that has minimal environmental impact is a focal point of our energy strategy. We also reduce the amount of energy we consume through operational efficiency and technological advances, all of which lower our energy costs and reduce our GHG emissions.

Our energy intensity increased by 0.5 percent in 2018 compared to the prior year. Our overall energy consumption increased by 11.0 million gigajoules, or 3.8 percent, in the same period. Key factors behind the increases are due to the previously discussed Warrick restart and process instability issues.

## ENERGY INTENSITY

*Gigajoules per metric ton of aluminum produced*



*Energy intensity values reflect the net energy value after energy is sold to the grid. Refining is included at a ratio of 1.9 metric tons of alumina produced to 1.0 metric tons of smelted aluminum. The intensity data represent the amount of energy we use onsite in the form of fuels or purchased electricity to produce alumina and aluminum.*

## 2018 ENERGY BY SOURCE

Source	Direct		Purchased Electricity	
	Thousands of Gigajoules	Percent	Thousands of Megawatt Hours	Percent
Natural Gas	103,327	57.4	4,823	11.5
Hydro	0	0.0	24,058	57.2
Coal	62,836	34.9	7,322	17.4
Oil	10,486	5.8	108	<0.1
Other Renewables	86	<0.1	2,948	7.0
Diesel	3,091	1.7	1,374	3.3
Nuclear	0	0.0	1,385	3.3
Propane	103	<0.1	0	0.0
Distillates	87	0.0	0	0.0
Local Grid	0	0.0	34	<0.1
<b>Total</b>	<b>180,016</b>		<b>42,052</b>	

*Other renewables include geothermal, biomass, solar and wind energy. Percent totals do not equal 100 due to rounding.*

For energy consumption, we use the [Greenhouse Gas Protocol](#) developed by the [World Resources Institute](#) and [World Business Council for Sustainable Development](#) to establish boundaries for our calculations and account for mergers, acquisitions, divestitures, startups, curtailments and closures of operating facilities. We report energy consumption based on management control and the location-based method as defined in the Greenhouse Gas Protocol. The [Intergovernmental Panel on Climate Change Guidelines](#) and country-specific databases, such as the U.S. Environmental Protection Agency's [Emissions & Generation Resource Integrated Database](#), continue to serve as our source of data on the characteristics of electric power generation and heat content values for fuel sources.

[First Environment](#) provided third-party verification of our 2018 energy data. (View the [verification statement](#).)

## Energy Security

Our internal energy team is responsible for purchasing approximately 370 terajoules of natural gas per day and supplementing our self-generated power with approximately 4.4 gigawatts of purchased electricity. More than half of our purchased natural gas and electricity is under long-term contracts that exceed 10 years.

Smelters are our largest consumers of electricity, and renewable sources comprised approximately 72 percent of their power consumption in 2018.

Our Canadian smelters (Bécancour, Deschambault and Baie-Comeau) are supplied almost entirely with hydro-electricity. This renewable energy source accounts for 100 percent of purchased energy consumed by our Alcoa Fjardaál smelter in Iceland and Massena smelter in the United States. Our Mosjøen and Lista smelters in Norway, both of which are certified to the ISO 50001 energy management standard, use 98 percent hydroelectricity.

We signed two long-term wind power purchase agreements in 2018 in Norway, adding to the two that we



*Mosjøen smelter*

signed in 2017. According to Bloomberg data, we were one of the world's 10 top clean-energy buyers in 2018.

Our portfolio of energy assets is composed of equity interests in consortia and wholly-owned facilities. Our share of the generation capacity of these assets is 1.5 gigawatts, of which more than 55 percent is low-cost hydroelectric power capacity.

## Operational Efficiency

We use a variety of approaches to improve operational energy efficiency, including:

- **Benchmarking:** We identify opportunities to compare our operations against industry leaders.
- **University collaborations:** We access the expertise at various universities around the world to develop solutions to our energy challenges.
- **Best practice sharing:** Through our internal Centers of Excellence, we share best practices and transfer operational improvements through numerous channels, including a network of Alcoa experts who provide direction and training to plant technical staff and operators.
- **Location-specific targets:** We set and monitor energy-efficiency targets for each location and develop an implementation roadmap, taking into account process variations from facility to facility.

Our refining operations have implemented significant process improvements over the past few years that focused primarily on process controls, heat transfer efficiency and maintenance improvements.

All of our smelters have realized efficiency improvements with the use of the SMART manufacturing platform, which displays process information so our employees can take

action to conserve energy. Our smelters are also focused on identifying raw materials or design changes that could lead to either more conductive or more efficient management of a smelting pot's heat balance.

Our casthouses are implementing new technologies that drive energy efficiency, such as oxy-fuel burners that use pure oxygen in a furnace's combustion process to avoid the unnecessary heating of nitrogen contained in air. We have installed magnetic stirring technologies at two of our casthouses to more efficiently mix molten metals, and we have implemented program and hardware changes on our furnace control systems to better regulate pressure and temperature.

## Technological Advances

Our heritage is in developing new technologies for the aluminum industry—including inventing the commercial aluminum industry in 1888.

In the decades since, our experts have created low-energy smelting cells and improved electrical connections. Our advanced process simulation capabilities create real-world technological advances in alumina refining.

We are also investing in the long-term for potential step-change outcomes. For alumina refining, our experts are examining the use of solar energy to power the calcination process and solar gas reforming (using solar energy to increase a gas stream's energy). In aluminum smelting, we continue to invest in research and development to improve energy efficiency and reduce carbon dioxide emissions.

## Demand Response Initiatives

Unlike other energy sources, such as oil or gas, electricity cannot be stored economically. The electricity produced (generation) must be balanced with the electricity consumed (load) on a real-time basis to preserve the stability of the electrical grid and prevent blackouts and other system disruptions. The challenge for utilities is that the normal peaks and valleys of demand vary throughout each day, by season and by region.

Demand response is a practice where certain customers, usually larger ones, adjust their electrical load in response to a signal from a utility or the electric grid. This adjustment helps maintain stability in the electrical system by balancing generation and load. The customer is paid for this service.



Our U.S. smelters participate in demand response, providing some or all of the following services:

- Capacity: A portion of a customer's load is considered system capacity, allowing the utility to avoid the cost of building additional generation to meet its reserve capacity requirements.
- Emergency demand response: A customer will respond within minutes to reduce large blocks of load for short periods of time to balance spikes in demand from other parts of the electric grid. The overall system remains in balance as a result.
- Spinning reserves: This service is similar to emergency demand response but on a smaller scale and for a shorter length of time.
- Load imbalance: For grids that use solar or wind power, which are intermittent sources of energy, a customer's load is used to keep the grid in balance.
- Regulation response: A small percentage of a customer's load is controlled directly by the utility, allowing for real-time adjustments to assist with managing the grid.

In Australia, we have an electricity demand management program for our smelter and refineries. We reduce our demand for electricity at these facilities during the hottest days of the year, which generally coincide with the highest demand for electricity. This helps support efficient investment in electricity infrastructure and avoids additional costs of electricity generation to cover events that only occur a few times a year.

Our production facilities in Spain and Norway provide load interruptibility to their respective transmission system operator to help manage the risk of system electrical blackouts. The facilities are remunerated for providing these services.

In Canada, we provide interruption rights to our power supplier under our long-term supply contracts.

## Related Information

[Climate Protection](#)

# BIODIVERSITY AND MINE REHABILITATION

We operate in a manner that aims to minimize our environmental impacts and promote sustainable land use.

## Biodiversity

We endorse biodiversity conservation, and we consider the mitigation hierarchy of avoidance, minimization, restoration and offsets during the lifecycle stages of our operations.

Prior to commencing new construction projects or significantly expanding existing facilities, we conduct an environmental assessment to determine any potential impacts to biodiversity. This assessment uses techniques, procedures and information generally accepted by the international scientific community as leading practices.

At our bauxite mines in Western Australia, for example, critical breeding habitat for three threatened black cockatoo species is identified in pre-mine surveys and avoided when planning locations for mine pits and haul roads. Ongoing monitoring of breeding success and habitat integrity are supported by a research program to help further improve our processes.

We seek to avoid designated protected areas, such as national parks and nature reserves, where strict nature conservation is the management objective. We also have committed to not explore, mine or operate in [World Heritage sites](#).

We believe our operations and biodiversity conservation can coexist on the same land, having successfully operated bauxite mines, alumina refineries and aluminum smelters within areas of high biodiversity value. When areas are disturbed, we rehabilitate progressively to mitigate impacts and return the land to either a native state or other sustainable use. When feasible, this includes efforts to reestablish pre-operating conditions.

### Biodiversity Action Plans

Our bauxite mining operations in Western Australia, Portland Aluminium smelter in eastern Australia and Juruti bauxite mine in Brazil have developed and implemented biodiversity action plans that:

***“Alcoa Foundation has been a steadfast partner in helping American Forests replant forests across the globe. The foundation’s three-year commitment has enabled American Forests to establish powerful new reforestation partnerships, aligning the company’s support for more lasting and strategic conservation impact. We have targeted our reforestation partnership with Alcoa Foundation to benefit communities and natural landscapes in and around Alcoa facilities, planting trees with volunteers in these host communities to deliver forest benefits for people and wildlife and inspire a new generation of environmental stewards. The new forests we have planted together will deliver many benefits, but we are especially proud of their benefits for slowing climate change through carbon sequestration, improving the health of watersheds, and providing shelter for sensitive wildlife.”***

#### Jad Daley

President and CEO  
American Forests



- Identify the biodiversity within the area of direct management control or significant influence, including the presence of threatened species and communities, in context with surrounding land;
- Pinpoint potential impacts, both positive and negative;
- Develop a range of strategies aimed at minimizing or mitigating biodiversity impacts;
- Inform our employees and communities where we operate about the importance of biodiversity protection, and encourage their participation in biodiversity initiatives; and
- Set and report performance against site-specific targets.

These three plans are serving as models for the Alumar refinery in Brazil, San Ciprián refinery in Spain, Baie-Comeau smelter in Canada and Mosjøen smelter in Norway. We anticipate completing plans for these four locations in 2019, and plans for our other locations are under consideration.

## SITES WITHIN OR ADJACENT TO PROTECTED AREAS OR AREAS OF HIGH BIODIVERSITY VALUE

Operational Site	Site Location & Size	Position	Biodiversity Value
Huntly and Willowdale bauxite mines	Jarrah Forest, Western Australia 712,900 hectares (1,761,614 acres)	Adjacent to protected areas; within an area of high biodiversity value	Recognized by Conservation International as an international biodiversity hotspot; threatened species and ecological communities ( <a href="#">International Union for Conservation of Nature</a> and federal government listed)
Anglesea power station and related coal mine (closed in August 2015)	Anglesea, Victoria, Australia 787 hectares (1,945 acres)	Within and adjacent to a protected area	Protected area; threatened species and ecological communities (International Union for Conservation of Nature and federal government listed)
Wagerup alumina refinery	Wagerup, Western Australia 6,000 hectares (14,826 acres)	Adjacent to areas of high biodiversity value	Ramsar listed wetlands adjacent; threatened species and ecological communities (International Union for Conservation of Nature and federal government listed)
Portland Aluminium smelter	Portland, Victoria, Australia 500 hectares (1,236 acres)	Adjacent to a protected area	Threatened species and ecological communities (International Union for Conservation of Nature and federal government listed)
Juruti bauxite mine and related railroad and port facility	Juruti, Pará, Brazil 29,426 hectares (72,713 acres)	Within an area of high biodiversity value	Amazon rainforest and river; threatened species and ecological communities (International Union for Conservation of Nature listed)
Poços de Caldas operations (bauxite mine, alumina refinery and aluminum smelter—the smelter closed in June 2015)	Poços de Caldas, Minas Gerais, Brazil 2,327 hectares (5,750 acres)	Within an area of biodiversity value	Fragmented native forests; threatened species (International Union for Conservation of Nature listed)
Coermotibo bauxite mine operations (ceased operation in October 2015)	Marowijne District, Suriname 32,800 hectares (81,051 acres)	Adjacent to and within a protected area	Adjacent to and within International Union for Conservation of Nature protected area; threatened species (International Union for Conservation of Nature listed)
Point Comfort alumina refinery (fully curtailed in 2016)	Point Comfort, Texas, USA 1,417 hectares (3,501 acres)	Adjacent to an area of biodiversity value	Native grassland and intertidal emergent marsh (protected under the Clean Water Act); important breeding habitat for wading birds.

Protected area status follows definitions described in Dudley, N. (Editor) (2008). *Guidelines for Applying Protected Area Management Categories*. Gland, Switzerland: IUCN. x + 86pp.

### Ecosystem Services

Ecosystem services are benefits obtained from natural ecosystems. These may be goods or raw materials, such as food, timber or fresh water. They also may be services carried out by ecosystems, including climate mitigation, erosion control and disease control. A company can both benefit from ecosystem services as well as impact them.

There are many situations where ecosystem services benefit our business. These include the provision of essential water supplies for our operations; management of forested land in our hydropower watersheds; rehabilitation of mined land by providing seeds of native plants, naturally re-colonizing microorganisms, flora and fauna; and restoration of ecosystem processes, such as nutrient, carbon and water cycles, that ensure long-term success.



Our Juruti mine and our mines in Australia were the subject of an independent research project aimed at developing and testing an ecosystems services-based framework called Ecosystem Services Approach to Rehabilitation (ESAR) to assist in planning mine rehabilitation. The approach uses an ecosystem services review step, similar to an impact assessment, and engagement with stakeholders, including local communities.

The study found that ESAR can help miners, regulators and the community plan rehabilitation and translate biophysical data into human benefits. Overall, ESAR upholds the international best practice in mine rehabilitation planning while enhancing community engagement and delivering social benefits.

## Mine Rehabilitation

Rehabilitation is a post-mining activity, but we begin planning for it as early as possible. This includes the very early stages of development for a new mine. When we inherit

legacy obligations at sites that were mined long ago, we begin rehabilitation planning as soon as we recognize such an obligation.

Regardless of when planning starts, we engage with stakeholders to develop a rehabilitation plan to ensure the site can be returned to sustainable use. In many cases, we strive to return the land to its natural state, such as



*A 30-year-old rehabilitated jarrah forest in Western Australia*

## In Search of Microbats

Deep in the jarrah forest in Western Australia, microbats as tiny as a thumb are thriving.

Through the years, we have assisted researchers studying these important pest controllers within the forest ecosystem. In 2018, an Alcoa team traveled a labyrinth of dirt roads to one of the oldest patches of

bush in the jarrah forest, which is home to numerous bat populations. The goal was to help Diana Prada, a Murdoch University Ph.D. student who was researching the population genetics and viral health of different microbat species throughout southwestern Australia.

Our team had spent considerable time prior to the journey planning and liaising, scouting possible trapping sites, confirming access and addressing safety requirements to allow the research to be conducted on our land. Ms. Prada obtained relevant permits and ethics clearances.

The study will increase understanding of the genetic diversity of Western Australia's microbats. This will provide further insights into their dispersion capacity, population trends and levels of connectivity between populations. Additionally, characterization of viral pathogens hosted by healthy bat

populations provides information into potential disease threats to the bats and may act as an indicator of adverse environmental pressures on bat communities. Documenting viral prevalence also will contribute to better-informed risk assessments of human-bat interactions and can serve as a relevant monitoring tool of population health.

The team caught, sampled and released approximately 120 bats representing six of the nine species in the jarrah forest. The highlight was catching and sampling a western false pipistrelle bat for the first time since the study started. Very little is known about the species, and its populations are estimated to be declining.

"We collected more samples than we could have imagined," said Ms. Prada. "I could not have wished for a better trip or more amazing crew."



*Western false pipistrelle bat*  
Photo credit: Diana Prada

forests, wetlands and grasslands. Where appropriate and in concert with government or local communities, our rehabilitation supports other productive land uses, including farming and residential, commercial or industrial developments.

We strive to lessen the impact of our mining operations by minimizing the environmental footprint for each mine. This includes not only minimizing the land disturbed for mining, but also the amount disturbed for the long-term infrastructure needed to support mining activities, such as haul roads, rail lines and washing plants. Areas disturbed by mining and no longer required for operations are progressively rehabilitated.

Each active mine also has a strategic management plan for long-term infrastructure, committing to repurpose the buildings, haul roads and railroads. Areas that cannot be repurposed are rehabilitated.

Rehabilitation approaches vary across our mines in response to local biophysical conditions and rehabilitation objectives.

In certain locations, for example, naturally occurring sulfide minerals contained in overburden have the potential to release low pH (acidic) water when exposed to air, resulting in dissolved metal concentrations in surface water and groundwater. Some clay overburden materials also exhibit these characteristics. To prevent the potential release of acid and metals, we manage this material through selective handling, which may include encapsulation or sub-aqueous (underwater) placement.

Where a diverse native ecosystem is the rehabilitation objective, we conserve and reuse topsoil. This valuable resource contains seeds, nutrients and microbes that are essential for successfully establishing diverse and sustainable vegetation cover after mining.

In addition to preserving topsoil, we apply many strategies to optimize the number of plant species we reestablish in rehabilitated areas. These include spreading collected and specially treated seeds and planting nursery-grown seedlings. We may use cuttings and tissue culture propagation techniques for species that generally do not produce viable seeds.

## Mining and Rehabilitation Activity

During 2018, we had four active bauxite mining areas in Australia and Brazil and one active coal mine in the United States. A number of inactive mines also contributed to the year's total open area. We also have a minority equity

interest in a bauxite mine in each of three countries—Brazil, Guinea and Saudi Arabia—but data from these mines are not included in this sustainability report.

Our goal is to maintain a corporate-wide running five-year average ratio of 1:1 or better for active mining disturbance (excluding long-term infrastructure) to mine rehabilitation. This will manage net expansion in land disturbed.

The ratio for the 2014 to 2018 period was 1.02:1. We expect the ratio to decrease as more areas at our closed mines in Suriname are returned to the Suriname government after rehabilitation.

## MINING LAND DISTURBED/LAND REHABILITATED

Hectares

	Open Mine Area (Cumulative as of year-end)	Area Disturbed (Annual)	Area Rehabilitated (Annual)
2014	15,632	1,414	1,008
2015	14,893	1,195	1,293
2016	15,283	1,028	646
2017	15,448	1,173	1,008
2018	15,769	1,243	923

One hectare equals approximately 2.5 acres. Open mine area is the cumulative area of land that has not been rehabilitated (including active mines and land used for mining infrastructure). Area disturbed means land used in each reported year for mining or for mining infrastructure (e.g., roads, shops, crushing equipment, conveyors). Area rehabilitated means land returned to natural conditions or to productive use (such as farming) after mining or decommissioning of mine infrastructure in each reported year. Generally, the open mine area in each reported year should be the open mine area from the preceding year plus any area disturbed and minus any area rehabilitated. Because the open mine areas are independently reviewed and adjusted from time to time, this calculation utilizing the figures in the table above is unable to be applied precisely.

## OPEN MINE AREA

Hectares

	Australia	Europe/ Africa	North America	South America	Total
2014	4,804	0	1,261	9,567	<b>15,632</b>
2015	5,009	0	1,191	8,693	<b>14,893</b>
2016	5,351	0	1,128	8,804	<b>15,283</b>
2017	5,614	0	1,068	8,766	<b>15,448</b>
2018	5,739	0	1,003	9,027	<b>15,769</b>

One hectare equals approximately 2.5 acres. Open mine area is the cumulative area of land that has not been rehabilitated, which includes active mines and land used for mining infrastructure. In Australia, the 2018 open mine area includes the Anglesea coal mine, which closed in 2015. The open mine area increased in 2017 and 2018 mostly due to a range of operational constraints to rehabilitation at the Huntly mine. Increased rates of rehabilitation at the Huntly and Willowdale mines are planned to reduce area open after 2020. North America data for 2018 include a total of 23 hectares of land at the inactive Squaw Creek coal mine in Indiana (USA), which has been rehabilitated but is awaiting the final phase of bond release. A total of 192 hectares at the Friendsville Mine (coal mine in Illinois, USA), which was sold in 2016, is also included for all years although the bond release occurred during 2018.

## AREA DISTURBED

Hectares

	Australia	Europe/ Africa	North America	South America	Total
2014	818	0	179	417	<b>1,414</b>
2015	756	0	109	330	<b>1,195</b>
2016	631	0	51	346	<b>1,028</b>
2017	675	0	50	448	<b>1,173</b>
2018	675	0	48	520	<b>1,243</b>

One hectare equals approximately 2.5 acres. Area disturbed means land used in each reported year for mining or for mining infrastructure (e.g., roads, shops, crushing equipment, conveyors). In Australia, the small increase in 2017 was due to slightly higher clearing for active mine areas at both the Huntly and Willowdale mines. In Brazil, the area disturbed increased in 2017 and 2018 due to additional clearing necessary for long-term infrastructure associated with the now-completed expansion of our Juruti mine.

## AREA REHABILITATED

Hectares

	Australia	Europe/ Africa	North America	South America	Total
2014	576	0	166	266	<b>1,008</b>
2015	550	0	179	564	<b>1,293</b>
2016	290	0	114	242	<b>646</b>
2017	412	0	110	486	<b>1,008</b>
2018	550	0	113	260	<b>923</b>

One hectare equals approximately 2.5 acres. Area rehabilitated means land returned to natural conditions or to productive use (such as farming) after mining or decommissioning of mine infrastructure in each reported year. The reduction in area rehabilitated in 2016 was mainly due to a range of operational constraints at the Huntly mine in Australia and reduced areas returned to the government of Suriname during 2016. In Australia, the increased area rehabilitated in 2018 was partly due to the commencement of rehabilitation of haul roads in the previous crusher region of McCoy and the execution of a closure plan at the Anglesea mine. In South America, a reduction in area rehabilitated in 2018 was due to slower-than-expected retirement of previously mined lands in Suriname.

## Impact on Indigenous Peoples and Traditional Populations

Our locations with the most direct impact on indigenous peoples and traditional populations are our Juruti mine in Brazil and our former operations in Suriname.

We have engaged with the traditional community of Juruti Velho, located at Vila Muirapinima, since the inception of the mine, which is located in the Amazon. Juruti Velho has a population of approximately 9,900 people (21 percent of the overall municipality of Juruti) and encompasses 56 settlements located near where we started mining bauxite ore in 2009.

Since 2008, Alcoa, the National Institute of Colonization and Agrarian Reform (INCRA) and the Association of Communities of the Juruti Velho Region (ACORJUVE) have established a negotiation process on land use for mining and community. ACORJUVE is the formal organization that represents the Juruti Velho community, including land-owner rights. The Brazilian federal and state governments also have participated in the negotiations.

A comprehensive study to evaluate compensation for loss and damages was completed in late 2014. In February 2018 following more than three years of negotiation, ACORJUVE, INCRA, federal and state prosecutors and Alcoa signed a social, environmental and economic agreement on common land use, shared value and sustainable mining in the Amazon region.

The agreement requires Alcoa to pay US\$5.3 million in compensation for the 2006 to 2010 period. This amount and the royalties paid to ACORJUVE will be managed by a foundation to ensure transparency and good governance in accordance with recommendations issued in February 2015 by federal and state prosecutors. From mine startup in October 2009 through December 2018, we paid US\$22.1 million in royalties to ACORJUVE.

The agreement involves a commitment to coexistence, compensation and communication between Alcoa and the communities of Juruti, and it establishes a new relationship model for seeking common land use solutions and shared value creation. As a result of continuous and intensive dialogue between Alcoa, communities and governments, this agreement shows that it is possible to reconcile mining and traditional community activities in the Amazon while delivering positive results to society as a whole.

In Suriname, we ceased all mining activities in 2015 and permanently closed the Paranam Alumina refinery in 2016. We are developing closure plans for the remaining mine sites that require rehabilitation in the Para district. For older, deep-seated mine sites, we began assessments in 2018 to ensure that these mines are stable and safe for post-mining land use. In the Marowijne district, we developed closure plans for mine sites that have not yet been rehabilitated, and we submitted these plans to the government of Suriname in 2018. A re-vegetation index completed in early 2019 outlines the criteria for the mine rehabilitation and established the basis for post-closure period's monitoring program.

We also engaged with the Kaliña and Lokono indigenous community in 2018 regarding the mine rehabilitation efforts previously conducted at Wane Hills in the Marowijne district. Suriname does not recognize indigenous people's collective rights in the country's traditional territory. In 2015, the Inter-American Court of Human Rights ruled in favor of the indigenous communities in lower Marowijne (Kalina and Lokono People) and ordered the government to address legal recognition



and protection of the communities' collective rights (land rights). Suralco is not a party to the court case.

Because we previously mined in the area under dispute, we have engaged with the affected indigenous communities to understand any concerns regarding previously conducted rehabilitation. The outcomes of this consultation will serve as input for a technical study on potential enhancements or further restoration of the previously disturbed mining area within Wane Hills. The study will be conducted in 2019.



*Meeting with the Kaliña community in 2018*

# WASTE

We closely manage the waste that we generate. We first look to eliminate waste at its source and then find alternative uses for whatever remains. We are committed to developing and pursuing technologies and processes that continue to shrink our waste footprint.

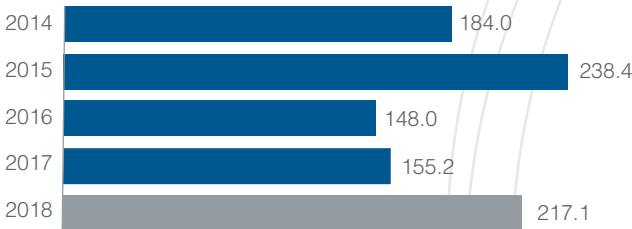
## Landfilled Waste

Our landfilled waste increased 39.9 percent in 2018, primarily due to a process upset that generated more waste than normal. We also had additional pot digging actions that increased the amount of spent pot lining (SPL) sent off-site for treatment and disposal.

Our landfilled waste data exclude certain waste streams, such as bauxite residue and fly ash. We manage these wastes separately within onsite storage or impoundment areas and do not send them to landfills for disposal. Overburden and rock generated from our mining activities are also not included in the data, as we reuse both materials in mine rehabilitation and do not consider them waste.

### LANDFILLED WASTE

Thousands of metric tons



### TOTAL WASTES SOLD OR RECYCLED

Thousands of metric tons



## Bauxite Residue

Generated during the alumina refining process, bauxite residue consists of mud, some residual caustic soda and, in some cases, coarse sand. It is stored in impoundments called residue storage areas that are closed and re-vegetated when full. In 2018, we generated 22.8 million metric tons of this residue.

In 2018, we implemented a new goal for bauxite residue that addresses our biggest challenge—reduce bauxite residue land storage requirements per metric ton of alumina produced by 15 percent by 2030 from a 2015 baseline. We achieved a 5.8 percent reduction from the baseline through 2018.

### BAUXITE RESIDUE LAND REQUIREMENTS

Square meters of land required per 1,000 metric ton of alumina produced



Data changes from prior reporting are due to the removal of discontinued operations in Jamaica.

### BAUXITE RESIDUE STORAGE AREA REHABILITATION RATE

Percent of total area rehabilitated



Data changes from prior reporting are due to the removal of discontinued operations in Jamaica.

## BAUXITE RESIDUE INTENSITY

Metric tons of residue per metric ton of alumina produced



The increase from 2015 to 2016 was due to a combination of the curtailing of refineries that had lower residue-to-alumina ratios and a drop in the bauxite quality used in some refineries. Data changes from prior reporting are due to the removal of discontinued operations in Jamaica.

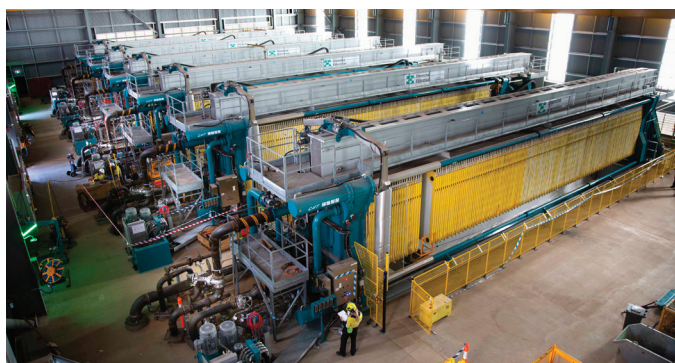
## Residue Filtration

We have been working toward more sustainable residue storage practices for many years, transitioning from a traditional wet disposal practice to a dry stacking process. Dry stacking increases the volume of residue that can be stored within a given footprint and significantly reduces the potential for impacts on the surrounding environment.

We have extended this work through the application of residue filtration, where bauxite residue is forced through very large filters that squeeze the water from the mud. The resulting filter cake has a moisture content low enough to allow for more conventional materials handling (conveying) and stacking.

Our first large-scale filtration facility is fully operational at our Kwinana refinery in Australia. We are also installing the first stage of filtration at our Pinjarra refinery, also in Australia, with an anticipated commissioning in mid-2019. We are investigating the technology's potential expansion to other refineries around the world.

The water that results from residue filtration is recycled in the refining process, reducing the Kwinana refinery's fresh-water use by 1.2 gigaliters (317 million gallons) annually. We expect a reduction of more than 2.5 gigaliters (660 million gallons) annually at the Pinjarra refinery.



Pinjarra filtration system

## Residue Management

We continue to focus on key elements of management and governance that are necessary to maintain the overall integrity of our residue storage areas. These include:

- A governance structure that provides global oversight with clearly defined location responsibilities;
- Globally mandated standards covering planning, design, construction and operations;
- Long-term strategic plans, known as master plans;
- Capital plans that match the master plans;
- Timely implementation of capital projects for mud and water storage;
- Qualified personnel in key roles, such as civil engineering oversight at each location;
- Review and assurance, such as peer reviews of residue storage area design and third-party audits/inspections;
- Risk management, with facilities in place to manage extreme events; and
- Emergency preparedness and response plans for unforeseen or extreme events.

We are continually reviewing and updating our procedures and plans to guide the safe and sustainable management of our bauxite residue storage. We also look to improve the technologies we use to store the residue.

All of our newly constructed bauxite residue storage areas now include a composite base seal and an underdrain system to increase the rate that water drains from the residue, increasing the residue's density and strength and reducing the hydrostatic pressure on the base seal. The use of dry stacking at some locations further improves this process, and residue filtration is the next step in improving overall efficiency and safety.

## Residue Reuse

Our collaboration with external organizations and universities on residue reuse opportunities continued in 2018.

Through Alcoa Foundation, we are supporting research at three universities that is focused on using bauxite residue in the manufacture of cement, helping reduce that industry's GHG emissions and use of non-renewable raw materials. In 2018, this research advanced to the pilot plant stage, where we are looking to produce typical pre-cast concrete products for longer-term durability testing. In parallel, we are working with the International Aluminium Institute to identify potential pathways for the adoption of bauxite residue in cement production and use.



We are also continuing to explore opportunities around the potential use of the residue's coarse sand component as a construction material or general fill in Western Australia.

## Closure and Rehabilitation

As with residue reuse, we are supporting collaborative projects aimed at improving the surface rehabilitation of storage areas once residue is no longer being deposited.

The IAI is coordinating a project titled "In Situ Remediation" that will build upon previously observed associations between geochemical and physical properties and microbial community composition and function across bauxite residue storage areas. Until now, the role of microbial communities in neutralizing bauxite residue has been overlooked, as these communities have been assumed to be passive responders rather than active remediation agents.

We are supporting the project by providing access to a series of lysimeters at one of the closed residue storage areas at our Kwinana refinery. Similar to a small pond, the lysimeters are allowing larger-scale field assessment and modelling of the most promising chemical, physical and biological remediation processes that have been developed over the past two years in laboratory trials.



Lysimeters

## Spent Pot Lining

Spent pot lining is the carbon and refractory lining left from retired smelting pots.

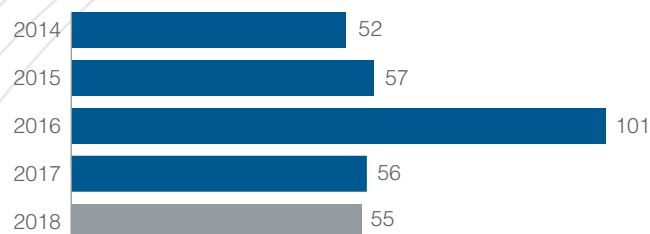
Our approach to managing spent pot lining is to first minimize the volume we generate by focusing on reduction at the source via process optimization, which increases the lifespan of our smelting pots. This reduces the amount of required re-linings and replacements.

We have been a leader in finding ways to transform our spent pot lining into a raw material or fuel source for other industries. For example, the cement industry uses spent pot lining as both a fuel and raw material. It also can be used as a raw material in the production of steel and a fuel source in the manufacture of rockwool insulation.

We recycle and/or reuse SPL in accordance with applicable country-specific requirements.

## SPENT POT LINING RECYCLED/REUSED

Percent of spent pot lining generated



Increased recycling in 2016 was the result of a focused effort to decrease the amount of spent pot lining in storage at several locations. Decrease in 2017 was primarily the result of reduced recycling of stored spent pot lining inventory.

## Coproducts and By-products Reuse

In addition to bauxite residue and spent pot lining, we are actively seeking alternative uses for our other [coproducts](#) and [by-products](#) to avoid their disposal. These products include carbon, electrolytic bath and secondary aluminas.

Our long-term goal is to optimize our portfolio of economically viable placement opportunities for by-product materials (from waste to value) by 2020 and define specific objectives to be achieved by 2025 and 2030.

In 2018, we added fly ash to our portfolio of core products. We also broadened our engagement with the cement industry to evaluate further additions to our product offerings.

We use a three-tiered classification for our coproducts and by-products:

- Commercial: Materials sold as a commercial product;
- Transition: Materials that have some limited commercial viability or can be placed with a user to derive a better financial outcome than landfilling; and
- Disposal: Materials that are typically landfilled or paid to dispose.

Our secondary minerals team sold 140,420 metric tons of coproducts and by-products that we made available for sale in 2018, generating US\$13.2 million in margin.

# WATER

Throughout the world, our facilities rely on a sustainable supply of water.

Our refineries are the largest users of water within our operations followed by our casthouses. In some countries, such as Canada, Iceland, Norway and in parts of the United States, water is plentiful and even powers some of our smelters via hydroelectric dams. The situation is markedly different for our operations in Western Australia, where the drying climate is a challenge. In Brazil, we manage our water use to account for high seasonal variation in rainfall.

In 2018, our freshwater consumption intensity was 13.8 cubic meters of water per metric ton of primary aluminum produced, which was a 2.2 percent increase compared to 2017. Our total freshwater consumption during the year was 70.4 million cubic meters, an increase over prior year primarily due to aluminum capacity restarts.

Our strategic long-term goal is to define and implement a program focused on enhancing water-use efficiency at locations in water-scarce areas by 2020 and define specific water-use reduction targets for 2025 and 2030.

The first step in achieving this goal was to enhance our understanding of the water-related risks at our operating locations. In 2018, we evaluated previous work to assess these risks and updated the assessment using the World Resources Institute's [Aqueduct tools](#). We further refined the risk assessment qualitatively to consider items such as local applicable requirements and local supply/demand needs.

The output from the risk assessment process will guide us through discussions with those locations in water-scarce areas, with emphasis on reduction opportunities. For 2019, our objective will be to develop targets aimed at managing water-related risks at these locations.

We also reviewed and updated our internal water reporting guidelines to align with the Minerals Council of Australia's [Water Accounting Framework](#) and [new reporting guidelines](#) from the International Council on Mining & Metals.

We encourage all locations, even those in water-rich areas, to look for ways to reduce consumption and discharge, use secondary sources of water, and increase recycling and other opportunities through advanced technologies and process improvements.

Our Kwinana refinery in Western Australia, for example, has reduced its fresh water use by 1.2 giga-liters (317 million gallons) annually through an innovative technology called residue filtration. We expect an additional reduction of more than 2.5 giga-liters (660 million gallons) annually once the technology is operational at our Pinjarra refinery. (See the [Waste](#) section.)

## FRESHWATER CONSUMPTION INTENSITY

*Cubic meters of water per metric ton of primary aluminum produced*



*Freshwater consumption reflects only fresh water used to directly manufacture products. It excludes rainwater to encourage reuse of alternative sources and large volume, once-through water usage from our energy facilities. The intensity data represent the combined impact of refining, smelting, casting and rolling operations indexed to metric tons of primary aluminum production (refining is included at a ratio of 1.9 metric tons of alumina to 1.0 metric tons of smelted aluminum). Data changes from prior reporting are due to improved accuracy around water balances and measurements.*

## FRESHWATER CONSUMPTION

*Million cubic meters*



*Data exclude rainwater and non-contact cooling waters. Data changes from prior reporting are due to improved accuracy around water balances and measurements.*

## 2018 WATER BALANCE—ALL LOCATIONS

Million cubic meters

	Water Withdrawn				Water Discharged				Net Consumption (Water withdrawn minus water discharged)
	Category 1	Category 2	Category 3	Total	Category 1	Category 2	Category 3	Total	
Surface Water	38.4	667.3	13.0	718.7	666.3	2.3	7.8	676.4	42.3
Groundwater	0.7	12.4	1.9	15.0	2.7	0.2	0.8	3.7	11.3
Seawater	0.0	0.0	63.7	63.7	13.3	3.1	69.1	85.5	(21.8)
Produced Water	0.2	2.9	2.5	5.6	0.0	0.0	0.0	0.0	5.6
Third-party Water	10.4	2.8	1.3	14.5	0.1	0.0	0.0	0.1	14.4
Other	0.0	0.0	0.0	0.0	19.5	1.7	29.9	51.1	(51.1)
<b>Total</b>	<b>49.7</b>	<b>685.4</b>	<b>82.4</b>	<b>817.5</b>	<b>701.9</b>	<b>7.3</b>	<b>107.6</b>	<b>816.8</b>	<b>0.7</b>

Category 1 water is of a high quality and may require minimal and inexpensive treatment (e.g., disinfection and pond settlement of solids) to raise the quality to appropriate drinking water standards.

Category 2 water is of a medium quality with individual constituents encompassing a wide range of values. It would require a moderate level of treatment (e.g., disinfection, neutralization, and removal of solids and chemicals) to meet appropriate drinking water standards.

Category 3 water is of a low quality with individual constituents encompassing high values of total dissolved solids, elevated levels of dissolved metals or extreme levels of pH. It would require significant treatment to remove dissolved solids and metals, neutralize and disinfect to meet appropriate drinking water standards.

Produced water is water entrained in ore. Other includes evaporation and entrainment.

## 2018 WATER BALANCE—LOCATIONS IN WATER-STRESSED AREAS

Million cubic meters

	Water Withdrawn				Water Discharged				Net Consumption (Water withdrawn minus water discharged)
	Category 1	Category 2	Category 3	Total	Category 1	Category 2	Category 3	Total	
Surface Water	6.8	6.7	12.1	25.6	0.2	0.0	0.0	0.2	25.4
Groundwater	0.5	6.3	1.9	8.7	0.0	0.2	0.8	1.0	7.7
Seawater	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	(0.1)
Produced Water	0.0	2.6	2.5	5.1	0.0	0.0	0.0	0.0	5.1
Third-party Water	1.1	2.3	1.3	4.7	0.0	0.0	0.0	0.0	4.7
Other	0.0	0.0	0.0	0.0	8.1	0.4	29.8	38.3	(38.3)
<b>Total</b>	<b>8.4</b>	<b>17.9</b>	<b>17.8</b>	<b>44.1</b>	<b>8.3</b>	<b>0.7</b>	<b>30.6</b>	<b>39.6</b>	<b>4.5</b>

Data are for our Alumar refinery in São Luís, Brazil, La Coruña cashhouse in Spain, and the Huntly mine, Kwinana refinery, Pinjarra refinery, Wagerup refinery and Willowdale mine in Australia. Produced water is water entrained in ore. Other includes evaporation and entrainment.



# EMISSIONS

The manufacturing process used at an Alcoa location determines the types of air emissions.

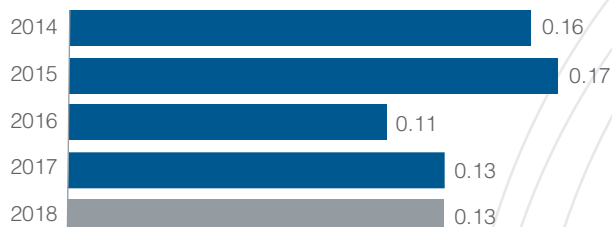
To better manage our air emissions, we develop internal guidelines that support our environmental management system and compliance with applicable emissions and air-quality regulations.

Most GHG, sulfur dioxide and fluoride emissions come from our smelting operations, while our refineries account for the majority of our mercury emissions. (See the [Climate Protection](#) section for a discussion on GHGs.)

We continue to work with each business unit to minimize releases cost-effectively, especially where global environmental challenges are guiding us to expedite actions necessary to reduce our environmental impacts.

## MERCURY EMISSIONS INTENSITY

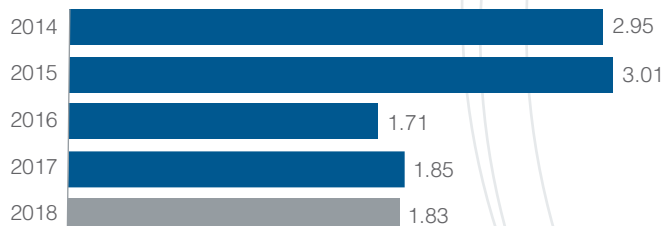
Grams per thousand metric tons of alumina produced



The intensity decline in 2016 is due to the closure of the Suralco refinery. The increase in 2017 is the result of higher levels of naturally occurring mercury within the bauxite we consume and process upsets at one refinery.

## MERCURY EMISSIONS

Thousands of kilograms



The decline in 2016 is due to the closure of the Suralco refinery.

## FLUORIDE EMISSIONS INTENSITY

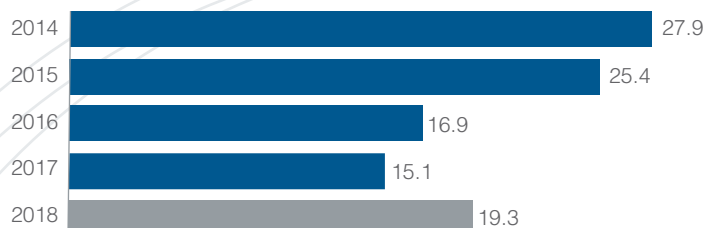
Kilograms per metric ton of primary aluminum produced



Data are for electrolysis operation only. Data changes from prior reporting are due to replacing estimated data with actual data at one site.

## NITROGEN OXIDE EMISSIONS

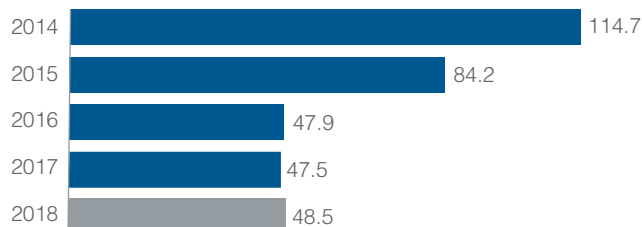
Thousands of metric tons



The significant decline in 2016 was due to facility curtailments. The increase in 2018 was due to increased generation at the Warrick Power Plant.

## SULFUR DIOXIDE EMISSIONS

Thousands of metric tons



The significant decline in 2016 was due to facility curtailments. The increase in 2018 was due to increased generation at the Warrick Power Plant.

## VOLATILE ORGANIC COMPOUNDS EMISSIONS

Metric tons



The increases in 2016, 2017 and 2018 were due to additional production of rolled aluminum products within permitted emission levels.

## Fugitive Emissions

Fugitive emissions, such as dust, are generally defined as those that are not emitted or released from a chimney, stack or vent.

Controls we use to manage or minimize fugitive emissions from our mining and process operations include:

- Watering haul roads and bauxite residue areas, using binders on storage piles and incorporating vegetative covers where possible to minimize windblown dust;
- Using weather forecasts to help guide decisions regarding the use of additional controls during periods of unfavorable weather conditions; and
- Implementing capture and control systems for loading/unloading, material handling, aluminum reduction and other process operations.

We frequently employ visual-emission observation and ambient-air monitoring as tools to verify the effectiveness of these controls.

## Related Information

[Climate Protection](#)

# FACILITY STEWARDSHIP AND TRANSFORMATION

Our approach to asset management covers the entire life cycle of a facility, including ongoing stewardship and end-of-life transformation that follows established plans. Throughout each stage, we consider it imperative to engage with stakeholders to ensure their input and the social agenda are taken into consideration.

We spent US\$107 million on stewardship and transformation projects at 46 locations around the world in 2018.

## 2018 TRANSFORMATION SPEND

Millions of U.S. dollars

Activity	Spend
Environmental Remediation	25
Demolition at Closed Locations	35
Mine Reclamation	27
Closure of Bauxite Residue Areas at Closed Locations	11
Spent Pot Lining Disposal at Closed Locations	6
Landfill Closure	3
<b>Total</b>	<b>107</b>

Includes reserve and expense spend.

Many were at non-operating locations that were once operated by us or a predecessor. The remaining projects were at operating locations or sold facilities with retained environmental responsibility.

Alcoa Foundation plays an important role in our facility transformation, providing funding to local non-governmental organizations to help impacted communities. In 2018, for example, the foundation invested US\$150,000 in projects focused on education and community enhancements in Suriname.

## Remediation Approach

As science and technology advance, we adapt our manufacturing practices to minimize their impact on the environment. However, some of our historical operating practices, which were legal and acceptable in their time, require attention today. We are committed to remediating the sites that employed such practices so they can be repurposed to benefit the local community.

# CASE STUDY

## Feeding Bodies and Minds in Suriname



Schoolchildren with their garden

In rural Suriname, school gardens bursting with vegetables are feeding not only the students' bodies but also their minds.

A \$100,000 grant from Alcoa Foundation to nonprofit Stichting Projekta supported the creation of gardens ranging from 16 to 24 square meters (19 to 29 square yards) at five schools. Other covered costs included securing a water supply for each garden and repairing or supplying necessary infrastructure, such as greenhouses.

Students take an active role in growing crops that include eggplant, cabbage, beans, okra, peppers, tomatoes and more. The harvested vegetables are

served at school cookouts and sent home with the students, many of whom come from financially challenged families.

The grant also supported the development of an educational component that uses the garden for lessons on ecological gardening, basic school subjects like math and science, and life skills. Teachers in each community received training on the lessons, which also are available to community organizations that manage the school gardens.

Due to the success of the project, several schools have extended their gardens using Alcoa Foundation funds.



The primary objective of any remediation project is the protection of human health and the environment. As part of this, we must first collect sufficient information using sound scientific assessments to understand the nature of the environmental condition. We also work to identify remedial solutions that are protective, feasible and compatible with current or likely future use of the facility. This requires us to address the often-challenging objective of balancing multiple needs, desires and expectations within Alcoa, the community and regulatory authorities while keeping good science and constructability as key drivers in selecting a remedial approach.

## Closed Facilities

Whenever we close a facility, we work closely with relevant stakeholders to develop a transformation strategy with a goal of reuse or redevelopment.

Some facilities can be repurposed with few changes. Others may require remediation, major modification or even demolition before the site can be reused.

A major focus of our work in 2018 continued to be decommissioning and remediating the 575-hectare (1,421-acre) Point Henry complex in Victoria, Australia, which closed in 2014. We worked with the community and other stakeholders to craft the [Point Henry 575 Concept Master Plan](#), which was released in September 2017. The plan envisions a mixed-use redevelopment with numerous types of residential, commercial and recreational subdivisions.

We had completed a substantial portion of the decommissioning work by the end of 2018. We removed and recycled approximately 60,000 metric tons of metals and 50,000 metric tons of other materials, and we processed approximately 285,000 cubic meters of concrete for reuse on the site. We also completed studies that are needed to identify and define potential environmental issues, and we are progressively submitting our remediation plans.

At our 150-megawatt coal-fired power station in Anglesea, Australia, which closed in 2015, we substantially completed asbestos abatement and demolition work in 2018. This included removing 13.5 kilometers (8.4 miles), or 30 percent, of the high-tension power line that connected the power station to the Point Henry complex. As part of this process, we are rehabilitating the right-of-way property, terminating the easements and turning over the land with no restrictions to the various owners. We also progressed against major earthmoving activities within the mine as we work to finalize closure plans.

During 2018, the Victorian Department of Environment, Land, Water and Planning (DELWP) continued to harvest winter water flows from the Anglesea River and stored the water in one of our Anglesea site's former ash ponds. DELWP distributed this water as needed over the summer to maintain the river's flow in order to mitigate impacts from naturally occurring acid soil within the adjacent national park.

In Suriname, we continued discussions with the national government regarding the creation of a potential industrial park that would use the infrastructure, port and utilities from our closed Suralco alumina refinery. Many of the initial potential tenants would process Suriname's resources, such as timber, into higher-value products, helping create jobs and a tax base in the area.

At our closed Massena East smelter in New York, USA, we removed the smelting equipment from the six potrooms. We also worked with the St. Lawrence Regional Development Authority and the New York Power Authority to help market the site to potential businesses. In 2018, a data management firm began investing in operating infrastructure under a lease at our former smelter buildings, with plans for up to 150 technical jobs.

In December 2017, we signed an agreement to transfer our closed Portovesme smelter in Italy to Invitalia, an economic development arm of the Italian government. Invitalia was successful in finding a new operator, and that company purchased the site and began restarting the facilities in 2018. We expect to complete our soil remediation work at the site in 2019.

We completed smelter demolition at our Fusina, Italy, location in 2018 and expect to complete soil remediation work in 2019. In Poços de Caldas, Brazil, we completed the decommissioning of the smelting equipment and will begin demolishing the smelter buildings in 2019.

## Operating Facilities

In Lake Charles, Louisiana, USA, we completed the remediation of a waste pile that had been generated by prior site operations. We removed 41,885 metric tons of brick, coke and impacted soil for disposal at a permitted landfill. We backfilled and vegetated the area, and the state agency subsequently approved the project completion report.

At our idled refinery in Point Comfort, Texas, USA, we installed a modified groundwater collection system adjacent to a bauxite residue disposal area. The collection system's ongoing operation will improve the remediation of impacted subsurface groundwater conditions.

## Environmental Responsibilities

During 2018, we continued to remove residual contaminated soil, treat groundwater, maintain closed landfill covers, and monitor surface water and groundwater systems at facilities we no longer owned but have retained remediation obligations.

At closed bauxite residue storage areas in St. Croix, U.S. Virgin Islands, and the U.S. state of Illinois, we maintained stormwater conveyance channels, monitored and maintained the vegetative cover, and repaired access roads and other erosion-impacted features to ensure the remedy cover remains compliant with requirements. We received a final No Further Action Determination letter from the U.S. Virgin Island Department of Planning and Natural Resources for the St. Croix site, officially completing our activities at that location.

We finished a complex negotiation with the state of Texas and Glencore Ltd. in 2018 to resolve liabilities associated with the 2017 bankruptcy of Sherwin Alumina, which operated the Sherwin alumina refinery and associated Copano bauxite residue storage facility near Corpus Christi, Texas. We previously owned these facilities but were required to divest them as part of the Reynolds acquisition in 2000.

As a result of the negotiations, we now have full ownership of the Copano facility. This comprises 4,480 hectares (11,070 acres) of land, including 1,355 hectares (3,349 acres) of residue storage areas.

We view this facility as a regional asset and are in discussions with various parties to attempt to reuse and repurpose the residue storage areas and related infrastructure. In 2018, we invested in numerous projects to secure the location and bring it into operating compliance.

At several other locations around the world, we continued to monitor groundwater systems to assess natural attenuation of contaminant plumes. We provided periodic reports to governmental agencies on our progress toward eventual closeout.

## Sustainable Land Use

For our large land holdings, some of which provide a buffer for our operations and others that contain reserves that will be extracted over time, we seek and support sustainable uses.

## Farming

We lease 6,032 hectares (14,905 acres) of our land at eight locations for farming. At our closed Frederick, Maryland, USA, location, for example, we have leased 434 hectares (1,072 acres) of land to the same farming family for more than 15 years for corn and other crops. Other farming operations produce apples, cherries, corn, hay and soybeans.

In Addy, Washington, USA, we grow alfalfa that the Washington Department of Fish and Wildlife harvests for the winter feeding of 7,000 elk and 200 bighorn sheep. We have grown and donated more than 900 metric tons of alfalfa annually since 2008.

## Livestock

At our Warrick operations in Indiana and closed operations in Rockdale, Texas, in the U.S., independent farmers maintain herds of hundreds of cattle. At the recently acquired Copano property, we own approximately 300 head of cattle. A small herd of cattle is also kept at our property in Blount County, Tennessee. At our Wagerup and Pinjarra refinery operations in Western Australia, our buffer lands are used by farmers to graze more than 6,000 head of cattle.

## Mineral Mining

At some locations, we have other mineral resources in addition to the coal or smelter-quality bauxite for which the lands were obtained. We work with third-party consultants and miners to evaluate and sustainably mine these resources.

In Bauxite, Arkansas, USA, we have contracted with a company to mine hard rock for the construction and cement industries. Two other companies are mining bauxite resources primarily used to produce proppants for the hydraulic fracking process.

## Water

At a number of locations, we hold significant water rights that benefit not only our operations but also the community. In Rockdale, Texas, USA, we provide water to a public water company that supplies communities near this closed location. Where we have dams, we proactively work to manage water and reservoir levels to enable recreation and fishing.

# ENVIRONMENTAL COMPLIANCE

Wherever we are located, our operations adhere to all applicable environmental laws and regulations and, in certain cases, meet our more stringent internal standards.

Our Compliance Committee comprises leaders from internal audit, ethics and compliance, legal, and environment, health and safety. It oversees EHS compliance-related matters to ensure that any non-conformance obtains the appropriate level of oversight based on its risk level. We also conduct a quarterly compliance review that includes our chief executive officer, chief financial officer and general counsel.

Our robust environmental compliance tracking system ensures we rapidly correct actual and potential incidents. We also use a review process to ensure that environmental permit applications, draft permits and final permits are effectively reviewed and submitted in accordance with regulatory requirements.

We encourage reporting of all deviations, no matter how small, so we can continuously improve our compliance management system.

In 2018, we more formally integrated environmental compliance assessments into our risk-based EHS assessment process. We conduct these assessments based on operational risks, and each is customized to a location's current needs and challenges. The assessment team, which is composed of internal and/or external subject matter experts, works collaboratively with locations to review and address challenges.

We also actively engage in regulatory rulemaking at all levels of government. We accomplish this via regional aluminum associations and industry partnerships on common industry issues at various regulatory levels, including federal, provincial and local, and through direct communication with state and local governments. Our objective is to work collaboratively with regulatory authorities so that the outcome of major rulemaking meets the needs of society.

As part of our regulatory development process, we monitor risks and potential business impacts. This process includes assessing the timeframe available to contribute to a regulatory development so we can appropriately engage stakeholders involved with the rulemaking process.

## Spills

In 2018, we experienced a major spill at our Kwinana Refinery in Australia. The spill consisted of approximately 150,000 liters (39,626 gallons) of a mud/sand slurry. The release occurred when a piece of scale became lodged in a pipe, which caused localized wear and ultimately created a hole within the pipeline. The spill was contained to the pipeline corridor, and the impacts were limited to the area directly under and around the corridor.

We cleaned up the area in accordance with regulatory requirements, and we initiated an environmental assessment to confirm there were no material environmental impacts. The assessment will be completed in 2019.

### SPILLS

	Spills over 20 Liters	Major Spills
2014	329	0
2015	330	1
2016	249	0
2017	235	0
2018	323	1

*We require any uncontained spill or release of oils, process liquids or solids in excess of 20 liters with an environmental impact to be reported internally as an incident regardless of whether they are required to be reported to external agencies. We define major spills as those meeting the criteria for a major environmental incident designation in the Alcoa Environmental Incident Management System, which includes spills that have the potential to cause significant harm to the environment. Increase in spills greater than 20 liters in 2018 was the result of a campaign to increase reporting transparency.*



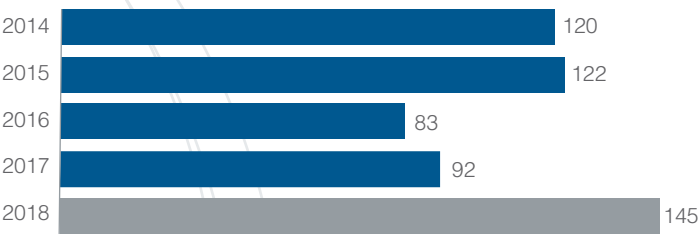
# Environmental Capital Expenditures

Our annual environmental capital expenditures vary based on the number and type of projects implemented. In 2018, we invested US\$145 million in projects that primarily focused on improving bauxite residue management.

For any capital expenditure request exceeding US\$2 million, including those not focused on environmental projects, members of our corporate environmental staff conduct a review to ensure that the work incorporates best practices and the final project will minimize additional environmental impact.

## ENVIRONMENTAL CAPITAL EXPENDITURES

Millions of U.S. dollars





# Appendix

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# 2018 AWARDS AND RECOGNITION

## Global

**Dow Jones Sustainability World and North American Indices**

**Bronze Class Sustainability Award 2018—RobecoSAM**

**One of the Most Admired Metals Company in the World—Fortune Magazine**

**Gold Supplier—EcoVadis**

**2019 Bloomberg Gender Equality Index**

**Constituent Company in the FTSE4Good Index Series**

## Australia

**Employer of Choice for Gender Equality (16th consecutive year)—Workplace Gender Equality Agency**

Alcoa of Australia

**Bronze Tier Employer (fifth consecutive year)—Pride in Diversity, Australian Workplace Equality Index**

Alcoa of Australia

**Golden Gecko Award for Environmental Excellence (merit award)—Department of Mines, Industry Regulation and Safety**

Alcoa of Australia (in partnership with Murdoch University)

**Community Partnership Resources Sector Award (merit award)—Department of Mines, Industry Regulation and Safety**

Alcoa of Australia (in partnership with Munda Biddi Trail Foundation)

**Network Leader of the Year—Pride in Diversity, Australian LGBTI Inclusion Awards**

Mark Hodgson, Pinjarra Refinery Manager

**Volunteer Employer Recognition Award (gold category)—Department of Fire and Emergency Services**

Willowdale Bauxite Mine

## Brazil

**One of the Most Sustainable Companies in Brazil (10th year)—Exame Magazine**

Alcoa in Brazil

**Brazil National Gold Award—Brazilian Congress of Health and Safety at Work**

Alumar Refinery, São Luís

**Best Work Award (bauxite, alumina and primary aluminum category)—Aluminum Association of Brazil**

Alumar Refinery, São Luís

**Human Being Award for Adolescent Health (human development category)—Brazilian Association of Human Resources**

Alumar Refinery, São Luís

**Chico Mendes Award (socio-environmental action category)—Chico Mendes Socio-environmental Research and Responsibility Institute**

Alumar Refinery, São Luís

**Best Security Case Study in Brazil, Best Security Case Study in the Northeast and Golden Case Study in Risk Management (for the “Integrated Risk Management to Prevent Serious Injuries and Fatalities” case study)—Proteção Magazine**

Alumar Refinery, São Luís

**Mineral and Metallurgical Excellence Award—Minérios & Minerais Journal**

Juruti Mine

**6th Development Networks Award (honorable mention)—Pará State Industry Federation**

Juruti Mine

## Canada

**Grand Prize (industry category)—2018 Québec Consulting Engineering Awards**

Baie-Comeau Smelter



## Hungary

**Top 100 Lovable Workplaces—Dreamjobs**

Alcoa in Hungary

## United States

**Region 10's Howard Orlean Excellence in Site Re-Use  
Award—U.S. Environmental Protection Agency**

Alcoa Corporation

**Indiana Manufacturers Hall of Fame Inductee—Indiana  
Manufacturing Association**

Warrick Operations, Indiana

# GLOBAL REPORTING INITIATIVE

## CONTENT INDEX

This index helps readers compare the information from our sustainability report, annual report and website with the [Global Reporting Initiative GRI Standards](#).

This report has been prepared in accordance with the GRI Standards: Core option.

### GRI 102 GENERAL DISCLOSURES 2016

	Description	Location
Organizational Profile		
102-1	Name of the organization	Alcoa Corporation
102-2	Activities, brands, products, and services	<a href="#">What We Do</a> <a href="#">Value Creation Process</a> <a href="#">Products</a> <a href="#">Recycling</a>
102-3	Location of headquarters	Pittsburgh, Pennsylvania, USA
102-4	Location of operations	<a href="#">Locations</a> <a href="#">Corporate Overview</a>
102-5	Ownership and legal form	Formed in 2016 under the laws of the State of Delaware, Alcoa Corporation is a publicly traded company listed on the New York Stock Exchange (NYSE: AA)
102-6	Markets served	<a href="#">What We Do</a>
102-7	Scale of the organization	<a href="#">Annual Report</a> <a href="#">Corporate Overview</a>
102-8	Information on employees and other workers	<a href="#">Our People</a>
102-9	Supply chain	<a href="#">Supply Chain</a>
102-10	Significant changes to the organization and its supply chain	<a href="#">Annual Report</a> <a href="#">Quarterly Reports</a> <a href="#">Periodic Reports</a> <a href="#">News Releases</a> <a href="#">Supply Chain</a>
102-11	Precautionary Principle or approach	Alcoa supports the precautionary principle. Consistent with that principle, we advocate a risk-based approach to our operations through our extensive management systems.
102-12	External initiatives	<a href="#">Reporting and Materiality</a>
102-13	Membership of associations	<a href="#">Stakeholder and Community Engagement</a>
Strategy		
102-14	Statement from senior decision-maker	<a href="#">From the CEO</a>
Ethics and Integrity		
102-16	Values, principles, standards, and norms of behavior	<a href="#">Alcoa Values</a> <a href="#">Human Rights Policy</a> <a href="#">Code of Conduct</a> <a href="#">Ethics and Compliance</a>

Description		Location
Ethics and Integrity		
102-17	Mechanisms for advice and concerns about ethics	<a href="#">Ethics and Compliance Integrity Line</a>
Governance		
102-18	Governance structure	<a href="#">Board of Directors</a> <a href="#">Board Committees</a>
102-19	Delegating authority	<a href="#">Safety, Sustainability and Public Issues Committee</a> <a href="#">Audit Committee</a>
102-20	Executive-level responsibility for economic, environmental, and social topics	Alcoa's CEO, who reports to and is a member of the Board of Directors, has ultimate responsibility for economic, environmental and social topics.  The chief financial officer is responsible for economic topics, and the vice presidents for environment, health and safety, sustainability and human resources have responsibility for environmental and social topics.
102-21	Consulting stakeholders on economic, environmental, and social topics	<a href="#">Safety, Sustainability and Public Issues Committee</a> <a href="#">Stakeholder and Community Engagement</a>
102-22	Composition of the highest governance body and its committees	<a href="#">Board of Directors</a> <a href="#">Board Committees</a>
102-23	Chair of the highest governance body	<a href="#">2019 Proxy Statement</a> (page 17)  The chairman of the board at the end of 2018 was Michael G. Morris.
102-24	Nominating and selecting the highest governance body	<a href="#">Governance and Nominating Committee</a> <a href="#">2019 Proxy Statement</a> (pages 14-28)
102-25	Conflicts of interest	<a href="#">Governance and Nominating Committee</a> <a href="#">Corporate Governance</a> <a href="#">Related Person Transaction Approval Policy</a> <a href="#">Annual Report</a> (page 151) <a href="#">2019 Proxy Statement</a> (pages 29-30)
102-26	Role of highest governance body in setting purpose, values, and strategy	<a href="#">Board of Directors</a> <a href="#">Safety, Sustainability and Public Issues Committee</a> <a href="#">Audit Committee</a> <a href="#">Officers</a>
102-27	Collective knowledge of highest governance body	<a href="#">Safety, Sustainability and Public Issues Committee</a> <a href="#">Audit Committee</a>
102-28	Evaluating the highest governance body's performance	<a href="#">2019 Proxy Statement</a> (pages 29-36)  The Board of Directors annually assesses the effectiveness of the full board, the operations of its committees and the contributions of directors.
102-29	Identifying and managing economic, environmental, and social impacts	<a href="#">Safety, Sustainability and Public Issues Committee</a> <a href="#">Audit Committee</a>
102-30	Effectiveness of risk management processes	<a href="#">Opportunities, Challenges and Risks</a> <a href="#">2019 Proxy Statement</a> (pages 33-34) <a href="#">Safety, Sustainability and Public Issues Committee</a>
102-31	Review of economic, environmental, and social topics	Alcoa Corporation's Board of Directors and its committees review impacts, risks and opportunities at regularly scheduled board/committee meetings five to six times annually.



Description		Location
Governance		
102-32	Highest governance body's role in sustainability reporting	Alcoa Corporation's Board of Directors does not have an active role in the report's development. Senior leaders are responsible for the report's content.
102-33	Communicating critical concerns	<p>Stockholders and employees can communicate any concerns to Alcoa's Board of Directors through:</p> <ul style="list-style-type: none"> <li>• Regular mail, addressed to Chairman of the Board, c/o Alcoa Corporation, Corporate Secretary's Office, 201 Isabella Street, Suite 500, Pittsburgh, PA 15212-5858, USA;</li> <li>• Regular mail, addressed to Audit Committee, c/o Alcoa Corporation, Corporate Secretary's Office, 201 Isabella Street, Suite 500, Pittsburgh, PA 15212-5858, USA;</li> <li>• <a href="#">Integrity Line</a>;</li> <li>• Stockholder resolutions;</li> <li>• Stockholder recommendations for director nominees;</li> <li>• Shareholder nominations from the floor of the annual meeting; and</li> <li>• Union representation or work councils.</li> </ul>
102-34	Nature and total number of critical concerns	<a href="#">Stakeholder and Community Engagement</a>
102-35	Remuneration policies	<a href="#">2019 Proxy Statement</a> (pages 26-28 and 43-77)
102-36	Process for determining remuneration	<a href="#">2019 Proxy Statement</a> (pages 26-28 and 43-77)
102-37	Stakeholders' involvement in remuneration	<a href="#">2019 Proxy Statement</a> (pages 26-28 and 43-77)
102-38	Annual total compensation ratio	<p>We report the global ratio only.</p> <p><a href="#">2019 Proxy Statement</a> (pages 76-77)</p>
Stakeholder Engagement		
102-40	List of stakeholder groups	<a href="#">Stakeholder and Community Engagement</a>
102-41	Collective bargaining agreements	<a href="#">Annual Report</a> (page 20)
102-42	Identifying and selecting stakeholders	<a href="#">Stakeholder and Community Engagement</a>
102-43	Approach to stakeholder engagement	<a href="#">Stakeholder and Community Engagement</a>
102-44	Key topics and concerns raised	<a href="#">Stakeholder and Community Engagement</a>
Reporting Practice		
102-45	Entities included in the consolidated financial statements	<p><a href="#">Annual Report</a></p> <p>All entities included in the consolidated financial statements are included in the sustainability report. Page 82 explains the principles of consolidation, and page 157 includes a list of significant subsidiaries.</p>
102-46	Defining report content and topic Boundaries	<a href="#">Reporting and Materiality</a>
102-47	List of material topics	<a href="#">Reporting and Materiality</a>
102-48	Restatements of information	Found throughout the report.
102-49	Changes in reporting	Changes in reporting from prior year are indicated throughout the report
102-50	Reporting period	2018
102-51	Date of most recent report	2017
102-52	Reporting cycle	Annual

	Description	Location
Reporting Practice		
102-53	Contact point for questions regarding the report	Rosa Garcia Piñero Vice President, Sustainability <a href="mailto:Sustainability@alcoa.com">Sustainability@alcoa.com</a>
102-54	Claims of reporting in accordance with the GRI Standards	This report has been prepared in accordance with the GRI Standards: Core option.
102-55	GRI content index	<a href="#">Global Reporting Initiative Index</a>
102-56	External assurance	<a href="#">Reporting and Materiality</a> <a href="#">First Environment Limited Assurance Verification Statement</a>

## MATERIAL TOPICS

Disclosure	Description	Location
GRI 201: Economic Performance 2016		
201-1	Direct economic value generated and distributed	<a href="#">Shared Value Creation</a>
201-2	Financial implications and other risks and opportunities due to climate change	<a href="#">Climate Protection</a>
201-3	Defined benefit plan obligations and other retirement plans	<a href="#">Annual Report</a> (pages 117-125)
GRI 302: Energy 2016		
302-1	Energy consumption within the organization	<a href="#">Energy</a>
302-2	Energy consumption outside of the organization	<a href="#">Energy</a>
302-3	Energy intensity	<a href="#">Energy</a>
302-4	Reduction of energy consumption	<a href="#">Energy</a>
302-5	Reductions in energy requirements of products and services	<a href="#">Products</a> <a href="#">Climate Protection</a> <a href="#">Recycling</a>
GRI 303: Water and Effluents 2018		
303-3	303-3: Water withdrawal	<a href="#">Water</a>
303-4	303-4: Water discharge	<a href="#">Water</a>
303-5	303-5: Water consumption	<a href="#">Water</a>
GRI 304: Biodiversity 2016		
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	<a href="#">Biodiversity and Mine Rehabilitation</a>
304-2	Significant impacts of activities, products, and services on biodiversity	<a href="#">Biodiversity and Mine Rehabilitation</a>
304-3	Habitats protected or restored	<a href="#">Biodiversity and Mine Rehabilitation</a>
304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	<a href="#">Biodiversity and Mine Rehabilitation</a>
GRI 305: Emissions 2016		
305-1	Direct (Scope 1) GHG emissions	<a href="#">Climate Protection</a>
305-2	Energy indirect (Scope 2) GHG emissions	<a href="#">Climate Protection</a>
305-3	Other indirect (Scope 3) GHG emissions	<a href="#">Climate Protection</a>
305-4	GHG emissions intensity	<a href="#">Climate Protection</a>

Disclosure	Description	Location
GRI 305: Emissions 2016		
305-5	Reduction of GHG emissions	<a href="#">Climate Protection</a> <a href="#">Recycling</a>
305-6	Emissions of ozone-depleting substances (ODS)	We use halon gas as a fire suppressant in several locations throughout the world, and we are phasing out these remaining systems as they expire or are used.
305-7	Nitrogen oxides (NO <sub>x</sub> ), sulfur oxides (SO <sub>x</sub> ), and other significant air emissions	<a href="#">Emissions</a>
GRI 306: Effluents and Waste 2016		
306-2	Waste by type and disposal method	<a href="#">Waste</a>
306-3	Significant spills	<a href="#">Environmental Compliance</a>
GRI 403: Occupational Health and Safety 2018		
403-1	Occupational health and safety management system	<a href="#">Safety and Health</a>
403-2	Hazard identification, risk assessment, and incident investigation	<a href="#">Safety and Health</a>
403-3	Occupational health services	<a href="#">Safety and Health</a>
403-5	Worker training on occupational health and safety	<a href="#">Safety and Health</a>
403-6	Promotion of worker health	<a href="#">Safety and Health</a>
403-9	Work-related injuries	<a href="#">Safety and Health</a>
403-10	Work-related ill health	<a href="#">Safety and Health</a>
GRI 413: Local Communities 2016		
413-1	Operations with local community engagement, impact assessments and development programs	<a href="#">Stakeholder and Community Engagement</a>

## MINING AND METALS SECTOR SUPPLEMENT DISCLOSURES

MM1	Amount of land (owned or leased, and managed for production activities or extractive use) disturbed or rehabilitated	<a href="#">Biodiversity and Mine Rehabilitation</a>
MM2	The number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place	<a href="#">Biodiversity and Mine Rehabilitation</a>
MM3	Total amounts of overburden, rock, tailings, and sludges and their associated risks	<a href="#">Waste</a> <a href="#">Biodiversity and Mine Rehabilitation</a>
MM4	Number of strikes and lock-outs exceeding one week's duration, by country	There was one lockout in Canada and one strike in Australia in 2018.
MM5	Total number of operations taking place in or adjacent to indigenous peoples' territories, and number and percentage of operations or sites where there are formal agreements with indigenous peoples' communities	<a href="#">Biodiversity and Mine Rehabilitation</a>
MM6	Number and description of significant disputes relating to land use, customary rights of local communities and indigenous peoples	<a href="#">Stakeholder and Community Engagement</a>



## MINING AND METALS SECTOR SUPPLEMENT DISCLOSURES

MM7	The extent to which grievance mechanisms were used to resolve disputes relating to land use, customary rights of local communities and indigenous peoples, and the outcomes.	<a href="#">Stakeholder and Community Engagement</a>
MM8	Number (and percentage) of company operating sites where artisanal and small-scale mining takes place on, or adjacent to, the site; the associated risks and the actions taken to manage and mitigate these risks.	Due to the minimal artisanal and small-scale mining on Alcoa sites worldwide, there is not a formal corporate policy. Action is taken on a case-by-case basis.
MM9	Sites where resettlements took place, the number of households resettled in each, and how their livelihoods were affected in the process	No resettlements took place in 2018.
MM10	Number and percentage of operations with closure plan	<a href="#">Facility Stewardship and Transformation</a>

# SAFETY PERFORMANCE DATA

An extensive update of our safety data to account for incident reclassifications and other factors has resulted in changes from prior reporting.

## FATALITIES

Employees/all contractors

	Global	Australia	Europe	North America	South America
2014	<b>0/1</b>	0	0	0/1	0
2015	<b>2/1</b>	0/1	0	2/0	0
2016	<b>0/1</b>	0	0	0	0/1
2017	<b>0/3</b>	0	0/1	0	0/2
2018	<b>0</b>	0	0	0	0

## FATALITIES BY GENDER

Employees and all contractors

	Male	Female	Total
2014	1	0	<b>1</b>
2015	3	0	<b>3</b>
2016	1	0	<b>1</b>
2017	3	0	<b>3</b>
2018	0	0	<b>0</b>

## FATAL AND SERIOUS INJURIES/ILLNESSES

Employees and all contractors

	FSI Actuals (Events resulting in a fatal or serious injury/illness)	FSI Potentials (Near-miss events)	Total FSI Events
2014	14	789	<b>803</b>
2015	5	698	<b>703</b>
2016	5	300	<b>305</b>
2017	5	433	<b>438</b>
2018	3	421	<b>424</b>

Data changes from prior reporting are due to recordkeeping audits and injury classification reviews. A serious injury/illness is any incident that is life-threatening or life-altering.

## DAYS AWAY, RESTRICTED AND TRANSFER RATE

Employees and all contractors

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>0.34</b>	2.2	0.81	0.20	0.45	0.07
2015	<b>0.33</b>	2.2	0.46	0.29	0.39	0.09
2016	<b>0.29</b>	1.8	0.49	0.15	0.26	0.22
2017	<b>0.62</b>	1.8	0.85	0.53	0.82	0.23
2018	<b>0.65</b>		0.88	0.53	0.93	0.28

The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Days away, restricted and transfer rate includes lost workday cases plus cases that involve days of restricted duty and job transfer per 100 full-time workers.

## DAYS AWAY, RESTRICTED AND TRANSFER RATE

Employees and supervised contractors

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>0.48</b>	2.2	0.80	0.21	0.49	0.06
2015	<b>0.39</b>	2.2	0.43	0.29	0.41	0.15
2016	<b>0.34</b>	1.8	0.63	0.20	0.27	0.12
2017	<b>0.89</b>	1.8	1.07	0.60	1.06	0.32
2018	<b>0.90</b>		1.04	0.63	1.12	0.18

The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Days away, restricted and transfer rate includes lost workday cases plus cases that involve days of restricted duty and job transfer per 100 full-time workers.

## DAYS AWAY, RESTRICTED AND TRANSFER INCIDENTS BY GENDER

Employees and supervised contractors

	Male	Female	Total
2014	100	6	<b>106</b>
2015	72	2	<b>74</b>
2016	51	2	<b>53</b>
2017	120	10	<b>130</b>
2018	115	15	<b>130</b>

## DAYS AWAY, RESTRICTED AND TRANSFER RATE

Non-supervised contractors

	Global	Australia	Europe	North America	South America
2014	<b>0.16</b>	0.82	0.18	0.27	0.07
2015	<b>0.21</b>	0.55	0.28	0.33	0.06
2016	<b>0.20</b>	0.07	0.00	0.26	0.26
2017	<b>0.21</b>	0.30	0.32	0.10	0.20
2018	<b>0.35</b>	0.52	0.28	0.34	0.31

Because contractors not directly supervised by Alcoa maintain their own health and safety programs and are accountable for investigating incidents involving their employees, certain details associated with their internal investigations are not fully transparent to Alcoa.

## DAYS AWAY, RESTRICTED AND TRANSFER INCIDENTS BY GENDER

Non-supervised contractors

	Male	Female	Total
2014	23	4	<b>27</b>
2015	20	1	<b>21</b>
2016	16	1	<b>17</b>
2017	19	1	<b>20</b>
2018	35	4	<b>39</b>

## LOST WORKDAY RATE

Employees and all contractors

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>0.11</b>	1.0	0.37	0.02	0.09	0.00
2015	<b>0.12</b>	1.3	0.23	0.07	0.13	0.04
2016	<b>0.15</b>	0.8	0.31	0.08	0.11	0.12
2017	<b>0.25</b>	0.7	0.49	0.11	0.20	0.17
2018	<b>0.19</b>		0.35	0.08	0.20	0.11

The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Lost workday rate represents the number of injuries and illnesses resulting in one or more days away from work per 100 full-time workers.

## LOST WORKDAY RATE

Employees and supervised contractors

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>0.16</b>	1.0	0.41	0.00	0.09	0.00
2015	<b>0.14</b>	1.3	0.25	0.03	0.11	0.12
2016	<b>0.19</b>	0.8	0.40	0.10	0.13	0.12
2017	<b>0.31</b>	0.7	0.59	0.11	0.25	0.19
2018	<b>0.12</b>		0.21	0.00	0.17	0.11

The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Lost workday rate represents the number of injuries and illnesses resulting in one or more days away from work per 100 full-time workers.

## LOST WORKDAY INCIDENTS BY GENDER

Employees and supervised contractors

	Male	Female	Total
2014	33	2	<b>35</b>
2015	26	0	<b>26</b>
2016	29	1	<b>30</b>
2017	42	4	<b>46</b>
2018	34	1	<b>35</b>

## LOST WORKDAY RATE

Non-supervised contractors

	Global	Australia	Europe	North America	South America
2014	<b>0.05</b>	0.27	0.09	0.11	0.00
2015	<b>0.09</b>	0.18	0.19	0.22	0.00
2016	<b>0.08</b>	0.07	0.00	0.06	0.12
2017	<b>0.14</b>	0.24	0.11	0.05	0.16
2018	<b>0.12</b>	0.21	0.00	0.17	0.11

Because contractors not directly supervised by Alcoa maintain their own health and safety programs and are accountable for investigating incidents involving their employees, certain details associated with their internal investigations are not fully transparent to Alcoa.

## LOST WORKDAY INCIDENTS BY GENDER

Non-supervised contractors

	Male	Female	Total
2014	8	1	<b>9</b>
2015	9	0	<b>9</b>
2016	6	1	<b>7</b>
2017	13	1	<b>14</b>
2018	12	2	<b>14</b>

## TOTAL RECORDABLE INCIDENT RATE

Employees and all contractors

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>1.12</b>	4.0	1.85	0.57	1.83	0.35
2015	<b>1.12</b>	3.8	1.33	0.79	1.61	0.37
2016	<b>1.11</b>	3.2	1.43	0.78	1.38	0.48
2017	<b>1.56</b>	2.9	1.97	1.16	2.38	0.47
2018	<b>1.55</b>		2.21	1.24	2.23	0.57

The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Total recordable incident rate includes days away, restricted and transfer cases plus cases that involve days of medical treatment or other recordables per 100 full-time workers.



## TOTAL RECORDABLE INCIDENT RATE

Employees and supervised contractors

	Global	U.S. Manufacturing Average	Australia	Europe	North America	South America
2014	<b>1.58</b>	4.0	1.93	0.59	2.06	0.33
2015	<b>1.35</b>	3.8	1.26	0.80	1.83	0.34
2016	<b>1.39</b>	3.2	1.61	0.96	1.54	0.46
2017	<b>2.19</b>	2.9	2.23	1.30	3.03	0.64
2018	<b>2.13</b>		2.50	1.54	2.61	0.43

The 2018 Bureau of Labor Statistics U.S. manufacturing industry average was not available at the time this report was published. Total recordable incident rate includes days away, restricted and transfer cases plus cases that involve days of medical treatment or other recordables per 100 full-time workers.

## TOTAL RECORDABLE INCIDENTS BY GENDER

Employees and supervised contractors

	Male	Female	Total
2014	327	22	<b>349</b>
2015	245	12	<b>257</b>
2016	198	20	<b>218</b>
2017	292	29	<b>321</b>
2018	274	35	<b>309</b>

## TOTAL RECORDABLE INCIDENT RATE

Non-supervised contractors

	Global	Australia	Europe	North America	South America
2014	<b>0.52</b>	1.64	0.55	0.87	0.37
2015	<b>0.67</b>	1.52	0.76	0.65	0.38
2016	<b>0.59</b>	0.91	0.21	0.70	0.49
2017	<b>0.61</b>	1.31	0.75	0.46	0.41
2018	<b>0.82</b>	1.55	0.46	1.01	0.61

Because contractors not directly supervised by Alcoa maintain their own health and safety programs and are accountable for investigating incidents involving their employees, certain details associated with their internal investigations are not fully transparent to Alcoa.

## TOTAL RECORDABLE INCIDENTS BY GENDER

Non-supervised contractors

	Male	Female	Total
2014	79	8	<b>87</b>
2015	62	4	<b>66</b>
2016	47	3	<b>50</b>
2017	55	4	<b>59</b>
2018	85	7	<b>92</b>

# FIRST ENVIRONMENT LIMITED

## ASSURANCE VERIFICATION STATEMENT

### Verification Statement

**Alcoa Corp**  
201 Isabella Street  
Pittsburgh, PA 15212

First Environment performed a verification of emissions sources contained in Alcoa Corp's (Alcoa) 2018 GHG Inventory, as represented to First Environment in "\_Final\_2018\_GHG\_Inventory\_rev1.xlsx" and "Final\_2018\_Scope 3\_Inventory\_rev1.xlsx" and Alcoa's total energy consumption as represented to First Environment in "\_Final\_2018\_GHG\_Inventory\_rev1.xlsx." The GHG Inventory and associated energy consumption total were prepared by representatives of Alcoa and submitted to First Environment for assessment.

The scope of the GHG Inventory is as shown in Table 1:

**Table 1: Alcoa's GHG Inventory Scope**

<b>Organizational Boundaries</b>	Operational/Financial Control
<b>Geographic Boundaries</b>	Global
<b>Operational Boundaries</b>	Scope 1, 2, and 3 emissions
<b>Reporting Period</b>	EY2018
<b>Included Greenhouse Gases</b>	CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, PFCs, and SF <sub>6</sub>
<b>Included Metrics</b>	Total reported energy consumption
<b>Reported Scope 1 and 2 Emissions</b>	25,187,382.63 tCO <sub>2</sub> e*
<b>Reported Energy Consumption</b>	180,015,127.1 GJ 42,050,196.85 MWh

\*Reported Scope 2 emissions are quantified using "location-based" methods and "market-based" methods where supplier-specific emissions factors are available.

The specific Scope 3 emission categories, sources, and total emissions reported by Alcoa are shown in Table 2:

**Table 2: Alcoa's Scope 3 GHG Assertion Details**

<b>Emissions Category</b>	<b>Included Scope 3 Emission Sources</b>	<b>Reported Emissions (tCO<sub>2</sub>e)</b>
Category 1: Purchased Goods and Services	Goods purchased in excess of 40,000 MT	2,992,303
Category 3: Fuel and Energy Related Activities	Includes purchased fuels for all Alcoa business units that are available in the Alcoa Global Environmental Metrics Systems. Excludes upstream emissions from electricity generation.	1,568,919
Category 5: Waste Generated in Operations	Emissions from waste disposal at third-party landfills by mining, refining, and smelting business units	22,019
Category 6: Business Travel	Business travel (air) for all employees in North America, Europe (excluding Iceland), Brazil, and Australia	6,684
Category 9: Downstream transportation and distribution	Truck and rail transportation for North American locations	81,028
Category 10 – Processing of Sold Products	Transformation of third-party sales of bauxite, alumina, and primary aluminum products into intermediate products	33,352,804

Reported Scope 3 emissions are comprised of emissions of CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O.

All reported emissions are quantified using the global warming potentials from the IPCC Fourth Assessment Report.

## Verification Statement

### Verification Objectives

The primary objective of the verification process is to provide Alcoa with an independent opinion of veracity of the GHG and energy consumption data presented in its GHG Inventory for the emission year 2018. Based on this statement, Alcoa is seeking a confirmation that the 2018 GHG Inventory is in conformance with the specified criteria and accurate relative to specified materiality thresholds for the purposes of assuring internal confidence for voluntary public reporting.

### Reporting and Verification Criteria

The GHG inventory was prepared and assessed using the following criteria prepared by Alcoa Corp:

- Basis of Preparation & Procedures, Alcoa Corp 2018 Energy Consumption and Greenhouse Gas Emissions (Scope 1 and Scope 2), 11 February 2019
- 2018 Basis of Preparation & Procedures Scope 3 Emissions, 5 March 2019

As informed by:

- The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Ed.) including Required Greenhouse Gases in Inventories, Accounting and Reporting Standard Amendment, February 2013 and GHG Protocol Scope 2 Guidance, 2015
- The Aluminium Sector Greenhouse Gas Protocol (Addendum to the WRI/WBCSD Greenhouse Gas Protocol), October 2006
- Corporate Value Chain (Scope 3 standard) Accounting and Reporting Standard (WRI WBCSD), September 2011
- Technical Guidance for Calculating Scope 3 Emissions, a companion document to the Scope 3 Standard, Version 1.0, 2013

The verification was performed consistent with ISO 14064, Part 3: *Specification with guidance for the validation and verification of greenhouse gas assertions*.

First Environment and Alcoa agreed upon the following definition of materiality for the verification engagement:

- A material misstatement is a discrepancy in total Scope 1 and 2 emissions of greater than five percent.
- A material misstatement is a discrepancy in total reported energy consumption of greater than five percent.
- A material misstatement is a discrepancy greater than ten percent in any Scope 3 emissions category.

### Verification Methods

The verification process consisted of a strategic review of the entire inventory, followed by review of a risk-based sample of historical evidence of source emissions estimates. Interviews with staff responsible for data collection and the administration of centralized data management systems conducted during previous verification activities for Alcoa and at a site visit to Alcoa's corporate headquarters in Pittsburgh, Pennsylvania during the current verification process also informed First Environment's emissions assessments. The effectiveness of the data management system and its controls were tested through assessment of database outputs and tracing of reported activity data to physical records. The results of these evaluations were used in the preparation of First Environment's estimates of Alcoa's emissions. First Environment's estimates were compared against Alcoa's total reported emissions and energy consumption considering both the GHG Inventory's conformance to the requirements of the criteria, as well as its overall accuracy.

### Level of Assurance

The level of assurance for the verification was to provide limited assurance of the assertions' accuracy and adherence to specified reporting criteria.

The procedures performed in a limited assurance engagement are less in extent than, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

## Verification Statement

### Verifier Independence

First Environment was not responsible for preparation of any part of the GHG inventory. First Environment confirms that we are not aware of any issue that could impair our objectivity in relation to this verification engagement.

### Conclusion

Based on the results of the verification activities performed, except for the effect of the matter described in the Qualified Conclusion section of our report, First Environment concludes, with limited assurance, that no evidence was identified to suggest reported emissions in Alcoa's 2018 GHG inventory as represented in "\_Final\_2018\_GHG\_Inventory\_rev1.xlsx" and "Final\_2018\_Scope 3\_Inventory\_rev1.xlsx" and Alcoa's total energy consumption as represented to First Environment in "\_Final\_2018\_GHG\_Inventory\_rev1.xlsx" are not materially correct.

This verification statement is provided on the Twelfth of April, Two-thousand and nineteen.

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A handwritten signature in blue ink, appearing to read "Michael M. Carim".

Michael M. Carim, Lead Verifier

A handwritten signature in black ink, appearing to read "Phillip Ludvigsen".

Phillip Ludvigsen, Independent Internal Reviewer



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