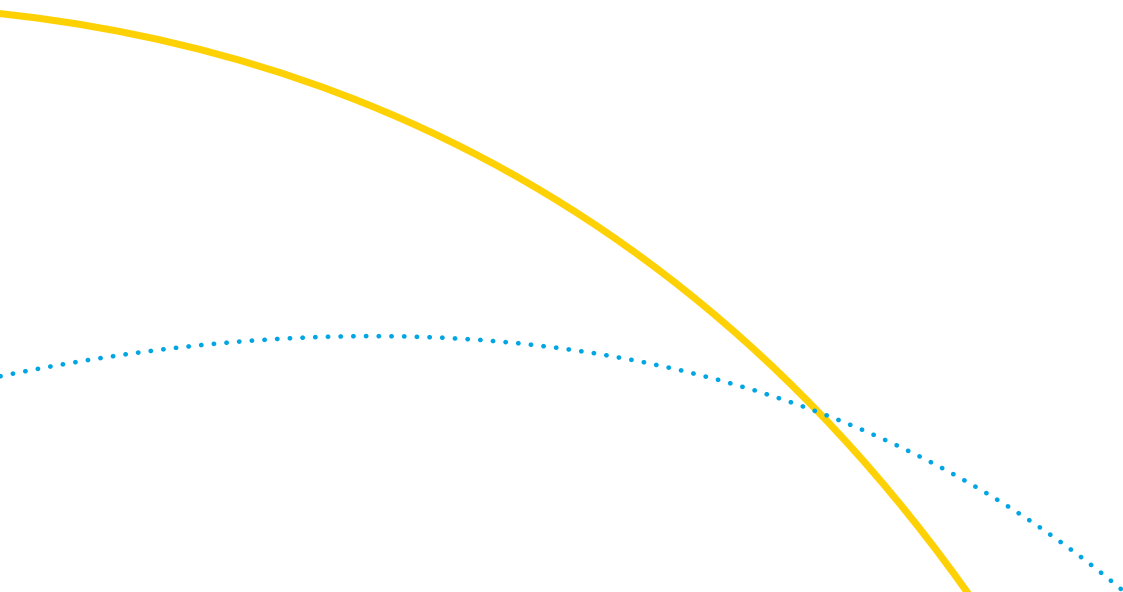




## 2019 Sustainability Report



## Forward-looking statements

This report contains “forward-looking statements” within the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. These forward-looking statements are based on management’s reasonable expectations and assumptions as of the date of this report. Actual performance may differ materially from projections and estimates expressed in the forward looking statements because of many factors not anticipated by management including the risk factors described in the Company’s Form 10-K for its fiscal year ended September 30, 2018. The Company disclaims any obligation or undertaking to disseminate any updates or revisions to any forward-looking statements contained in this report to reflect any change in the Company’s assumptions, beliefs or expectations or any change in events, conditions, or circumstances upon which any such forward-looking statements are based.



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# S U S T A I N A B I L I T Y 2 0 1 9



## Grow

**responsibly through sustainability-driven opportunities that benefit our customers and our world.**

We help customers improve their sustainability performance through higher productivity, better quality products, reduced energy use, and lower emissions.



## Conserve

**resources and reduce environmental footprints through cost-effective improvements.**

We set aggressive environmental performance goals for greenhouse gases, energy, water, and our fleet, and we measure progress to continually improve our own operations.



## Care

**for our employees, customers and communities—protecting our license to operate and grow.**

We are building a culture of safety, simplicity, speed, and self-confidence. Our goal is zero accidents and zero incidents. We are committed to developing our people, supporting our communities, engaging suppliers and upholding our integrity.





# Chairman, President and CEO Message

“Our higher purpose is to create a company where people feel they belong, and their contributions are recognized and valued. A company that promotes collaboration among people of different cultures and backgrounds. A company that is committed to sustainability and supportive of the communities in which we operate. A company that our people want to work for, where they are proud to be part of the innovative process to solve the energy and environmental challenges facing the human race.”



Grounded in the themes of “**Grow, Conserve, Care,**” Sustainability is at the core of what we do as a business. Air Products’ 16,000 people around the world are focused on delivering excellent financial and operating performance, improving the environment and our customers’ sustainability, building an inclusive and collaborative culture, and supporting the communities where we live and work. Through their actions every day, they are fulfilling our higher purpose.

Within this Sustainability Report for 2019, you will learn of the progress we have made on that journey. We have already achieved many of our 2020 Sustainability Goals and continue to make progress on others, as we prepare to establish new goals to be achieved.

I am honored to share some of the highlights with you in this letter.

## Grow

Through our mega-project in Jazan, Saudi Arabia; our first gasification project in Lu’An, China; state-of-the-art industrial gas facility in Kochi, India; additional capacity added to our world’s largest hydrogen pipeline and supply network on the Gulf Coast in the United States; multiple supply contracts for key gases for Samsung plants around the world; and increased capabilities at our liquefied natural gas heat exchanger manufacturing facility in Florida in the U.S. – we continue to “Grow.”

As part of our growth goal, we have targeted a contribution of over 50% of our earnings from sustainable offerings. I am pleased to report that in 2018, we exceeded that goal with a result of 54%.

At the same time, we continually look for new and improved ways of doing business. We established new Technology Centers in Pune, India and the Dhahran Techno Valley Science Park, Saudi Arabia. We also upgraded our Asia Technology Center in the Zhangjiang Hi-Tech Park in Shanghai, China. At these Technology Centers and throughout the world, we will continue to seek advances in order to provide excellent service to our customers.



Grow • Conserve • Care  
**SUSTAINABILITY**

## Conserve

The products we produce are aimed at benefitting the environment, from our innovative and, in many cases, world-leading proprietary technologies, to the way we produce our products and make our customers' processes better. Our products improve environmental performance and energy efficiency and help to annually avoid tens of millions of metric tons of carbon emissions in manufacturing processes and in the products our customers produce.

Our products in 2018 enabled customers to avoid 55 million metric tons of carbon dioxide (CO<sub>2</sub>) – equivalent to the emissions from 12 million cars – and almost double our own direct and indirect CO<sub>2</sub> emissions.



Through our energy efficiency and water conservation programs, we have conserved two million MWh of energy and 5.6 billion gallons of water. These results are good for the environment and our bottom line as they represent \$60 million in costs avoided.

## Care

**Safety:** This is the foundation of everything we achieve as a team. We believe we have a moral responsibility to protect each other's well-being, as well as that of our customers and our communities. Of course, words without action are just words, and I am very proud to report that we have improved our employee lost-time injury rate by 71% and our employee recordable injury rate by 50% between 2014 and 2018. While this is excellent performance, we know that the only acceptable goal is zero accidents or incidents.

In 2017, we added "most diverse" to our company's goal. During the past year we were named to the DiversityInc Top 50 and Noteworthy Company lists, recognizing top companies for diversity and inclusion management. We once again earned a perfect score for LGBTQ workplace equality on the Corporate Equality Index. We will continue our work and focus on this goal, building our inclusive culture.

We remain committed to the communities where we have operations, be it through the responsible operation of our facilities and care of the environment, through our philanthropic efforts, or individual volunteer actions of our employees. In this report you will read how our employees have worked with My Brother's Keeper in the U.S. to showcase careers and job opportunities; filled a children's hospital ward with color in Spain; spent time working with a local orphanage providing clothing and installing solar lights in Pune, India; and turned our 60th anniversary of operations in the UK into a community volunteer effort. There are many noteworthy goodwill actions in the communities where we operate.





As we grow in Asia, so do our community efforts and during 2018, we received "Community Care" and "Best Social Responsibility" awards in China. We were also again named to the 100 Best Corporate Citizens list. Additionally, EcoVadis honored us with a gold medal for our Corporate Social Responsibility efforts, and we were recognized by the Dow Jones Sustainability Index. It is encouraging when others recognize our focus on sustainability and the progress we are making.

We know we have more work to do, and I want to sincerely thank all of our employees for their commitment and motivation to always move us forward in sustainability. Please take some time to learn more about us in the following pages, and as always, we appreciate your interest in our company.

Seifi Ghasemi  
Chairman, President and Chief Executive Officer of Air Products

# 2018 Progress on our Sustainability Goals

In 2016, Air Products set sustainability goals across all aspects of our **Grow-Conserve-Care** sustainability framework. This process was aligned with the identification of our sustainability priorities and engagement with key stakeholders. In 2018, we continued to make good progress against these goals:





Grow	Air Products' 2020 Goal	2018 Status
Economic Performance 	LEAD the industrial gas industry in PROFITABILITY as measured by EBITDA margin, operating margin and ROCE	EBITDA margin*: 34.9% Operating margin*: 21.7% ROCE*: 11%
Customer Sustainability 	ENABLE customers to AVOID CO <sub>2</sub> EMISSIONS while CONTRIBUTING >50% of REVENUES from sustainable offerings	CO <sub>2</sub> e avoided: 55 MM MT Revenues from sustainable offerings: 54%
Ethics & Integrity 	REQUIRE 100% of employees to be trained in and certified to Air Products' Employee CODE OF CONDUCT and ensure all allegations of misconduct are reviewed and closed	Training and certification: 100%
Compliance 	CONTINUOUSLY IMPROVE COMPLIANCE systems and performance	Enhanced governance systems

\*Adjusted





Grow • Conserve • Care  
**SUSTAINABILITY**

Conserve	Air Products' 2020 Goal	2018 Status
Energy Savings 	SAVE ENERGY by reducing use intensity by 2.5% for ASUs and 1.5% for HyCOs (from 2015 baseline)	ASUs: 2.0% reduction HyCOs: 0.9% reduction
GHG Reductions 	REDUCE GHG emissions intensity by 2% (from 2015 baseline)	1.5% reduction
Distribution Efficiency 	IMPROVE distribution efficiency and reduce CO <sub>2</sub> emissions intensity by 10% (from 2015 baseline)	16% improvement
Water Conservation 	CONSERVE WATER and lower use intensity by 5% (from 2015 baseline)	18% reduction

Care	Air Products' 2020 Goal	2018 Status
Safety 	LEAD the industrial gas industry in SAFETY as measured by recordable and lost-time incident rates	Recordable rate: 0.29 LTI rate: 0.07
Talent & Diversity 	BUILD the MOST DIVERSE and INCLUSIVE workforce in the industrial gas industry	Female share of workforce: 22%
Community Support 	ENHANCE our ability to measure the positive impacts of our EMPLOYEE and COMMUNITY ENGAGEMENT	\$6.9 million in cash and product donations
Supplier Sustainability 	ENSURE 100% of new supplier agreements include HUMAN RIGHTS and CONFLICT MINERALS clauses	Conflict Minerals clauses added to global terms and conditions

# Our Businesses

Air Products reported fiscal 2018 results under five segments:

- Industrial Gases—Americas
- Industrial Gases—EMEA (Europe, Middle East, and Africa)
- Industrial Gases—Asia
- Industrial Gases—Global
- Corporate and other

## Regional Industrial Gases

The regional Industrial Gases (Americas, EMEA, and Asia) segments produce and sell atmospheric gases such as oxygen, nitrogen, and argon (primarily recovered by the cryogenic distillation of air) and process gases such as hydrogen, carbon monoxide, helium, syngas, and specialty gases. We serve customers in many industries, including refining, chemical, gasification, metals, electronics, manufacturing, and food and beverage. We distribute gases to customers through a variety of supply modes, including liquid or gaseous bulk supply delivered by tanker or tube trailer and, for smaller customers, packaged gases delivered in cylinders and dewars or small on-sites (cryogenic or non-cryogenic generators). For large-volume customers, we construct an on-site plant adjacent to or near the customer's facility or deliver product from one of our pipelines.

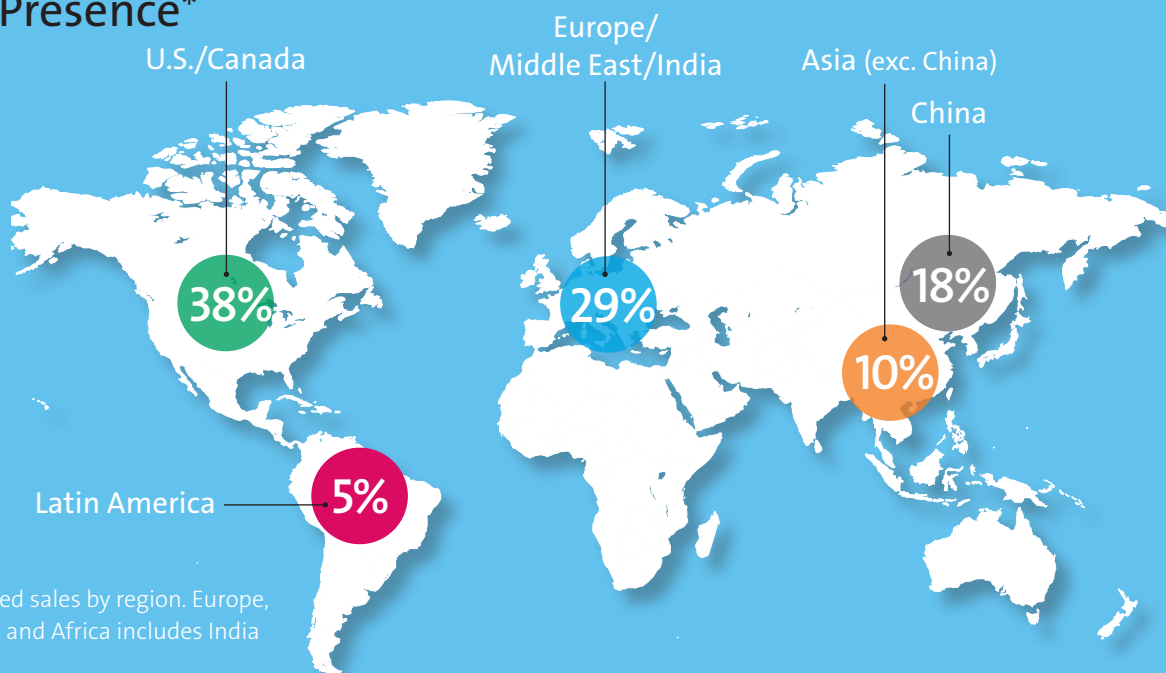
## Industrial Gases—Global

The Industrial Gases—Global segment includes atmospheric sale of equipment businesses, such as air separation units and noncryogenic generators, as well as global resources associated with the Industrial Gases business. The equipment is sold worldwide to customers in a variety of industries, including chemical and petrochemical manufacturing, oil and gas recovery and processing, and steel and primary metals processing. The Industrial Gases—Global segment also includes centralized global costs associated with managing all the Industrial Gases segments.

## Corporate and other

The Corporate and other segment includes three global equipment businesses: liquefied natural gas (LNG) sale of equipment and process technology, liquid helium and liquid hydrogen transport and storage containers, and turboexpanders and other precision rotating equipment.

## Global Presence\*



\*Consolidated sales by region. Europe, Middle East and Africa includes India



# Air Products FY '18



**\$8.9**  
billion in sales



**~\$45\***  
billion market cap



**1,800**  
miles of industrial  
gas pipeline



**~16,000**  
employees



**7+**  
decades in  
business



**750+**  
production  
facilities



**50**  
countries of  
operation



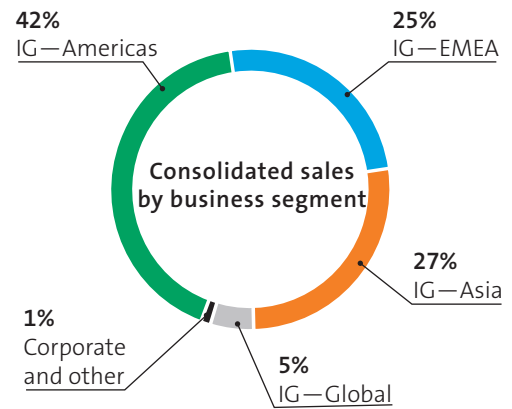
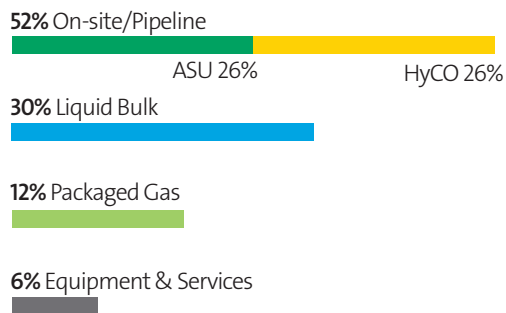
**170,000+**  
customers



**30+**  
industries served

*\*As of May 2019*

## Supply Modes





# Grow



# Grow responsibly through sustainability-driven opportunities that benefit our customers and the world

## Delivering Business Value: FY '18

**54%**

of revenues from sustainable offerings

**\$65**

million in R&D spending

**\$1.9**

billion in capital expenditure

**3,423**

patents

**\$60**

million in cumulative energy and water costs avoided

**55**

million metric tonnes of CO<sub>2</sub>e avoided by customers

**11%**

increase in EBITDA

**\$1.9**

billion adjusted operating income

**34.9%**

adjusted EBITDA margin

# Strategy, Opportunities and Risks

Our strategy focuses on creating value in the markets we serve, particularly energy, environmental and emerging markets. Providing our customers with innovative products and excellent service underpins our efforts. In serving our customers and making their operations more efficient and productive, we serve our higher purpose, which includes supplying products that benefit the environment in a more efficient and sustainable manner.

We supply industrial gases and related equipment that help our customers be more energy efficient and sustainable. Our oxy-fuel burners improve productivity for glass and metal manufacturers while reducing energy consumption and emissions. As the world’s largest supplier of hydrogen, we supply vast quantities of hydrogen to petroleum refiners to lower sulfur content and help in the making of cleaner-burning gasoline and diesel fuels, significantly reducing vehicle emissions. We are also a leader in hydrogen fueling infrastructure and are helping to build the hydrogen economy around the world. Furthermore, we remain a global leader in liquefied natural gas equipment, air separation plants, and hydrocarbon recovery and purification equipment.

At the same time, we are continually working to improve our own productivity

and reduce our impact on the environment consistent with our 2020 Sustainability Goals. Additional details on these goals and our progress are provided in the Conserve section of this report.

Over the past several years, our strategic Five-Point Plan has guided Air Products’ success. Our journey is never complete, and so we have taken the Five-Point Plan to the next phase of our journey to shape our growth in the coming years. This evolved Five-Point Plan is our roadmap for driving safety, inclusion, profitability and sustainability as we grow. The Five-Point plan consists of the following elements:

**Sustain the lead:** Our goal has not changed. We want to be the safest, most diverse and most profitable industrial gas company in the world, providing excellent service to our customers. To sustain this lead, we will keep our ultimate focus on safety. We also want to be best-in class operationally in everything that we do and will continue to drive productivity to maintain our margins.

**Deploy capital:** Over the next five years, we will have at least \$16 billion of capital to commit to high quality industrial gas projects. In fact, we have already committed over \$9 billion of this capital, which includes cash and debt capacity available today and the investable cash

flow we expect to generate. We are committed to managing our debt balance to maintain our current targeted A/A2 rating.

**Evolve portfolio:** We will continue to invest in our merchant business where we see good opportunities. Meanwhile, we are evolving our portfolio to more large, on-site projects, and we are creating step change growth opportunities through syngas/gasification and complex megaproject execution.

**Change culture:** We are continuing to drive our culture change, building a team that works together and wins together. This remains a strong focus for us – creating an environment where people feel included and respected, so they can give their best effort. We continue to improve our “4S” culture of safety, simplicity, speed and self-confidence.

**Belong and matter:** As we work hard every day to create value for our shareholders, we are also fulfilling our higher purpose – creating a work environment where people belong and matter, producing products that improve the environment and our customers’ processes, and promoting collaboration among people of different cultures and backgrounds all over the world.

## Five Point Plan: Moving Forward

Sustain the lead	Deploy capital	Evolve portfolio	Change culture	Belong and matter
<p>Safest, most diverse, and most profitable</p> <p>Best-in-class performance</p> <p>Productivity</p>	<p>Strategically invest significant available capacity</p> <p>Win profitable growth projects globally</p>	<p>Grow onsite portion</p> <p>Energy, environment and emerging markets</p>	<p>4S</p> <p>Committed and motivated</p> <p>Positive attitudes and open minds</p>	<p>Inclusion</p> <p>Enjoyable work environment</p> <p>Proud to innovate and solve challenges</p>





In 2018, our team continued to prove its ability to execute the largest and most complex projects in the history of our Company, successfully completing megaprojects around the world, including:

- Achieving mechanical completion of the [largest industrial gas complex in the world](#) in Jazan, Saudi Arabia. Under a joint venture (JV) of Air Products (25%) and ACWA Holding (75%), the facility is to supply 75,000 metric tons per day of gases (20,000 oxygen and 55,000 nitrogen) to Saudi Aramco's refinery and Integrated Gasification Combined Cycle power block. The Air Products team achieved mechanical completion of the world-scale complex without a lost time injury in 25 million worker hours, an exceptional accomplishment especially considering the remote location of the site and regional climate challenges.



- Inaugurating a new [world-scale industrial gas complex](#) within the Integrated Refinery Expansion Project (IREP) of the Bharat Petroleum Corporation Limited (BPCL) Kochi Refinery located in Kochi, India. The complex generates hydrogen, nitrogen, oxygen, and steam, and is an invaluable constituent of BPCL's IREP to manufacture auto-fuels complying with Euro-IV/Euro-V specifications. The industrial gases manufactured at the complex also enabled BPCL to increase its refining capacity by nearly two-thirds, from 190,000 to 310,000 barrels per day, while producing cleaner fuels through upgraded fuel specification. This industrial gas complex required more than 10 million worker hours to build and was done so without any safety incidents.
- Successfully starting-up Air Products' first-of-its-kind and [world-scale coal gasification project](#). Located in Changzhi City, Shanxi Province, China, the project supplies syngas and other industrial gases to Shanxi Lu'An Coal-based Clean Energy Co., Ltd.'s (Lu'An Clean Energy) syngas-to-liquids production. The project involves four large air separation units, four gasifiers and two syngas clean-up systems operating at full capacity. The gasifiers, which represent the largest pulverized coal gasifiers

adopting Shell's proven gasification technologies, have been delivering outstanding performance in feedstock input, gases output, carbon conversion rate and operational efficiency.

- Commissioning a [world-scale steam methane reformer \(SMR\)](#) in Baytown, Texas to supply hydrogen and carbon monoxide (CO) to Covestro and other customers linked to Air Products' Gulf Coast Hydrogen and CO pipeline networks. The SMR produces approximately 125 million standard cubic feet per day of hydrogen and a world-scale supply of carbon monoxide, a critical raw material for Covestro's chemical production in Baytown. The facility also offers other benefits to Air Products, other customers, and the public, increasing the production capacity of our well-established and world's largest hydrogen pipeline supply network while creating a product necessary to making cleaner burning transportation fuels.



**Air Products also pursued several strategic acquisitions in 2018.**

- We acquired Shell's [Coal Gasification technology and patents](#) and formed a strategic alliance with Shell for liquids (residue) gasification for refineries. These moves extend Air Products' offerings in synthesis gas (syngas) to provide turn-key sale-of-gas gasification facilities for solids (coal and biomass) and liquids (refinery residues), building on more than 40 years of Air Products' gasification experience. Air Products also announced it had signed an agreement to acquire General Electric Company's gasification business, which has an extensive track record of processing solid, liquid, gaseous, and blended feedstocks.
- Air Products acquired the [Rotoflow™ turboexpander business](#) of Baker Hughes, a GE company. This acquisition extends Air Products' existing world-scale industrial gas and liquefied natural gas (LNG) turboexpander capabilities into growing hydrocarbon, petrochemical and energy segments. It also supplements Air Products' history of designing and manufacturing over



1,600 high quality turboexpanders as an integral part of large industrial gas and LNG projects it has already executed.

- To expand our European carbon dioxide (CO<sub>2</sub>) position and strengthen our European Industrial Gas Business, Air Products announced a definitive agreement to purchase ACP Europe SA (ACP), the largest independent CO<sub>2</sub> business in Continental Europe. The transaction, which was completed in early 2019, complements Air Products' existing European CO<sub>2</sub> capabilities in core geographies where the company already provides industrial gases and includes a liquid carbon dioxide production unit in the northeast of France that is based on a renewable, bioethanol source.

- We also increased our capabilities for Engineering, Procurement and Construction (EPC) activities, completing our technology center in the Dhahran Techno Valley Science Park in Saudi Arabia and opening our new Engineering Center at Pune in Maharashtra, India. We also upgraded our Asia Technology Center in the Zhangjiang Hi-Tech Park in Shanghai, China.

Additional details about these centers and their positive impacts on sustainability are provided page 15 of this report.

While our strategy provides opportunities for Air Products' continued success and growth, the Company's economic performance may be affected by various risks, many of which are beyond our control. These risks are routinely reviewed by Company leaders and the Board of Directors, and auditable risks are included in the Company's Internal Audit program.



The risks, which are described in detail in our [2018 Annual Report](#), include but are not limited to:

- Changes in global and regional economic conditions, the markets we serve, or the financial markets may adversely affect the results of operations and cash flows.
- Our extensive international operations can be adversely impacted by operational, economic, political, security, legal, and currency translation risks that could decrease profitability.
- Regulations addressing, among other things, environmental compliance, import/export restrictions, antibribery and corruption, and taxes, can negatively impact the financial condition, results of operation, and cash flows.
- Interruption in ordinary sources of raw material or energy supply or an inability to recover increases in energy and raw material costs from customers could result in lost sales or reduced profitability.
- Catastrophic events could disrupt Air Products' operations or the operations of suppliers or customers, having a negative impact on business, financial results, and cash flows.
- Legislative, regulatory and societal responses to global climate change create financial risk.



## World's Largest Industrial Gas Complex Completed by a Team from Around the World and with Zero Lost-Time Injuries in 25 Million Worker Hours

### Milestone Achievements Demonstrate Megaproject Expertise and Capabilities

Air Products is proud of its earned reputation of successfully executing the engineering, building, and operating of large-scale projects for customers around the world.

In April 2015, Air Products announced it had been awarded a 20-year contract by Saudi Aramco, the world's largest company, under a JV of Air Products (25%) and ACWA Holding (75%) to build, own and operate the world's largest industrial gas complex to supply 75,000 metric tons per day (20,000 oxygen and 55,000 nitrogen) to Saudi Aramco's refinery and Integrated Gasification Combined Cycle being built in Jazan.

The Jazan Project, which is expected to be brought on-stream in phases in 2019, was executed by Air Products' major execution centers in the United Kingdom, United States, China and India, with active engagement of employees in Saudi Arabia. The now mechanically complete industrial gas complex took approximately three years to engineer, procure and construct. The Air Products team completed this work without a lost-time injury in 25 million worker hours. This was achieved while facing non-facility construction challenges including: the plant's location in the warmest place in the country, with mean maximum temperatures ranging from 40°C (104°F) in July to 31°C (88°F) in January; coastal lagoons bringing high humidity; extremely low rainfall of less than three inches per year; and a high prevalence of sand storms during summer months.

The project is significantly larger than anything executed by Air Products to date and required a massive internal and external recruitment effort to bring the construction workforce and others to the location, train them, and have them understand Air Products' benchmark standards for safety. The Jazan project effort required the hiring of new sub-contractors for almost all of the construction scope. At peak construction periods, a multi-national workforce from over 30 countries and totaling 6,000 people was at the site.



# Our Contributions to the UN Sustainable Developmental Goals

In 2015, the 193 UN member states, in collaboration with many organizations, developed the [Sustainable Development Goals \(SDGs\)](#). The 17 goals and 169 targets are aimed at achieving the following by 2030: ending poverty and hunger and promoting dignity, equality and a healthy environment; protecting the planet through sustainable consumption and production; managing resources, and taking action on climate change; ensuring that all human beings can

have prosperous and fulfilling lives as technology progresses in harmony with nature; fostering peaceful, just and inclusive societies that are free from fear and violence; and partnering with stakeholders to implement the goals.

Air Products has programs or products that align with most of the SDGs, though we are focusing activities on select goals where we can have the most impact, including SDGs 4 through 9.



## Grow

**Goal 8:** Promote inclusive and sustainable economic growth, employment and decent work for all

**Goal 9:** Build resilient infrastructure, promote sustainable industrialization and foster innovation

Our business strategy is focused on serving energy, environmental and emerging markets, which will continue to grow as population and infrastructure needs increase. Through our technologies and products, we support higher levels of economic productivity and resource efficiency. We offer competitive salaries and benefits that attract, motivate and retain the best talent.



## Conserve

**Goal 6:** Ensure access to water and sanitation for all

**Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all

We set aggressive goals to reduce our consumption of water and energy. In addition, our products enable clean energy and water, and improve energy efficiency for our customers. We are also investing in research and development to improve efficiencies and reduce environmental impact for our company and our customers.



## Care

**Goal 4:** Ensure inclusive and quality education for all and promote lifelong learning

**Goal 5:** Achieve gender equality and empower women and girls

For many years, Air Products has promoted Science, Technology, Engineering and Mathematics (STEM) educational programs through schools, workforce programs, and communities. Likewise, the Air Products Foundation has provided grants to charitable organizations serving educational needs in several industries we serve. Additionally, as part of our goal, we are committed to becoming the most diverse and inclusive industrial gas company.





## New Technology Centers Strategically Located in Emerging Markets

### Innovation Hubs Responsive to Customer Needs

One of the basic tenets of Air Products' "4S" philosophy is Speed. The ability to act with speed and to be innovative in response to customer needs was enhanced over the past year as Air Products announced, opened, or expanded technology centers in emerging markets around the world.

#### India

With our growing EPC activity, Air Products opened a world-class Engineering Center in Pune, India. The Pune Center provides technology and equipment for air separation, hydrogen generation and associated technologies for industrial gas applications. It acts as an EPC innovation hub for the company's operations in India and throughout the world.

India is one of the fastest growing economies and Air Products is keen to be part of unlocking and harnessing this market potential as part of its global growth strategy. The new technology center continues to expand Air Products' presence in the country by maintaining strong relationships with existing business and joint venture partners, and by forging strong relationships with key stakeholders in providing excellent service to customers.

This new center enhances and supports the development of solutions for the local market, in which Air Products has had a presence for nearly two decades. The center offers opportunities for talent from local communities, supporting the government's 'Skill India' campaign. At full capacity, the center is expected to employ 400 skilled engineers.

#### Saudi Arabia

Air Products has worked in Saudi Arabia since the 1970s and made long-term investments in the country since 2012 in conjunction with joint venture partners.

Now, Air Products has developed a world-class industrial gases technology center in the Dhahran Techno Valley to serve as its central hub in the Kingdom of Saudi Arabia and Middle East region. The Dhahran Techno Valley Science Park is a prestigious home for Air Products' center, which serves as the cornerstone for its industrial gas technology and project development in Saudi Arabia.

The investment is yet another example of the company's strong commitment to the Kingdom's future and development of its people. Once complete in 2019, the center will become the hub for Air Products to provide technology expertise in support of new opportunities for industrial gases, providing improvements in process safety, energy efficiency, reliability and operational excellence to serve regional customers.

It will also be a base for collaboration with regional universities and supporting other technical activities in the region.

#### China

Air Products upgraded its Asia Technology Center in the Zhangjiang Hi-Tech Park in Shanghai, China. Equipped with state-of-the-art research and development (R&D) capabilities, the Center supports the fast-paced development of the China and Asia markets through its advanced applications technologies.

The Center houses seven laboratories serving a wide range of high-growth markets, including environment, new energy, advanced electronics, food and beverage, chemicals and pharmaceuticals, and glassmaking.

The latest upgrade adds a food laboratory, which helps improve food quality and safety with [liquid nitrogen technologies](#) by simulating actual production; a water laboratory that makes wastewater and water treatment processes more efficient and environmentally-friendly through oxygen and ozone; and more advanced equipment for the welding, combustion, metals processing, [industrial cryogenics](#), and electronics packaging, assembly and testing laboratories.

Air Products was the first global industrial gas company to establish an internal R&D capability of its kind in China in 2005. The Asia Technology Center has gone through several expansion cycles and is one of the company's key technology centers in the world.

## Innovation and Technology

Bringing talented people together to innovate solutions for the challenges that face us, our customers, and our world is another facet of our higher purpose. Many of these challenges are related to sustainability, such as providing cleaner fuels, improving energy efficiency, reducing emissions, providing clean water and enabling quality foods.

We pursue a market-based approach to technology development through R&D, engineering, and commercial development. R&D is conducted principally at our technology centers in the United States (Trexlerstown, Pennsylvania), the United Kingdom (Basingstoke, Hersham and Carrington), Spain (Barcelona), China (Shanghai), India (Pune), and Saudi Arabia (Dhahran). Air Products also funds and cooperates in R&D programs conducted by major universities and undertakes research work funded by others, including the U.S. government.

Our research groups are aligned with and support the efforts of various company businesses. Development of technology for use within the Industrial Gases business focuses primarily on new and improved processes and equipment for the production and delivery of industrial gases and new or improved applications



for industrial gas products. During fiscal year 2018, Air Products increased the number of patents in its portfolio by 11%, and now owns approximately 535 United States (U.S.) patents, nearly 3,000 foreign patents, and was a licensee under certain patents owned by others.

### Some of our key innovation and technology successes for 2018 include:

#### Helping address a matter of **national energy importance** for The Netherlands.

The Netherlands has long sourced natural gas from its domestic Groningen Field; however, that extraction has resulted in seismic activity which now requires a switch to imported gas. Complicating the supply issue is that the imported natural gas is incompatible with the applications currently served by the domestic Groningen source. Air Products will build plants to supply nitrogen to condition the imported natural gas to the correct specification, making

it suitable for widespread use in the country. Air Products has been working in The Netherlands for 50 years, and its world-scale facilities play a critical role in the country's largest port, Rotterdam. These facilities support the efficient and economic operation of key manufacturing industries, including the production of hydrogen and oxygen that allow refineries to produce cleaner, low-sulfur fuels as well as hydrogen for fuel cell electric vehicles.

**Dedicating a new, state-of-the-art liquefied natural gas equipment test facility in Port Manatee, Florida.** As the world's leader in LNG technology and equipment, Air Products continues to innovate its coil wound heat exchangers, 116 of which have been deployed at LNG facilities throughout the world. The new equipment test facility will enable the development of the next generation of exchangers, which are vital to helping meet the world's increasing energy needs and desire for clean energy. Air Products provides technology and key equipment for the natural gas liquefaction process for large export plants, small and mid-sized LNG plants, floating LNG plants and LNG peak shavers. For example, Air Products has announced an agreement to provide its proprietary LNG technology, equipment, and related process license to Golden Pass Products LLC, a joint venture between Qatar Petroleum and ExxonMobil that will bring cleaner energy from Texas to the world. Our process and equipment were selected based on work done over a period of many months, with the culmination being the award in early 2019.



**Expanding our production of liquid hydrogen while supporting hydrogen-based fueling.** We are building a liquid hydrogen plant in La Porte, Texas that will produce approximately 30 tons per day, and a second liquid hydrogen production facility in California to meet increasing product demand from several customer markets, including the growing fleet of hydrogen fuel cell vehicles. We also signed cooperation and equipment supply agreements with Beijing Sinoscience Fullcryo Technology Co., Ltd. (Fullcryo) to accelerate the development of hydrogen infrastructure and support Fullcryo's first, and also China's first, commercial-scale liquid hydrogen-supplied fueling station. Liquid hydrogen-supplied fueling stations, which involve advanced gas storage and fueling technology, can bring added benefits, including higher throughput, lower energy consumption, and a relatively smaller footprint. This represents an important approach for large-scale hydrogen energy applications and a mainstream trend in the development of future transportation.

We also developed and acquired new technologies in 2018 that will help customers further improve their sustainability. These are described in the Customer Sustainability section of this report.



## Another Space First – Air Products Supplies NASA's InSight Launch to Mars

### Mission Support Continues Company's Six Decades of Space Travels

Involvement with first-ever U.S. space missions dates back 60 years, but 2018 recorded yet another successful mission by Air Products going to Mars – well, sort of.

In May, Air Products continued its long collaboration in providing vital industrial gases to NASA and the U.S. Space Program with the successful launch and first-ever mission to study the heart of the Red Planet. NASA's mission to Mars—Interior Exploration using Seismic Investigations, Geodesy and Heat Transport ([InSight](#))—launched from the West Coast's Space Launch Complex-3 at Vandenberg Air Force Base in California aboard a United Launch Alliance (ULA) Atlas V rocket, all with an assist from Air Products.

Air Products supplied vital industrial gases for ULA's Atlas V Rocket, which helped carry InSight on its journey to and arrival at Mars in November. Air Products supplied its proprietary helium pumping system, a one-of-a-kind in the industrial gas industry, which is key to the pressurization of helium, as well as the helium for the mission used for pressurization and purging of the fuel propellant tanks. Air Products also supplied liquid nitrogen for rocket instrument purging, and liquid oxygen as part of the overall rocket fuel mix.

InSight is part of NASA's Discovery Program, managed by the agency's Marshall Space Flight Center in Huntsville, Alabama. Air Products has supplied nitrogen at Huntsville for several decades. NASA has reported that InSight will be the first mission to peer deep beneath the Martian surface to help scientists understand how different its crust, mantle and core are from the Earth's. The mission will also focus on the Red Planet's heat output and listen for marsquakes, which are seismic events like earthquakes on Earth. Findings from the mission may help to gain a better understanding of how other rocky planets, including Earth, were and are formed.

Air Products in the U.S. has always been proud of its collaboration and support of NASA missions, and with this mission, global colleagues also celebrated the company's participation. The Mars mission has several European partners, including France's space agency, the Centre National d'Étude Spatiales, and Germany's DLR. Air Products has operations in France and Germany, among the more than 50 countries where it has industrial gas operations.

Air Products' long space travel history has also included fueling and providing technical services to NASA travels of the Orion, the Space Shuttle, Apollo, and earlier Mercury missions. Air Products remains heavily involved in supporting a growing number of space launches and missions of several independent companies.

Air Products' working relationship with NASA began in 1957 with the commissioning of an industrial gas plant in Ohio and has since included supplying NASA with liquid hydrogen and other industrial gases for advancing the U.S. Space Program. In addition to product supply to the space launches, Air Products also has had a long-term relationship with NASA's engine testing program at Stennis Space Center in Mississippi, Johnson Space Center in Texas, as well as Marshall Space Flight Center.



# Products that Benefit Our Customers Around the World

Air Products' gases, equipment and applications enable our customers and their downstream users to improve sustainability by increasing productivity, producing better quality products, reducing energy use and lowering emissions. We enabled 55 million metric tonnes of CO<sub>2</sub>e to be avoided in 2018 through several of the following products.

## Oxy-fuel Technology

Air Products' oxy-fuel combustion technologies are used in energy-intensive applications like cement, metals and glass manufacturing to increase production, lower fuel use and costs, reduce emissions and optimize efficiency. Air Products has been a leader in oxy-fuel technology since it was first introduced over 50 years ago and continues to help customers improve operations and efficiency through new burner designs and performance testing at our world-class [combustion laboratory](#) facilities.



## Biogas Membrane Separators

Biogas membrane separators are used to produce methane from farm waste, manure, or municipal waste. The proprietary hollow fiber membranes purify the biomethane by removing unwanted elements from the biogas stream, so it can be used to generate heat and power.



## Hydrogen

Hydrogen is used to refine heavier, sour crudes, increase refinery yields and reduce emissions through cleaner transportation fuels including ultra-low sulfur diesel fuel and hydrogen powered electric fuel cell vehicles. Many other industries such as electronics, food, glass, chemicals, and more also benefit from hydrogen's unique properties to improve quality, optimize performance and reduce costs. Air Products is the world's largest provider of hydrogen. We operate over 100 hydrogen plants, including some with liquefaction capabilities, and which have a combined 1,500 years of operating experience. In many cases, we provide hydrogen from pipeline systems around the globe, including the world's largest hydrogen pipeline network and system located in the U.S. Gulf Coast.



## Gasification

Gasification technologies convert lower-value feedstocks into syngas that can be used to make higher-value products such as substitute natural gas, power, steam, hydrogen, transportation fuels, fertilizers, chemicals, and more. Gasification of coal is the cleanest of all coal-based electric power technologies and produces significantly lower levels of air emissions and solid waste than traditional, combustion-based power generating processes. Gasification also enables countries to use available resources and improve energy security by converting feedstocks into cleaner energy and value-added products. Air Products has acquired gasification technology and is developing a robust technological foundation to serve the growing gasification industry.

## Modified Atmosphere Packaging (MAP) and Freshline® Solutions

Gases for MAP and Freshline® solutions provide high-purity gases and equipment to extend the shelf life of food, improve taste, reduce waste, and help to keep production cost down. The research and development team at Air Products has been at the forefront of food freezing for over 50 years, pioneering cryogenic technology and continuing to push the boundaries of efficiency and versatility while ensuring safety and hygiene.



## SmartFuel® Technology

Hydrogen can be used in many different types of transportation, either in a fuel cell or an internal combustion engine, to eliminate or significantly reduce emissions. Our SmartFuel® hydrogen fueling station technology provides complete fueling infrastructure from supply to dispensing for fuel cell vehicles and is used in 1.5 million hydrogen fills per year. With more than 50 years of hydrogen experience, Air Products is at the forefront of hydrogen energy technology development. Cars, trucks, vans, buses, scooters, forklifts, locomotives, planes, cell towers, material handling equipment, and even submarines have been fueled with our SmartFuel® technologies.

## Helium

Helium and our high purity medical gases help sustain life. Magnetic resonance imaging (MRI) is enabled by helium, which is used to keep MRI magnets cold and superconducting. Helium is also valued as a gas for lifting, breathing, leak detection, space exploration, semiconductor manufacturing, scientific applications, and shielding. It has unique properties that optimize performance and productivity, reduce labor costs, and improve safety. As a leading producer and supplier of helium, Air Products has pioneered many of the helium extraction, production, distribution, and storage technologies still in use -- including cryogenic equipment for most of the world's helium recovery plants.



## Halia®

Air Products' Halia® solutions enable healthy aquatic ecosystems and effective treatment of water and wastewater. We supply high-purity oxygen and Halia® aeration systems for use in hatcheries and fish farms, lakes, ponds and other water bodies to promote conditions that allow fish, turtles and other aquatic life to thrive. Since the 1960s, Air Products has provided solutions to increase and improve treatment of wastewater and drinking water for industrial and municipal customers. These innovative, value-added technology solutions improve water quality, reduce costs, lower emissions and increase the environmental sustainability of water treatment processes.

## LNG Process Technology and Equipment

The use of LNG continues to increase with strong energy demands in growing economies. Air Products' LNG technology and equipment enables the efficient and economic production and transport of this critical energy resource, including from stranded energy sources around the globe. More LNG is produced using Air Products' mixed component refrigerant and liquefaction processes than any other processes, with over 100 LNG trains currently in operation. We manufacture this efficient and reliable equipment at our state-of-the-art facility in Florida (U.S.). In the past year, Air Products dedicated an LNG Equipment Test Facility and announced a manufacturing plant expansion at the site.



## The Use and Benefits of Gasification



Energy is fundamental to modern life and economic growth. The Global Energy Institute projects that global demand for energy will rise by 27% between 2017 and 2040, increasing most in the developing world due to population growth and improving infrastructure, prosperity and living conditions. Population growth and prosperity also drive consumption, resulting in the increased production of goods, that incorporate chemicals into their manufacture.

Gasification can convert virtually any hydrocarbon into synthesis gas or “syngas,” a combination of hydrogen and carbon monoxide from which energy, fuels and chemicals can be produced. Gasification enables the conversion of lower value feedstocks into cleaner energy and value-added products. It also enables countries to use available resources, improve energy security and lower trade deficits when compared to importing oil and natural gas.

There are over 900 gasifiers in operation around the world and many more planned. China has the most gasifiers due to the abundance of coal, which is a critical resource and represents 64% of the country’s energy consumption and 94% of its energy reserves. It is expected to remain the largest source of energy for at least 20 years. China’s 13th Five-Year Plan emphasizes a strategic focus on coal gasification, with coal-to-liquids viewed as critical for national energy security, and coal-to-olefins encouraged for raw materials diversification. Likewise, gasification projects in India allow the country to utilize indigenous feedstocks, make valuable products, improve financial and energy security, and reduce environmental impact. Countries with significant natural gas reserves, such as the U.S., Russia, Uzbekistan and Algeria, can create additional value from natural gas by using gasification to convert the gas to liquid fuel or high-value chemicals.

Gasification can also address the new limit established by the International Maritime Organization (IMO) for sulfur in bunker oil used to power ships. Effective in 2020, the new sulfur limit will significantly reduce the amount of sulfur oxides from ships and provide environmental and health benefits, especially for people living close to ports and coasts. Because the main type of bunker oil is derived as a residue from crude oil distillation, refiners all over the world need to find a use for these high sulfur, bottom-of-the-barrel liquids that can no longer be used in ships. Gasification is one of the cleanest ways to process these liquids while producing valuable syngas and enabling sulfur recovery.

Air Products, which serves energy, environmental and emerging markets, views gasification as a significant opportunity and differentiator. We are committed to the use of gasification to produce power or to manufacture chemicals around the world, including direct investment to build and operate these facilities. Gasification is not new to Air Products – for decades we have

“Gasification enables the conversion of lower value feedstocks into cleaner energy and value-added products.”



“Our approach to sustainability is holistic and we recognize the other environmental benefits of gasification, such as reduced emissions and cleaner air, as well as its economic and social benefits.”

supplied gasifiers around the world with oxygen and made syngas from natural gas to produce hydrogen. Our approach to gasification, however, has expanded beyond the supply of oxygen to design, build, own and operate gasifiers.

To effectively serve the gasification industry, we are developing a robust technological foundation that builds on our core focus of supplying the full range of industrial gases to our customers. We have also pursued key acquisitions of gasification technology.

Also in 2018, we started up the largest pulverized coal gasifiers using the Shell technology at our Lu’An coal gasification project located in Changzhi City, Shanxi Province, China. The technology will also be used to convert 120,000 barrels a day of heavy oil that can no longer be used as bunker fuel into power at the Jazan Economic City in Saudi Arabia. In addition, we continued to make progress on the air separation unit/gasifier project to provide syngas to Yankuang in Shaanxi Province, China and announced an agreement for the first 100% Air Products’ gasifier project to provide syngas to Jiutai in Hohhot, China.

Gasification of coal is the cleanest of all coal-based electric power technologies and produces significantly lower levels of air emissions and solid waste than traditional, combustion-based power generating processes using coal. This is due to the higher efficiency of gasification, which requires less coal to make the same amount of power or fuel when compared to combustion-based processes, and the ability to capture emissions from gasifiers. Even when compared to newer, ultra-supercritical coal-fired energy plants with best available control technology, gasifiers have higher efficiencies and lower emissions by 25–90% on a per unit of coal basis, including sulfur dioxide ( $\text{SO}_2$ ) by 60–70%, nitrous oxides ( $\text{NO}_x$ ) by 70–90%, particulate matter (PM) by 40–80%, and  $\text{CO}_2$  by 25% based on data from the International Energy Agency. The sulfur can be collected in its elemental form or as sulfuric acid, both of which are usable products. Likewise, PM is captured directly from the gasifier and incorporated into an inert slag that can be used for cement, roads and roofing. The  $\text{CO}_2$  stream from gasification is capture-ready and can be used or sequestered.

Air Products acknowledges that while gasification generates the least amount of  $\text{CO}_2$  for processing coal, it will increase our carbon footprint. We have used our technology for carbon capture and sequestration at our Port Arthur, Texas facility since 2014, capturing over five million metric tonnes of  $\text{CO}_2$ . We also have been processing  $\text{CO}_2$  at our Doe Canyon, Colorado facility, removing and supplying the valuable helium byproduct it contains. For both projects we purify the  $\text{CO}_2$  and provide it to our customers for enhanced oil recovery which sequesters the  $\text{CO}_2$  underground. These carbon capture technologies and others developed by Air Products can be deployed to new plants or retrofit to existing plants based on market dynamics. Our approach to sustainability is holistic and we recognize the other environmental benefits of gasification, such as reduced emissions and cleaner air, as well as its economic and social benefits.

From a social perspective, gasification facilities are large and require thousands of skilled workers during construction and hundreds for operation and maintenance. These jobs provide direct economic benefits to local communities and indirect economic benefits through supply chains. In addition, the products made from syngas have many benefits for people. The transportation fuels produced from syngas have significantly less sulfur, which reduces  $\text{SO}_2$  emissions and provides local environmental and health benefits. For example, in India an important ingredient in fertilizers, urea, is made from syngas. These fertilizers not only improve crops, they support the agricultural industry which is a backbone of the Indian economy and employs about half of the country’s workforce. Syngas is also used to make dimethyl ether, a substance added to liquefied petroleum gas (LPG) that can replace wood for cleaner cooking. Using LPG eliminates hours per day of gathering wood and reduces cooking times. The time saved can enable women to develop a skill for a trade that can add to the family income and aid in their financial independence.

## Uses of Syngas



## Economic Performance\*

In fiscal year 2018, we delivered strong safety and financial results. Sales of \$8.9 billion increased 9% over the prior year primarily driven by higher volumes from base business growth and new, large industrial gas projects. The higher regional volumes were partially offset by lower sale of equipment activity on our Jazan project as we neared project completion. In addition, we began to execute our gasification strategy with the completion and on-stream of the Lu'An acquisition, the announcements of the Jazan gasifier/power project in Saudi Arabia, the Yankuang coal-to-syngas production facility in Yulin City, Shaanxi Province, China, and the Jiutai coal-to-syngas project in Hohhot, China.

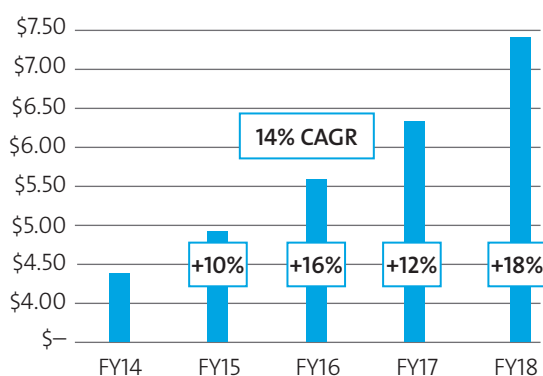
For fiscal year 2018, record adjusted earnings per share (EPS) of \$7.45 increased 18% over the prior year, the highest annual adjusted EPS in Air Products' history and fourth consecutive year delivering greater than 10% adjusted diluted EPS growth.

Having the strongest financial position in our industry allows us to continue to commit a significant amount of capital to grow Air Products into the future. We generated over \$10 per share of distributable cash flow and returned about 40%, or almost \$900 million, to our investors via dividends.

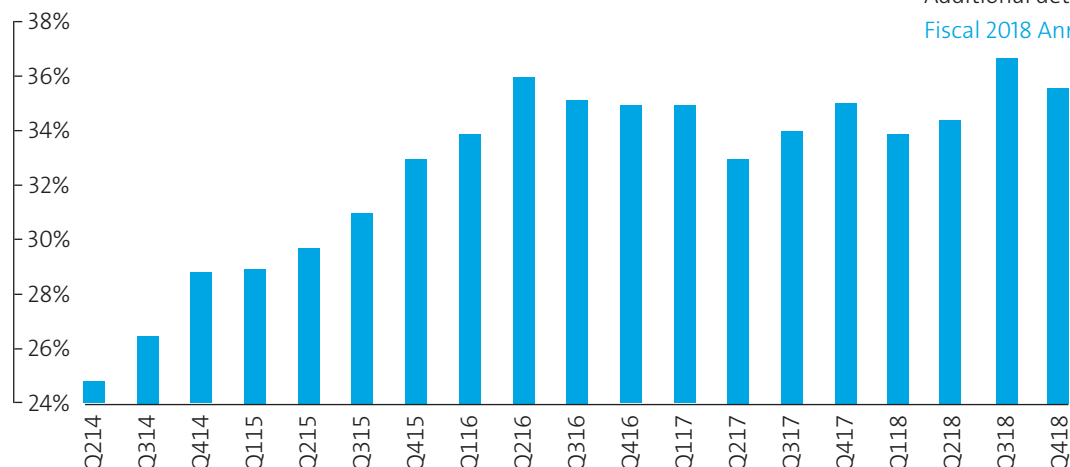
Additional details are available in our [Fiscal 2018 Annual Report](#).



Adjusted Earnings Per Share



Adjusted EBITDA Margin Trend



\*The results included in this report are non-GAAP. See reconciliation to GAAP results in our Fiscal 2018 Annual Report.



# Digital Transformation

Digital technologies and innovation continue to provide opportunities for Air Products to better support customers, increase our own efficiencies, and differentiate our company. In 2018, the company continued its journey of enabling smarter products, more agile and efficient operations, and seamless interactions with customers as we executed against our regional business and functional roadmaps across the globe.

In China, as part of our strategy to embrace Industry 4.0 and the era of Big Data, we've successfully developed the SPIDER project. SPIDER, or "Smart Plants Integrated Diagnostic and Optimization on Efficiency and Reliability," brings together several advanced digital tools, including ProcessMD™, to improve the efficiency, reliability, and process safety of our very large steam turbine air separation units in China. Many of these facilities are remotely located, so our new SPIDER Center at our Shanghai Zhangjiang office enables collaboration between employees in Shanghai and at the plants to troubleshoot process deviations at an early stage.

In the United Kingdom (UK), as part of improving the efficiency of our supply chains and enhancing our customers' experiences, we successfully piloted a new, low-cost telemetry system for a key Microbulk customer, which contributed to Air Products being named a "Supplier of the Year" for this customer. The cloud-based IIoT (Industrial Internet of Things)

system enables us to track product levels continuously at the site, ensuring the customer has the needed product while taking delivery trucks off the road by reducing deliveries by almost one-third.

We continue to evolve our internally developed and patented ProcessMD platform, including a new cloud-based version for equipment customers. In the U.S., we obtained the first contract for this offering in 2018 for application at a copper smelter in Arizona. Increasingly we expect to be able to use ProcessMD and other digital tools to increasingly add value not

only to our own operating plants, but also to our customers' operations.

For both our current and future employees, we also continue to evaluate new digital and automation tools that will be critical for the future of work and the digital workplace of tomorrow, including mobility, artificial intelligence and machine learning systems, and immersive experiences through augmented and virtual reality tools.

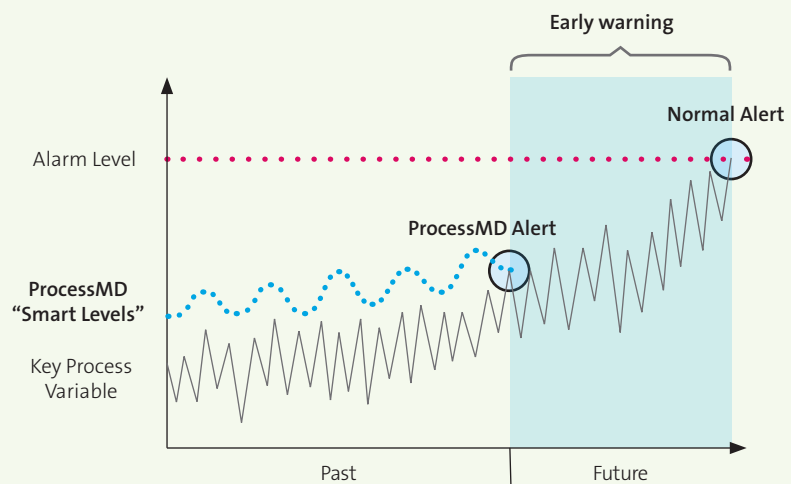
## Early Warning with ProcessMD™

Air Products successfully monitors and maintains approximately 400 industrial gas facilities in its fleet of operating plants around the world using its proprietary ProcessMD IIoT platform for predictive monitoring and fault diagnosis.

At the foundation of this technology are predictive models built uniquely for each plant or piece of equipment. These data-driven, auto-adaptive models provide advanced alerts of subtle abnormalities and deviations from expected behavior across a whole plant for specific components. This allows for more efficient operations in real time, opportunities for reduced power consumption, increased production and reduction in vent losses.

Air Products is now offering its ProcessMD IIoT platform to customers, enabling them to improve their plant reliability, reduce downtime, plan smarter and uncover costs savings opportunities.

### How ProcessMD alerts can give you early warning:



# Customer Sustainability

Producing products that improve the environment and make our customers' processes better is part of our higher purpose. In fact, Air Products has over 170,000 customers across more than 30 industries who rely on us for innovative thinking and solutions to their most pressing business and operational challenges.

We often construct our facilities on customer sites, allowing us to integrate operations with the customer in a way that enables products to be sent efficiently through pipelines, and utilities such as steam and water to be shared across plants.

We also offer many products and applications that have sustainability benefits for customers and downstream users. Several have been noted already, including our oxy-fuel burners, hydrogen for making ultra-low sulfur diesel and powering fuel cell vehicles, and equipment to liquefy natural gas.

## Additional products and offerings that help customers improve sustainability include:

- Gases for water treatment including oxygen to improve fish health in aquaculture, reduce unwanted byproducts in drinking water, and lower volatile organic compounds (VOC) emissions from wastewater treatment

plants. Carbon dioxide is also used to safely neutralize the pH of wastewater.

- Membrane gas separators that generate gas on-site for industrial applications, and biogas membrane separators that use farm waste, manure, or municipal waste to make methane for heat and power generation.
- Hydrogen supply and process optimization for producing renewable diesel from animal fats and used vegetable oils, as well as treating used oils and lubricants so they can be recycled.
- Nitrogen or carbon dioxide for preventing and suppressing fires in the storage and handling of biomass fuels, such as wood pellets.
- Liquid nitrogen or liquid carbon dioxide for cryo-grinding materials more effectively and efficiently, increasing quality, recycling and reducing waste while improving process safety.
- Helium for magnetic resonance imaging and high-purity medical oxygen, nitrogen, and other medical gases that help sustain life.
- PRISM® Vacuum Swing Adsorption (VSA) Oxygen Generators operate at ambient conditions, maximizing efficiency and reducing energy requirements for a variety of uses across industries, including nitrous oxide abatement.
- PRISM® PHG Hydrogen Generators combine Air Products' proprietary reformer technology with hydrogen pressure swing adsorption in a highly efficient system that uses less natural gas and other utilities.
- Gases and applications that help the steel industry reduce energy consumption and improve yields and productivity, producing new generation steel grades that are lightweight and stronger.
- Our Maxx® weld process gases improve welding speeds by up to 60%, reducing gas and energy consumption while also minimizing fumes and ozone and contributing to a healthier work environment.
- The Integra® e<sup>2</sup> cylinder and Gastrak® e<sup>2</sup> service ensure welders use optimum gas flowrates and reduces gas waste. Gas savings of up to 50% are common and reduce the energy and emissions associated with gas manufacturing (electricity) and distribution (diesel).
- Flux-free soldering technology for wafer level packaging applications for electronics improve quality and productivity while eliminating the use of chemical fluxes, cleaning equipment and solutions.



## Helping Customers and Society Avoid Emissions

For several years, Air Products has quantified potential emissions avoided by its customers using products that improve energy efficiency and/or reduce environmental emissions.

Through this process, we identify the sustainable offering; determine a base case against which the offering is compared; develop product- and application-specific calculations, based on standard protocols and emissions factors (where available), to estimate potential emissions avoided; and apply sales data to these calculations to estimate the potential emissions avoided on a product/application basis.

Air Products estimates that the potential emissions avoided by industrial gas customers for these products and applications totaled 55 million metric tonnes of CO<sub>2</sub> in 2018 equivalent to the emissions from 12 million cars – and almost double our own direct and indirect CO<sub>2</sub> emissions.

**In 2018, Air Products acquired and commercialized new products and services that help our customers be more sustainable, including:**

**Burners that improve efficiency and reduce emissions.** The patent-pending Cleanfire® HR<sub>x</sub>™ burner enables glass manufacturers to control the magnitude and location of oxygen staging, resulting in higher fuel efficiency and productivity, ultra-low NO<sub>x</sub> emissions, and reduced foam for higher-quality glass production. In 2018, the burner was commercialized and successfully implemented in the Americas, Europe and Asia, helping address the glass industry's top priorities of emissions control, defect reduction and production efficiency improvement. Likewise, the Transient Heating Oxy-fuel Burner was commercialized in 2018 for use in the non-ferrous metal recycling market. This patented oxy-fuel burner uses a sensor-driven control strategy to distribute the heat flux across a reverberatory furnace, resulting in uniform heating at a lower peak temperature. By minimizing overheating and enhancing the heat transfer to the metal, the technology helps improve productivity and fuel efficiency by up to 40%, while reducing oxidative melt losses.

**On-site gas generators that meet quality and efficiency needs while eliminating transportation emissions.** Air Products' TN Nitrogen Generators provide cost-effective gas supply with reliability, safety and efficiency. Using our on-site generators, customers can rely on gases and liquids made at their sites, removing their dependence on trucked-in products. Our newest generator has been optimized for the electronics industry to produce gases at new purities required by the latest chip and memory manufacturing technologies. A new, high efficiency distillation packaging technology is used in this process to provide our customers with lower power consumption and smaller footprint.

#### **Technologies for improving food preparation and preservation.**

Air Products provides food-grade industrial gases for modified atmosphere packaging (MAP). MAP is a process where the breathable atmosphere in a package is replaced with pure gas, like nitrogen, or a mixture of gases to extend the shelf life of food. Our new Freshline® Aroma MAP™ system enables the injection of essential oils or flavors into foods. Not only does this help customers respond to consumer demands for clean label ingredients, it can also help fight against food waste, reduce the costs associated with unwarranted product returns, and lengthen the shelf life of products. Likewise, our new Freshline® Easy Freeze (EF) tunnel freezer has been specially designed to offer worry free inline cryogenic freezing. The EF freezing tunnel ensures fast, high-quality cryogenic freezing, in full compliance with all regulations and best practices, enabling processors to optimize nitrogen consumption, increase productivity, reduce bottlenecks and meet the needs of their customers.

**Improving the traceability of gas cylinders in hospitals.** Air Products has created a new service to scan and manage gas cylinders with a smart phone and application. The medical gases are traced via a unique barcode, allowing the real-time monitoring of each bottle from filling at the production site, through delivery and use at the hospital, to the return of the empty bottle. Essential information such as point-of-use, status, product description, and batch number, as well as expiry dates and quality and safety data, are now visible with the cylinders and using the MyAirProducts<sup>SM</sup> service. The service also saves time for the hospital by eliminating manual recording and searching for cylinders and providing an inventory of cylinders using a simple scan. MyAirProducts<sup>SM</sup> also enables paperless ordering, billing and receipt of safety data sheets.



**Air Products has set and exceeded a goal to ensure that over 50% of its revenues are derived from products that help our customers be more sustainable. For 2018, revenue from these products represented 54% of sales.**

Air Products' customers appreciate the products that we supply and the positive impacts they create. They also value our commitment to safety, reliability, quality, and excellent customer service. When serving our customers, the people who are closest to them are responsible for customer relationship management. Air Products' regional businesses measure customer sentiment throughout the year, routinely monitoring and communicating data on customer satisfaction and feedback. Customer satisfaction ranged from 83% to 96% across the regions. We have a high level of customer loyalty, averaging 96% across the regions, which is important not only from an economic perspective, but also because switching gas providers often requires replacement of equipment and consumes resources. Finally, Air Products' Customer Service Teams are prepared to respond to customer questions, including many related to sustainability that have continued to increase over the last several years.



### Going for Gold

In 2018, Air Products was awarded a gold medal for its Corporate Social Responsibility (CSR) performance for the second year in a row from EcoVadis, a multinational CSR ratings agency. EcoVadis rates and continually monitors a company's CSR management and progress while offering tools to drive improvement. The EcoVadis rating methodology is based on 21 CSR criteria, which are organized in four main categories including: Environment; Labor & Human Rights; Ethics; and Sustainable Procurement. The 21 CSR criteria follow verifiable international CSR standards including: the Global Company Principles; the International Labor Organization Conventions; the Global Reporting Initiative Standard; and ISO 26000.

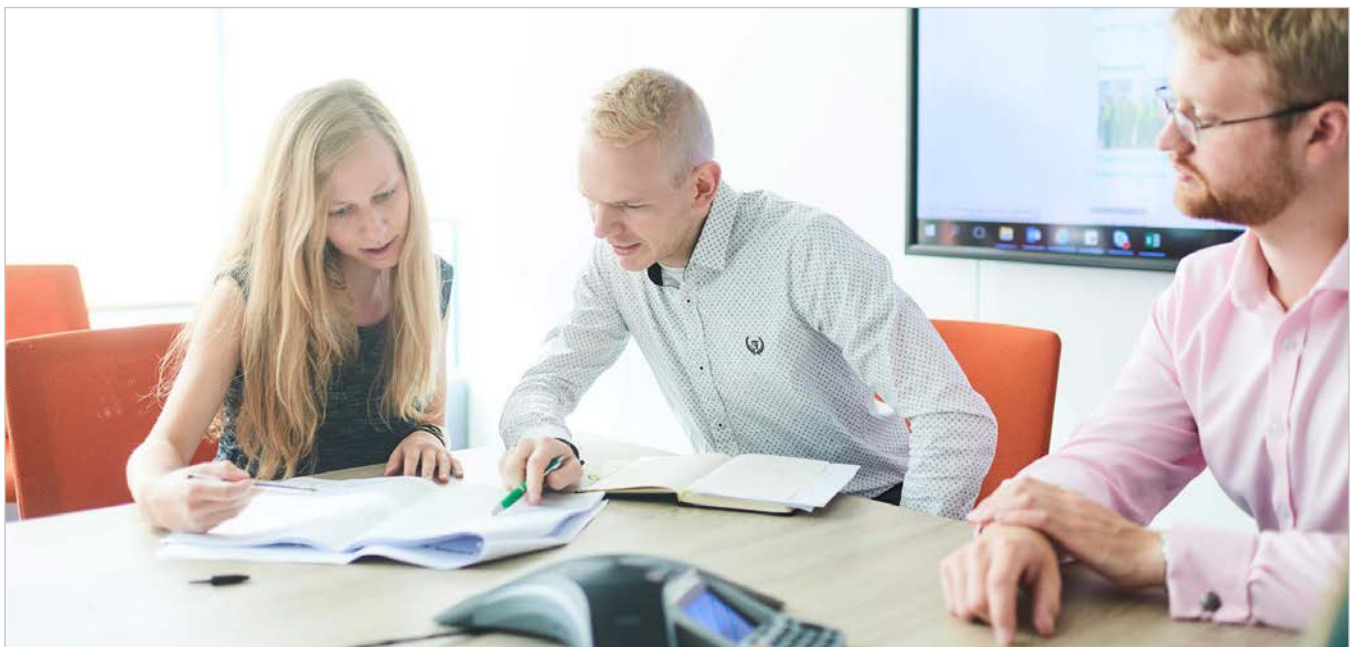
## Certifications

We understand our customers' expectations around certifications. Because of the importance of improving product quality, service, and overall value to customers, we have adopted ISO 9001 as our model for quality assurance and obtained multiple ISO 9001 certifications. These certificates, which cover more than 95% of our staffed facilities, are available on our website.

Air Products has also obtained Food Safety System Certification (FSSC) 22000 at 21 facilities, including 13 sites in the Americas and eight sites in Europe.

## Marketing

Our marketing organizations and regional marketing managers promote, protect and enhance the value of our brand. We benchmark respected external organizations for best practices and follow consistent guidelines for global promotional materials to ensure clarity and consistency of our message and identity standards.





## Data Privacy

At Air Products, we believe it is our responsibility to safeguard, in accordance with applicable laws, the personal information of our employees and all other individuals with whom we work, including customers, suppliers and contractors.

Since our data protection program was rolled out several years ago, expectations and requirements for protecting personal data have expanded substantially. We have adapted our program to address these changes, including:

- Mapping data privacy requirements across the 50 countries in which we operate, determining that 44 countries have some form of data privacy legislation.
- Establishing a global network of 25 Privacy Champions who review and support compliance with national legislation, keep local staff informed of their rights and roles through training and procedures, and support the process for managing incidents, complaints and enquiries.
- Applying the European Union's General Data Protection Regulation (GDPR) as a global standard and integrating GDPR compliance into our use of systems such as SAP.
- Changing and adding to mandatory internal privacy related training courses to ensure our workforce is aware of and equipped to respond to privacy requirements.
- Updating our inventory of third-party vendors with whom we share personal data and ensuring that our supply chain partners also comply with privacy regulations.
- Updating our [Global Data Privacy policy](#) and ensuring that personal information is handled and stored in a secure manner.
- Ensuring that we are open and transparent with our employees and other stakeholders in telling them what personal data we collect, process and store through employee notifications and [privacy notices](#) on our website.
- Providing and monitoring a [privacy mailbox](#) that enables asking questions, invoking access rights or reporting concerns easier for all stakeholders.

We have had no substantiated complaints regarding breaches of customer privacy or losses of customer data.



# Governance

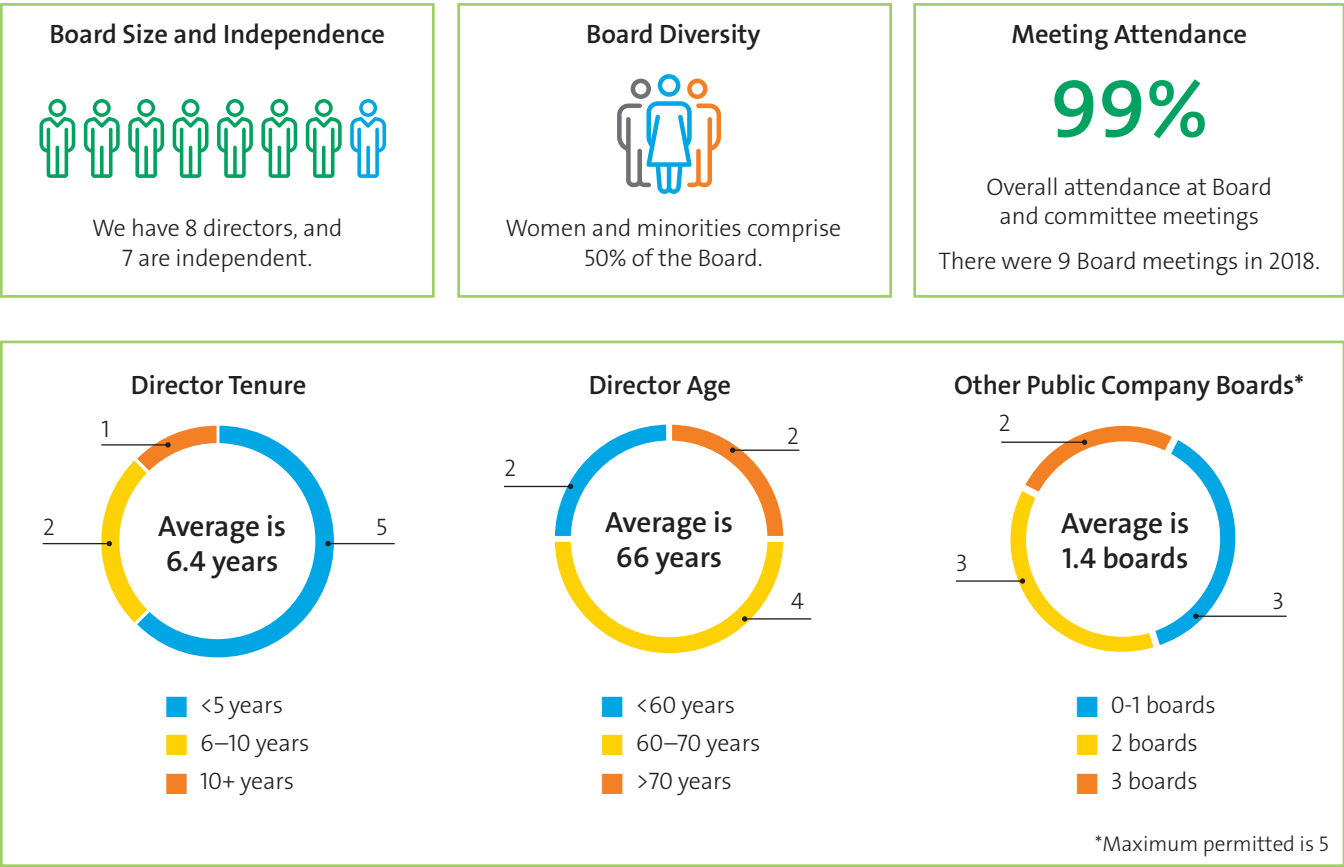
Air Products’ Board of Directors is composed of a diverse group of leaders with experience at major domestic and international companies. They have worked in key market sectors that reflect our customer base and have sound financial and governance expertise. Their experience provides an understanding of business strategies and impacts, as well as challenges and risks. Directors are elected annually. Details on director qualifications and skills are provided in our most recent [proxy statement](#).

## Our Board and Committee Structure

Among other responsibilities discussed herein, the Board reviews, monitors and, where appropriate, approves fundamental financial and business strategies and major corporate actions. The Board does not have a policy on whether the roles of Chairman of the Board and CEO should be separate, and at this time has decided to combine the Chairman and CEO roles because it has a high level of confidence in Mr. Ghasemi’s leadership and willingness to work closely and transparently with the independent directors. The Board’s responsibilities are described in detail in our [Corporate Governance Guidelines](#), which are posted on our website.

The Board has three standing committees that operate under written charters approved by the Board: the Audit and Finance Committee, the Corporate Governance and Nominating Committee, and the Management Development and Compensation Committee. Each of these committees is comprised entirely of independent directors. The Board and each committee undertake an annual self-evaluation process to evaluate performance against responsibilities outlined in the respective committee charters. Information regarding the operation and responsibilities of each standing committee is provided in our most recent [proxy statement](#), and [charters of these committees](#) are on our website.

# Corporate Governance Highlights



## Corporate Governance Practices

The Board has accountability for oversight of the Company's Environmental, Health and Safety performance, which it reviews at least quarterly. The Corporate Governance and Nominating Committee has responsibility for monitoring the Company's response to important public policy issues, including social responsibility, corporate citizenship and sustainability, which are reviewed on a routine basis. Business ethics, climate change and diversity were key subjects discussed by the Board in 2018.

With respect to Board Diversity, the Corporate Governance Guidelines provide that, as a whole, the Board should include individuals with a diverse range of experience to give the Board depth and breadth in the mix of skills represented. We implement this guideline by seeking to identify director candidates that bring diverse skills sets, backgrounds, and experiences, including ethnic, gender and geographic diversity, to the Board when director candidates are needed. Half of the Board is comprised by women and minorities.

To promote Board Succession Planning and refreshment, non-executive directors may not continue on the Board after the annual meeting following the earlier of the director's completion of 15 full years of service on the Board or attainment of age 75. The Board retains the flexibility to waive this policy, including in response to events or recruiting realities.

Our Executive Compensation Program balances financial results with other company values such as safety, sustainability, diversity, productivity and environmental stewardship. Accordingly, certain components of the program provide flexibility to adjust compensation upwards or downwards for non-financial and strategic goals and to reduce or recoup compensation in cases of misconduct and restatement of financial results.

Additional information about our governance practices, including director and executive officer compensation, CEO pay ratio, the process for reviewing related party transactions, and details related to the above information is available in our most recent [proxy statement](#).

## Shareholders and Rights

The Board believes that fostering long-term and institution-wide relationships with shareholders, listening to their concerns and maintaining their trust and goodwill is a prerequisite to good governance. To this end, Investor Relations is very engaged with key shareholders. Meetings, presentations and ongoing dialogue provide opportunities throughout the year to understand shareholder concerns, including those related to sustainability, governance, compensation and safety, as well as financial and operational matters. Direct communications to the Board from shareholders and other interested parties is managed through a written procedure that is available through the Corporate Secretary's Office.





Seifi Ghasemi is Chairman, President and Chief Executive Officer of Air Products. In this role, which he assumed in July 2014, Mr. Ghasemi focuses on setting the strategy and policies of the company, developing leadership, and meeting shareholder commitments.

## Executive Leadership

Reporting to Mr. Ghasemi is our Executive Leadership Team.

### Executive Leadership Team:

**Ivo Bols**, President, Europe and Africa. Mr. Bols is responsible for driving the strategy and profitability of the company's Industrial Gas business in Europe and Africa.

**Richard Boocock**, Senior Vice President, Chief Information Officer and Special Advisor to the Chairman. Mr. Boocock is responsible for Air Products' commercial business in India, including managing the relationship with INOX Air Products, a joint venture company. He also serves as Special Advisor to the Chairman and has leadership responsibility for a variety of functions, including generated gases; mid- and large-size cryogenic plants; environment, health, safety and quality (EH&S); operational excellence; Information Technology; and Sustainability.

**Victoria Brifo**, Senior Vice President and Chief Human Resources Officer. Ms. Brifo is responsible for leading all aspects of the company's Human Resources organization, including HR Operations, Diversity and Inclusion, Talent Management, and Compensation and Benefits, as well as Global Health and Wellness, and Corporate Aviation and Corporate Transportation.

**M. Scott Crocco**, Executive Vice President and Chief Financial Officer (CFO). Mr. Crocco is responsible for all aspects of the worldwide financial organization, including Controllershship, Treasury, Investor Relations, Tax, Audit, Shared Business Services and Corporate Development.

**Marie Ffolkes**, President, Americas. Ms. Ffolkes is responsible for driving the strategy and profitability of the Company's Industrial Gases operations in North and South America.

**Sean D. Major**, Executive Vice President, General Counsel and Secretary. Mr. Major has responsibility for leading the company's Legal organization worldwide.

**Wilbur W. Mok**, President, Asia. Mr. Mok is responsible for driving the strategy and profitability of the company's Industrial Gases business in Asia.

**Dr. Samir J. Serhan**, Executive Vice President. Dr. Serhan leads the Company's Technology, Engineering, Project Execution, Procurement, Manufacturing, Construction and Start-up functions. He has profit and loss responsibility for the Equipment Sales and Plant Support, Liquefied Natural Gas technology and equipment, PRISM® Membrane Systems, and Gardner Cryogenics and Rotoflow businesses. In 2018, Dr. Serhan's role was expanded to include the identification, development and commercial negotiation for all large HyCO and ASU projects for the company.

**Naji Skaf**, President Middle East, Egypt and Turkey. Mr. Skaf is responsible for managing and growing the company's Industrial Gases operations and partnerships in the Middle East region.



### Sustainability Leadership Council:

Air Products' Sustainability Leadership Council sets our sustainability strategy and reviews programs and progress at least quarterly to assess progress toward the achievement of our sustainability objectives. The members of the Council include:

- **Richard Boocock**, Senior Vice President, Chief Information Officer and Special Advisor to the Chairman
- **Victoria Brifo**, Senior Vice President and Chief Human Resources Officer
- **M. Scott Crocco**, Executive Vice President and CFO
- **Art George**, External Communications Manager
- **Sean D. Major**, Executive Vice President, General Counsel and Secretary
- **Katie McDonald**, Vice President, Corporate Communications
- **Simon Moore**, Vice President, Investor Relations and Corporate Relations
- **Julie O'Brien**, Sustainability Director
- **Dr. Samir J. Serhan**, Executive Vice President

The Council has an integral role in the assessment of sustainability priorities described throughout this report and is the highest-level committee that reviewed this 2019 Sustainability Report.

## Risk Management

Responsibility for risk oversight rests with the full Board, which oversees the processes that are in place to safeguard the Company's assets and mitigate risks. The Committees of the Board have oversight of risk matters in accordance with their charters. The risks considered include, but are not limited to, financial matters; compliance with laws, regulations and Company business conduct policies; and succession planning for Executive Officer positions. In addition, the Corporate Governance and Nominating Committee monitors the company's response to important public policy issues impacting the company including in the areas of social responsibility, corporate citizenship and sustainability. The Board possesses a broad range of qualifications and skills that facilitate strong oversight of Air Products' management and strategy.

The Audit and Finance Committee of the Board has specific responsibilities related to evaluating the internal

controls environment and enterprise risk management. The Committee routinely discusses the company's major risk exposures with management, the senior internal audit executive and the independent external auditor. Company risks are reported in the Annual Report, and summarized in the Strategy, Opportunities and Risk section of this report.

Internal Audit employs an ongoing, iterative risk assessment process to identify auditable risks, completing a comprehensive review each year that includes risk themes encompassing strategic, operational, financial, compliance and IT categories. Results of these audits are routinely reported to leadership and the Audit and Finance Committee of the Board.

Additional details concerning the management of risks related to sustainability are provided throughout this report.



# Ethics and Integrity

Integrity—behaving ethically and being true to our words—is a core value at Air Products and one we must never compromise. We do not tolerate ethics violations and have put strong policies and programs in place to prevent, detect, report and address these issues. Ethics and integrity begin with the leadership of the company. Seifi Ghasemi, Chairman, President and Chief Executive Officer, as well as members of our Board of Directors and Executive Committee, have taken firm positions on ethics and integrity and have set a strong tone on compliance. This is evidenced by the policies implemented and followed, as well as actions taken against ethics violations.

At the heart of our ethics and integrity efforts is the Air Products Code of Conduct and Business Ethics (Code of Conduct), which was revised effective January 1, 2019. The Code of Conduct has been adopted by our Board of Directors and applies to all full and part-time company employees at all operations worldwide, our Board of Directors, and

our subsidiaries, affiliates, operating units and divisions worldwide. Every employee is required to comply with the Code of Conduct, complete mandatory training, and certify their understanding of the Code on an annual basis. This is a condition of employment at Air Products. In 2018, the annual Code of Conduct training and certification (ACOC) were combined into a new, comprehensive online program that each employee is required to complete every year. In 2018 Air Products achieved 100% completion of the ACOC.

The Code of Conduct also applies to employees of joint ventures where Air Products has control. In addition, suppliers are expected to comply with the Code of Conduct in their dealings with us, as well as meet our sustainability expectations.

Supporting the Code of Conduct is a comprehensive compliance program that is in place to ensure strict compliance with the letter and spirit of the Code of

Conduct, related policies and procedures, and all applicable laws, rules, and regulations. These policies include but are not limited to: anti-bribery and corruption; competition and anti-trust law; engaging third parties; accepting and providing gifts, meals or entertainment; and the reporting and investigation of claims of misappropriation of assets, business integrity concerns, legal matters and improper accounting matters. Training in these areas is required of certain employees based on their specific role in the company.

Air Products encourages individuals to report, as allowed by local law, misconduct or ethics violations. Employees are advised to ask questions, express concerns, or report suspected Code of Conduct violations to their manager or to our Ethics and Compliance Team contacts, which are listed on the company's intranet. Air Products' IntegrityLine also is available for employees who are in doubt about what to do, or whether an action is appropriate. Instructions for accessing the IntegrityLine are available to employees on our intranet in the same 22 languages as the Code of Conduct. The availability of the IntegrityLine is also communicated to employees via posters and electronic newsletter articles.

The Air Products' IntegrityLine is available to anyone who would like to report a potential issue about Air Products. It can be found in the Governance section of our website and is linked from various webpages, including our Code of Conduct, Human Rights Policy, Conflict Minerals, and Supplier Information.

Air Products does not tolerate discrimination, harassment, or retaliation. Those who take steps to uphold our integrity and report in good faith will never suffer reprisals or retaliation.

Every allegation is reviewed, investigated and closed. The company employs a case management system for investigations



## Air Products' Code of Conduct is available on our website in 22 languages and covers the following critical subjects:

- Business Ethics, including Anti-Bribery, Anti-Corruption and Conflicts of Interest
- Financial Accounting and Accuracy
- Competition and Fair Dealing
- Import/Export Laws
- Confidential Information
- Equal Opportunity and Protection Against Harassment
- Environment, Health, Safety, and Security
- Sustainability and Corporate Social Responsibility

that is managed by our Global Asset Protection Director. The Director also leads the Company's Investigation Council, which is comprised of representatives from each region and includes Security investigators, Corporate Audit, Legal and Human Resources. The Council meets every quarter to review cases, statistics, and trends so that the company can identify issues and address them as early as possible.

The company has deployed a disciplinary decision-making process for addressing allegations that have been confirmed. This process includes, as warranted, disciplinary actions up to and including employee termination. Internal communications about the incidents provide an opportunity for the Company to reinforce that improper behavior will not be tolerated. Over the past year, the enhanced Code of Conduct and emphasis on reporting and discipline have driven a 17% increase in the number of allegations being reported.

We also conduct risk assessments for the potential for corruption risks across the organization. Anti-bribery and corruption are elements of the Internal Audit risk assessment process that is applied across the company globally. Through the process, businesses and operations having the highest potential for corruption are identified and considered in annual audit planning. Risk levels are assigned based on location, work being performed, and other factors. Cases related to ethics and integrity issues are also considered in the audit planning process. Issues identified during audits are addressed in conformance with auditing procedures and the company's disciplinary process. Significant risks related to corruption that have been identified through this risk assessment include relationships and transactions with governmental authorities and the use of third-party intermediaries.

Air Products evaluates potential corruption and bribery risks of third-party intermediaries using a consistent,



## Employees Hit the Century Mark – Reach 100% Certification Completion

### New Code of Conduct Released Globally

**Integrity** – behaving ethically and being true to our words – is an Air Products core value and one that must never be compromised. Air Products' Code of Conduct is the foundation of this core value.

Two achievements during 2018 highlighted the importance of this core value. First was a successful completion rate of 100% by all Air Products' employees in earning certification for the annually required Code of Conduct training. The second was the refresh of the Code of Conduct for all employees.

Over the course of 31 days in May, all employees around the world completed the mandatory Annual Code of Conduct learning module and certified their understanding and compliance with Air Products' Code of Conduct and policies, standards and guidelines.

To ensure the achievement of 100% certification, several actions were taken. These included: combining Code of Conduct training and certification, which was previously conducted separately; targeted communications to all employees from managers and supervisors, as well as the third-party vendor about the mandatory responsibility; and holding managers and supervisors responsible for ensuring completion by those employees for whom they are accountable.

Additionally, during May's month of activity, completion rates were tracked and reported out to managers, supervisors and Air Products' executive leadership team to get to "100%" as quickly and simply as possible.

Also in 2018, Air Products' Code of Conduct and Business Ethics was revised and published internally. Key improvements included streamlined content; eliminating complex language or jargon; removing hypothetical examples to help reduce potential confusion; and adding subsections to make the revised Code easier to navigate.,

global process that considers the work being done, where the work will be performed, compensation amount and method, and the potential for interaction with government officials. Third-party intermediaries rated as medium or high risk require due diligence. The findings of these investigations, together with the considerations noted above, are evaluated by Air Products' Business Compliance Office, Legal, Global Asset Protection and

others, as required based on the risk and spend, to determine if the vendor should be used. In 2018, the company reviewed nearly 500 third-party intermediaries.

Ultimately, the Company believes that it is the responsibility of each employee to uphold the ethical business standards on which our corporate and individual reputations depend.

## Governmental Relations

Maintaining the support and confidence of government officials and regulatory agencies is critical to our day-to-day operations. Governmental support and confidence are equally important to help ensure timely permitting and completion of our projects. For these reasons, Air Products engages with government officials in matters that support our businesses and operations.

These activities are governed by our Policy on Political Contributions and Expenditures, which recognizes our responsibility to our stakeholders to participate in the political process while prohibiting the use of corporate funds for contributions to candidates in any country or region, even where allowed by law.

Corporate resources are used to advance public policy through the education of public officials about our business. For example, in 2018 Air Products announced it would build its first liquid hydrogen plant in Texas at its La Porte facility. Hydrogen produced at the new facility will be shipped across the U.S. Project construction is underway with an anticipated facility onstream during the second quarter of 2021. Government Relations and Commercial teams had meetings with the La Porte Mayor and City Manager to introduce and gain support for the project. The city leaders expressed an interest in touring the facility and participating in a ribbon-cutting for the new plant. Similar project engagement will be held with the State Representative and State Senator representing the facility.

Corporate resources are also used to support the administrative functions of Air Products' employee Political Action Committee (PAC). Our employee PAC

assists in advancing the nomination or election of qualified and responsible candidates, building and strengthening our relationships with elected officials, and facilitating positive interactions with governing bodies and regulatory agencies. In 2018, the employee PAC disbursed \$77,500 to political candidates in the U.S. that represented federal, state and local jurisdictions and all political parties.

Air Products also engages in advocacy on an as-needed basis to ensure that our business is not disadvantaged in regulation and rulemaking. For example, we have worked with governments in North America and Europe to ensure that our business model for producing on-site hydrogen is not disadvantaged from a carbon emissions cost perspective relative to a refinery customer making the hydrogen. Most recently we have engaged with the European Commission, European Parliament and governments of key EU Member States, successfully demonstrating that our business model for on-site hydrogen promotes better energy efficiency and environmental performance, thereby supporting the policy intent of Phase 4 of the EU Emissions Trading System (EU ETS).

Persons who advocate on behalf of Air Products must be approved through our third-party intermediary process. Given the nature of their work and interaction with governments, these individuals and companies undergo due diligence and significant internal review. Air Products also asks these vendors to review and acknowledge our Code of Conduct and often requires anti-bribery and corruption training.

The company's advocacy activities, relationships with government authorities, political contribution policies and political expenditures are monitored by the Corporate Governance and Nominating Committee of the Board. Air Products reports corporate spending on public policy matters in accordance with U.S. requirements, including to the U.S. Secretary of the Senate and Clerk of the U.S. House under the Lobbying Disclosure Act (LDA) and Honest Leadership and Open Government Act (HLOGA) requirements, and to the Internal Revenue Service.

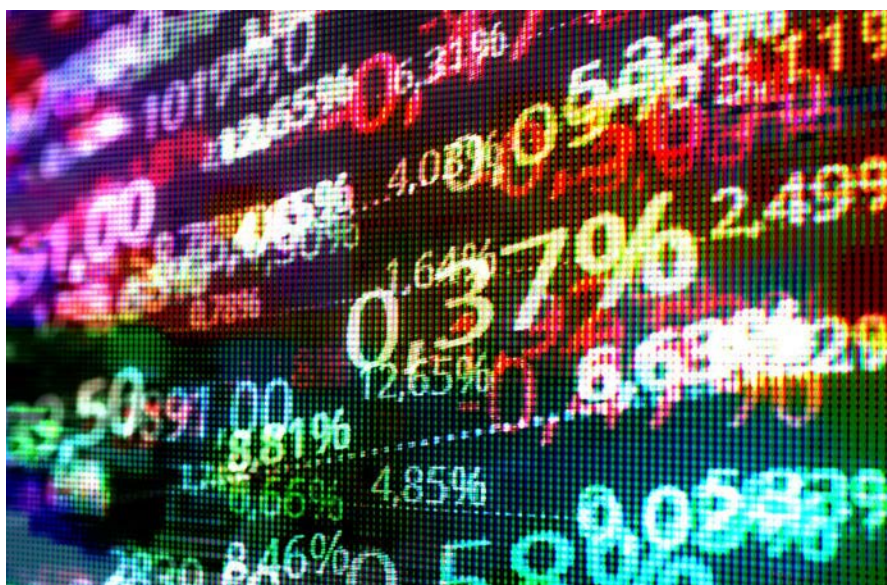




## Tax Strategy

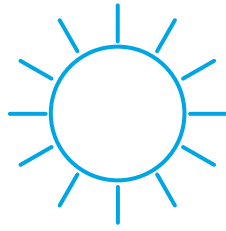
Because industrial gases cannot be transported efficiently beyond a relatively small geographic area, Air Products' operations, assets, sales and supply chains are primarily local. Accordingly, Air Products earns and reports our taxable profits in the same jurisdictions where we economically earn them. Air Products does not report such taxable profits in tax havens or other countries where we do not have substantial operations.

Air Products has policies in place to ensure that our tax planning is appropriate. Parameters and controls have been established to guide the tax planning process. The controls include ongoing and at least quarterly reviews of all tax planning matters within the global tax group and between the global tax group and regional accounting staff. Likewise, there are a minimum of quarterly reviews between the Vice President - Taxes, the CFO, and the Corporate Controller and Chief Accounting Officer regarding tax planning and risks, and any large tax audit settlements must be approved by our CFO. In addition, the Audit and Finance Committee of our Board of Directors has oversight of, and frequently reviews, tax matters.





# Conserve



# Conserve resources and reduce environmental footprints through cost-effective improvements

## Reducing Environmental Impact

**570**

thousand metric tonnes  
of CO<sub>2</sub>e avoided

**\$60**

million in energy and  
water costs avoided

**16%**

improvement in  
distribution efficiency

**5,600**

million gallons  
of water conserved

**2**

million MWh of  
energy conserved

**18%**

improvement in  
water efficiency

**1.5%**

reduction in GHG  
emissions intensity

**2.0%**

improvement in ASU  
energy efficiency

**0.9%**

improvement in HyCO  
energy efficiency



## Protecting the Environment

We have a shared responsibility to protect the environment. This belief is reflected in our higher purpose as an industrial gas company – to produce products that improve the environment and make our customers' processes better. Our products enable our customers and their downstream users to reduce or avoid emissions of CO<sub>2</sub>. In 2018, we enabled the avoidance of 55 million metric tonnes of CO<sub>2</sub> emissions, equivalent to the CO<sub>2</sub> emitted from 12 million cars and almost double our direct and indirect CO<sub>2</sub> emissions.

We are also committed to improving our own performance by operating efficiently, incorporating environmental considerations into the design of our facilities and products, effectively managing environmental risks, and transparently communicating our

environmental performance. While our resource consumption and emissions may increase due to growing customer demands for our products, our efficiency and environmental improvements enable us to make our customers' processes and products better without proportionally expanding our environmental footprint.

As described in our [Supplier Sustainability Expectations](#), we also encourage suppliers to develop environmental sustainability programs for their operations and supply chains, including resource conservation and emissions reduction. Additional supplier requirements are described in the Care section of this report.



## Environmental Goals

We established four environmental sustainability goals for 2020; each uses operating performance from 2015 as the baseline year:

- Save energy by reducing use intensity by 2.5% for ASUs and 1.5% for HyCOs
- Reduce GHG emissions intensity by 2%
- Conserve water and lower use intensity by 5%
- Improve efficiency and reduce CO<sub>2</sub> emissions related to distribution by 10%

These goals reflect the environmental parameters of greatest importance to Air Products. The target for each goal was developed through an iterative process involving experts across Distribution,

EH&S, Engineering, Operations, and Sustainability and took into account past performance, plans for facility start-ups and shutdowns, and industry benchmarking. The Sustainability Leadership Council approved the goals, which were aligned with Air Products' Board of Directors.

For decades, we have continually improved energy efficiency, which is directly related to CO<sub>2</sub> emissions and water consumption, making these goals appropriate for Air Products. An example of this improvement is our fleet of ASUs in North America, where we have increased energy efficiency by almost 30% since 1980.



# Environmental Management, Risks and Compliance

Our [EH&S Policy](#) describes our commitment to industry leadership in environmental performance through our operations, products, risk management and disclosures.

To implement this policy, Air Products has a global EH&S Management System that applies to 100% of our locations worldwide. This system integrates controls driven by our policies and governmental regulations, and supports the principles promoted by international standards such as ISO 14001. Included in the management system are standards related to environmental risk assessment, best management practices, management of air emissions, water discharges, and wastes, and environmental considerations for mergers and acquisitions. While we believe our EH&S Management System fulfills the requirements of ISO 14001, we consider our customers' needs and seek ISO 14001 certification when appropriate. ISO 14001 certification has been obtained for [facilities in nine countries](#).

Air Products' Board of Directors has formal oversight for environmental performance. Our Sustainability Leadership Council sets our sustainability strategy and reviews programs and progress at least quarterly to assess progress towards our sustainability objectives. The Vice President of EHS&Q has direct operating responsibility for environmental policies and programs and is a member of our EH&S Risk Council, which evaluates potential risks and impacts of proposed business activities and projects. Our Environmental Centers of Excellence (COEs) are comprised of environmental subject-matter-experts from our operating regions who are responsible for supporting environmental requirements, programs and performance. COE members also identify potential risks to the company, share best practices, and communicate their concerns to the regional businesses.

Potential environmental impacts of our products are assessed through our product risk review process that establishes risk management measures based on a product's intrinsic hazards. In addition, we have conducted life cycle assessments of products and processes, such as hydrogen, nitrogen and oxygen production technologies, to assess environmental impacts. We also consider environmental protection during plant design, construction and operation.

We are subject and adhere to various environmental laws and regulations of the countries in which we have operations. Our Corporate EH&S Assurance Group audited 32 plants in 2018 for compliance with governmental requirements and internal standards using our EH&S functional and

operational expertise in production plants. Audit results are reported to senior management and, as appropriate, to the Board of Directors. There were no significant controversies related to Air Products and the environment in 2018.

We work hard to meet all environmental requirements and regulations every day, at every site. The vast majority of our sites use the SAP Compliance Management tool to administer compliance with environmental permits and regulations. However, with over 750 manufacturing facilities around the globe, there are opportunities for plant upsets and unintentional errors that may result in unintended non-conformances.



## Air Products' Environment, Health and Safety Policy

**We will be an industry leader in environmental, health, and safety performance and are committed to the following basic principles in managing our businesses worldwide:**

- Compliance with all applicable environmental, health, and safety laws and regulations.
- Continual improvement in health, safety, and security performance with the goal of zero injuries.
- Continual reduction of the environmental impact of our operations.
- Design and operation of our plants and facilities in a manner that protects the environment and the health, safety, and security of our employees, contractors, and the public.
- Development and production of products that can be manufactured, distributed, used, and recycled or disposed of in a safe, secure, and sustainable manner.
- Existing and new EH&S risks are understood and managed through our Risk Management Processes.
- Transparent discussion of our environmental, health, and safety practices and performance.

Compliance with environmental requirements is tracked and reported monthly. Incident reports, which are tracked in a Global Event Management tool, are required for any situation that may cause harm to the environment or does not maintain compliance with government regulations.

In fiscal year 2018, NOVs were up relative to prior year (17 vs. 14) while KPIs were down slightly (33 vs. 34). There were no reportable spills. Regulatory fines were also higher due to an NOV related to an odor complaint in Chile.

Compliance with environmental laws and regulations also results in capital

expenditures and costs. During fiscal 2018, we spent \$3 million for capital improvement in our facilities to further control emissions and reduce waste. We spent another \$12.8 million in additional operating expenses directly attributable to environmental protection activities.

Air Products is engaged in active remediation at several sites, including some that were part of a former chemicals business which was divested and is no longer part of our business. We accrue environmental investigation and remediation costs when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. The potential exposure for such costs was estimated to range from \$76 million to a reasonably possible upper exposure of \$90 million for fiscal year 2018.

## Global Environmental Measures

	FY18 Performance
Notices of Violation (NOVs) <sup>1</sup>	17
Key Performance Indicators (KPIs) <sup>2</sup>	33
Reportable Spills	0
Regulatory Fines	\$17,600

<sup>1</sup>A deviation from a regulation or permit requirement that is formally cited by a government agency.

<sup>2</sup>Any emission or discharge that exceeds a regulatory or permit limit, the discovery of missing or expired permits and NOVs.



## Efficient Use of Resources

The principal raw materials for making atmospheric gases and hydrogen are air, energy as electricity or steam, and natural gas. Air, which is considered by many to be a renewable resource, represents more than 90% of the raw materials we use on a weight basis. Similarly, 80% of the raw material used for our carbon dioxide business is from renewable sources.

Industrial gas manufacturing is energy intensive. Air separation units require electricity or steam to compress air so that it can be cryogenically distilled into oxygen, nitrogen and argon. Likewise, the production of hydrogen consumes natural gas, and in some cases, refinery off-gas as a feedstock and as a fuel in the production process. At the same time

our products enable our customers to be more energy efficient, which reduces their fuel consumption and emissions.

Packaging is not a significant issue for Air Products because we supply most of our products in two-way bulk or semi-bulk containers or via pipelines. For small-scale supply, we use cylinders that are long life, returnable, and reusable transportable pressure vessels with typical life spans of 20 years or more.

## Energy Conservation and Efficiency

Energy consumption is the most significant variable in the cost of our production processes. We carefully track and manage energy purchases, and our conservation programs are focused on continually improving energy efficiency across our plants, particularly larger facilities.

Our energy consumption in 2018 was 50.8 million MWh, representing a 7% increase from 2017. The increase was a result of our growth that was driven by rising customer demands, particularly in Asia and India.

Of our electricity purchases in 2018, 23% was from renewable sources. This is an increase of 5% from 2017 due to our higher use of renewable energy in Europe, as well as increasing the amount of renewable energy we use that is available on the grids in certain regions where we operate.

In 2018, our ASUs realized a 2% reduction in energy intensity from a baseline year of 2015. Our HyCO units improved energy efficiency by 0.9%. These successes were realized through higher plant utilization; increased production at new, larger and more efficient facilities; and hundreds of facility improvement projects involving changes to equipment and manufacturing processes. For example, equipment replacements at one ASU in the western U.S. saved over 2,000 MWh of electricity and over \$500,000 in costs.

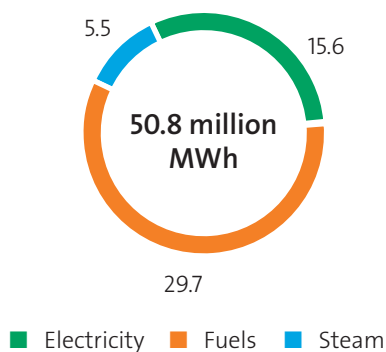
## Energy Improvements in 2018

Our regional businesses identify and implement energy efficiency improvements every year. Additional significant improvements in 2018 includes:

- Recertification to the ISO 50001 Energy Standard in Germany which not only earned a tax rebate, but also helped create higher organizational awareness and generate new ideas for energy conservation and improvements.
- Certification to the ISO 50001 Energy Standard in France.
- Process changes at our facilities in The Netherlands to recover hydrogen and lower process pressures, both of which conserve energy.
- Switching to LED lighting in our Northern European Continent facilities.
- Replacing an existing facility in Baytown, Texas with a higher efficiency plant.



### Energy Consumption



## Renewable Energy

Air Products increased its use of renewable energy in 2018, continuing our journey to identify green energy sources that can reduce our energy costs and environmental footprint.

Air Products France is using renewable electricity to produce merchant industrial and medical gases and to power its sales and administrative offices. We were the first industrial gas company in the country to use 100% renewable electricity and to invest purely in French renewable energy sources. The renewable electricity is validated by the purchase of GO (Guarantee of Origin) certificates registered on the National Registry for Guarantees of Origin. In 2018 we continued our work with the French multinational electric utility company ENGIE to apply blockchain technology to trace and certify the green electricity from wind and hydroelectric power sources to the point of use at our L'Isle d'Abeau plant. The blockchain technology ensures day-to-day matching between

the amount of renewable energy injected by ENGIE on the network and the consumption of electricity by Air Products. The technology further enables Air Products to associate its green electricity certificates with the products delivered to customers who can use this data for environmental assessments.

Wind power is also used in the UK for our merchant gas production through our partnership with Ørsted (formerly DONG Energy), a global leader in offshore wind power. In addition, the UK team is looking at opportunities for on-site energy generation at several facilities.

At our Keumiée, Belgium facility we are using the latest generation of solar roof panels to produce green energy. In 2018 we installed 800 panels on the roofs of the three buildings at the plant, covering an area of 4,800 m<sup>2</sup> (over 50K ft<sup>2</sup>). The panels will meet a significant portion of the site's average annual energy demand. The supplier of the solar panels, Green

Energy 4 Seasons, is a member of the Seed for Life environmental initiative and is planting one tree in Madagascar for each solar panel installed.

Renewable energy is in use at other facilities around the world. In Asia we use electricity from wind power for our ASU in Dalian, China and have solar arrays at two ASUs in Tainan, Taiwan. We are also installing a solar array at our ASU in Kuan Yin, Taiwan. In Europe, and in addition to the projects above, we have signed a deal for rooftop solar at our Halfweg depot in The Netherlands that we expect to bring online in 2019. In the Americas we have a solar array at our facility in Araraquara, Brazil and we continue to operate the solar farm at our current corporate headquarters in Allentown, Pennsylvania. Combined, these solar energy projects generate 5,000 MWh per year of renewable energy. We are also continuing to evaluate power purchase agreements in all European countries where we operate, and in the U.S.



### Storing Energy, Balancing Demand

Air Products has installed energy storage systems at three sites in South Korea (Gumi City, Onsan and Yongyeon in Ulsan City), increasing our energy efficiency while supporting the Korean government's national plan to reduce consumption and shave peak power demand.

Energy storage technologies enhance overall power consumption by capturing and storing excess energy during low demand periods for later use. They can balance and reduce demand from the grid, allowing for emissions reductions, and supplement the intermittence of renewable energy sources such as solar and wind.

## Greenhouse Gases and Climate Change

As a world-leading industrial gas company, Air Products is in a unique position to apply our deep knowledge of atmospheric gases and technologies to help combat the climate change challenge. We support the goals of the [Paris Agreement](#).

Our Greenhouse Gas (GHG) strategy is defined in our [Greenhouse Gases Policy Statement](#) and addresses both opportunities and risks. We believe a

diverse mix of technologies and solutions are needed to tackle greenhouse gases while enabling the world to meet its clean energy demands. We can contribute by developing and deploying products and clean energy technologies with the potential to reduce emissions across energy supply chains.

From our leading position supplying hydrogen to refineries to make low-sulfur, cleaner burning fuels; to large-scale

oxygen systems for solid fuel combustion and gasification; to delivery systems that support the hydrogen economy, we continue to invest in R&D to develop products and processes that contribute to cleaner air and GHG mitigation. In 2018, over half of our total R&D budget of \$65 million was spent on products and processes that improve energy efficiency and/or benefit the environment.



Meanwhile, as we grow our operations to meet the increasing needs of our customers, we are committed to improving our own facilities, acting on emission reduction opportunities, and decreasing our overall environmental impact. These efforts include ensuring the resiliency of our facilities through engineering plant design. For example, our structures and related foundations are designed based on regional wind velocities that consider 50 years of climate data. Likewise, in the design and layout of our plants we evaluate how to eliminate or minimize flooding risks based on site drainage where we identify this as an issue, as well as the use of flood walls and elevation for sensitive equipment if necessary.

Our Sustainability Leadership Council is engaged in addressing the risks and opportunities related to climate change, which are routinely reviewed by our GHG COE. The COE is comprised of regional environmental experts and Government Relations team members representing the Americas, Asia, and EMEA, as well as our Sustainability Team. In addition to risk assessment, the COE considers the financial impacts of climate change, supports internal policy development, tracks regulations and legislation, and regularly updates management. COE members communicate risks to potentially impacted businesses to develop strategies and execute plans to address the risks.

Some of our operations are within jurisdictions that have, or are, developing regulatory regimes governing emissions of GHGs. These include the European

Union Emission Trading System, the California Cap and Trade Scheme, Alberta's Carbon Competitiveness Incentive Regulation, China's Emission Trading Scheme, South Korea's Emission Trading Scheme, and Environment Canada's developing Output Based Pricing System. In addition, the U.S. Environmental Protection Agency (EPA) requires mandatory reporting of GHG emissions for certain operations and is regulating GHG emissions for new construction and major modifications to existing facilities. Some jurisdictions also have developed mechanisms to target the power sector to achieve emission reductions that can result in higher power costs.

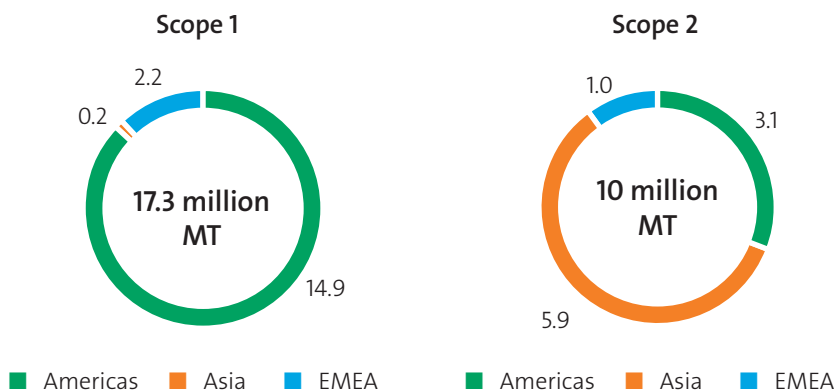
Developments related to the Paris Agreement and increased public concern may result in more requirements to reduce or mitigate the effects of GHGs. These developments could increase our costs related to energy or GHG emissions. We will be able to mitigate some of the increased costs through contractual terms, but the lack of definitive requirements prevents an accurate estimate of the long-term impact these measures may have on our operations. As noted in our 2018 Annual Report, any legislation that limits or taxes GHG emissions could negatively impact our growth, increase our operating costs, or reduce demand for certain of

our products. These are some of the reasons why we are striving to reduce our environmental impact while working with regulators to ensure economic and environmental solutions to GHG emissions.

In 2016 Air Products established a goal to reduce GHG intensity 2% by 2020 from a 2015 baseline. This goal was set based on past performance, operational changes, and industry benchmarks. We also evaluated techniques for establishing a science-based target. However, due to the nature of our business and heavy reliance on energy, thus far, we have been unable to develop a credible, economically viable, and achievable target.

Performance against our goal is calculated by totaling Scope 1 and 2 emissions normalized to production for the reporting year, and then dividing by this same ratio for the baseline year. This results in a dimensionless value that shows year-on-year changes but does not disclose production levels, which are company confidential.

In 2018, our Scope 1 GHG emissions, which are primarily related to HyCO operations were 17.3 million MT, representing a 5% increase from the prior year. Our Scope 2 emissions, which are due in large part to emissions related to the electricity and steam we consume in our ASUs, were 10 million MT in 2018, which was a 5%



increase from 2017. Our Scope 3 emissions were 5.2 million MT and rose by 6% to the prior year due primarily to increased energy consumption.

The increased emissions were due to a significant increase in industrial gas production, particularly in Asia where our ASUs are often driven by steam produced from coal because electricity is not available. In 2018, our GHG emissions intensity declined by 1.5% compared to 2015 and we are on track to meet our 2020 goal.

We use the World Resources Institute (WRI) / World Business Council for Sustainable Development (WBCSD) Greenhouse Gas Protocol standard to define organizational and operational boundaries, emission calculation methodologies, and inventory quality aspects to ensure an accurate and representative inventory. We apply the financial control method and use publicly available global warming potentials and emissions factors, primarily from the Intergovernmental Panel on Climate Change, International Energy Agency, and U.S. Energy Information Administration. GHG emissions reporting is mandatory in many of the jurisdictions where we operate, and we incorporate these reports into our inventory. Scope 2 emissions are calculated using the location-based method.

An Inventory Management Plan defines the work processes employed in managing our data, documents emission estimation methodologies and guides any restatements of historical values based on objective criteria. The calculations and data are subjected to several levels of quality assurance to ensure completeness and accuracy of the resulting emissions inventory. The Inventory Management Plan and all the underlying calculations and data compilations are reviewed by an independent, third-party assurance firm. For our 2018 inventory, this work was completed by WSP.

## New Global Headquarters: Going Vertical for Sustainability

In July 2018 an overflow gathering of employees at a Town Hall was informed that the company's new global headquarters facility would be built in Pennsylvania's (U.S.) Lehigh Valley, not far from the company's current headquarters location – moving a little over one mile from the existing site.

The new headquarters site will include new administration offices, an R&D facility, and an enclosed parking structure for employees. Occupancy for approximately 2,000 employees with capacity for growth is targeted for Summer 2021.

Sustainability is a key driver for the global headquarters, and it all starts with its vertical design. By going vertical with the administrative building and parking structure, the total building footprints and the resulting impact on soil and storm water are significantly reduced, and at the same time green space per developed acre increases. The new facility will sit on a 53-acre tract of property that is much smaller than the 235-acres of property and 1.5 million square feet of buildings making up Air Products' current campus.

Going vertical also increases the exterior glazing, infusing work spaces with more natural light and provides views of the nearby surroundings. Meanwhile, a neighborhood approach to office planning and interconnected stairs among floors will help improve collaboration with colleagues and efficiency inside the building.

The new location will take advantage of sustainable technologies and afford Air Products a special opportunity to modernize and optimize office space and R&D facilities, improve energy efficiency and water conservation, support employee health and wellness, and invest in a work environment that motivates and energizes employees. As a global company operating in more than 50 countries, the new headquarters will reflect the safety, speed, simplicity and self-confidence to move Air Products forward as a world-leading industrial gas company.

In the meantime, sustainability efforts at the current headquarters location in Allentown remains a focused effort. Environmental improvements during 2018 versus 2017 have included: reduced natural gas consumption by 9.2%; reduced water consumption by 8.4%; reduced electricity by 1.1%; and used power generated by solar, which reduced the amount of power taken off the grid by 5.4%. In addition, we generated 2,100 MWh of electricity using our solar farm and recycled 59% of the waste we generated, including 435 tons of paper, cardboard, metal, wood and leaf wastes.

Conceptual Rendering, Feb 2019



## Distribution Efficiency

Each year, our drivers travel about 150 million miles, or 240 million kilometers. That's the same as going to the moon and back more than 300 times.

With that distance to travel, being as fuel efficient as possible makes strong financial and environmental sense.

To improve our fleet efficiency in 2018, we replaced 15% of our North American tractors as part of a six-year implementation plan. In the UK, we replaced nearly 50% of our fleet with fuel efficient Euro 6 compliant tractors that also reduce NO<sub>x</sub>, CO and PM emissions by 10-15%. We are also replacing tractors in France, Belgium and The Netherlands while testing the impacts of aerodynamic kits.

Our fleet upgrades also include higher payloads on some vehicles, increasing tons-per-distance-driven, and fuel efficiency. Improvements to our French fleet will help us meet our commitment to FRET 21, which we renewed and pledged an additional 7% reduction of CO<sub>2</sub> emissions in our product transport within France.

Alternative delivery methods, such as our Microbulk business, as well as our scheduling teams' efforts to reduce overall driving distances, contribute favorably to our distribution efficiency. Since 2015, we have improved our distribution efficiency by 16% and transportation related CO<sub>2</sub> emissions by 30 thousand metric tonnes.



### Supersizing Gas Delivery

**Jumbo trailers offer environmental and productivity benefits over traditional trailers by reducing the distance traveled per volume of gas delivered. We have procured 30 jumbo trailers for use in France and The Netherlands, including:**

- 20 jumbo liquid oxygen and liquid nitrogen trailers with a 10% larger payload for use in France;
- Three jumbo liquid nitrogen trailers with a 20% larger payload to serve The Netherlands; and
- Seven jumbo bulk hydrogen trailers having 80% higher payloads for use in The Netherlands.

Use of these new trailers has improved distribution efficiency by 26%.





## Hydrogen Delivers Cleaner Air Every Day

Hydrogen is essential for removing sulfur from crude oil and producing cleaner burning transportation fuels. These fuels, combined with changes to internal combustion engines and emissions control systems, have enabled significant reductions in transportation emissions. That includes reductions in SO<sub>2</sub>, which can harm the human respiratory system and contribute to acid rain that impacts our ecosystems.

Using hydrogen to reduce sulfur also enables catalytic converters to work more efficiently and decreases other pollutants from transportation fuels such as NO<sub>x</sub>, PM, and volatile organic compounds (VOCs), which also cause respiratory problems and contribute to pollution. In addition, the largest component of particulate matter, black carbon, has a strong global warming potential that can impact climate change.

The most practical, commercially viable way to produce the volume of hydrogen needed to produce cleaner transportation fuels is to extract it from natural gas using steam methane reforming. This process releases CO<sub>2</sub>, a greenhouse gas, but the CO<sub>2</sub> released from our SMRs is more than offset by the CO<sub>2</sub> avoided from black carbon emissions.

The use of hydrogen in the oil refining process has additional benefits – it helps conserve a valuable natural resource as it increases the amount of fuel that can be produced from every barrel of crude oil. In fact, by using hydrogen in the refining process, refiners have increased the production of transport fuels by improving yields from 42% in the 1990s, to a present 82%.

Air Products has more than 60 years of global hydrogen experience. Every day, we make three billion standard cubic feet of hydrogen. We have more than 100 hydrogen production plants worldwide, and the world's largest hydrogen supply pipeline network over 600 miles in length in the United States' Gulf Coast.

Our SMRs maximize energy efficiency and optimize heat integration. This alone reduces emissions by converting more feedstock into hydrogen. Many SMRs use waste refinery fuel gas as a feedstock, thereby preventing pollution of waste gases and reducing the need for fossil fuels. We also use our SMRs to make steam for our customers, producing it in a way that is much more efficient than boilers. Plus, our patented, combined gas turbine SMR cycle enables the co-production of electricity from the process.

With more people and more vehicles around the world, more cleaner fuels will be needed. We will continue to work hard to meet the industrial and societal global demand for more hydrogen; to innovate and make the hydrogen production process more sustainable; and with an eye to the future, look to increasing renewable hydrogen sources for fueling.

### Looking Ahead to the Hydrogen Economy

The world faces a huge challenge in making the shift toward clean, sustainable energy sources. In many ways, hydrogen is a great solution. It enables the integration of renewables into power generation, fuels and distributing energy across sectors and regions supporting the decarbonization of transportation and energy use. When used in a fuel cell, hydrogen is nearly two times more efficient than gasoline and diesel on a well-to-wheel basis and produces no emissions. Hydrogen can also be made from renewable resources and may be the only alternative fuel that can simultaneously reduce a country's dependence on imported energy and significantly reduce GHGs.

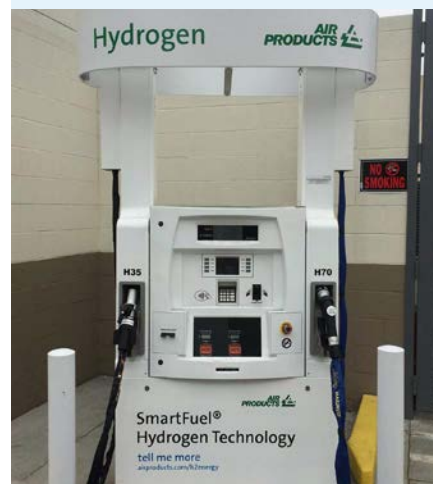
To enable successful commercialization of hydrogen vehicles around the world, Air Products has taken a leadership position in the development of hydrogen supply and fueling infrastructure. Our plan has been to demonstrate how to build out a hydrogen market holistically. We have proven through our efforts

## A First for Renewable Hydrogen

Air Products is working with CertifHy, a European-wide initiative for low carbon and renewable hydrogen, on a pilot project to generate some of Europe's first Guarantees of Origin (GO) sustainable, renewable hydrogen. Transferable across the continent, GOs are intended to create an innovative, transparent hydrogen market. The GOs are being sought for hydrogen produced at the Rotterdam, Netherlands chloralkaline electrolyzer plants of Nouryon (formerly AkzoNobel Specialty Chemicals), which uses wind power as part of its energy mix. Once produced, the hydrogen is conditioned by Air Products before taking it into our established pipeline in Rotterdam for commercial use.

As part of the pilot project, two of Air Products' hydrogen customers in the mobility sector will receive GOs for renewable hydrogen. The first is H<sub>2</sub> MOBILITY Deutschland, an organization operating a network of hydrogen fueling stations in Germany. The second is London's integrated transport authority, Transport for London, which operates hydrogen buses across the UK's capital.

Having a European-wide Guarantees of Origin program for renewable hydrogen will contribute towards a clean, sustainable transportation system and help meet the carbon dioxide emission reduction targets of European Union countries in a cost-effective way.





in California that it is possible to meet transportation fueling needs safely and competitively and are continuing our leadership position in the state through new fueling stations, additional hydrogen capacity, increasing reliability and renewable sources.

Our SmartFuel® hydrogen fueling technology has been adopted in the Society of Automotive Engineers (SAE's) hydrogen fueling standard practiced worldwide. This advanced, high-pressure dispensing system enables hydrogen-powered fuel cell vehicles to be refilled in a safe, fast, reliable, and familiar manner. In fact, SmartFuel® technology has been used in approximately nine million hydrogen fills to date, and Air Products has been involved in over 250 hydrogen fueling projects in over 20 countries.

In 2018, Air Products signed several agreements for fueling stations, including an agreement with Shenhua New Energy Co. Ltd. to supply China Energy Investment Corporation Limited's first hydrogen fueling station being built in Rugao City. Also, in China we signed cooperation and equipment supply agreements with Fullcryo for the first commercial-scale liquid hydrogen-supplied fueling station, and with Weichai Power Co., Ltd. to build a station for this premier powertrain manufacturer. Early in 2019, we announced the signing of an agreement with Saudi Aramco to jointly-build the first hydrogen fuel cell vehicle fueling station in Saudi Arabia and establish a pilot fleet of fuel cell vehicles for which high-purity compressed hydrogen will be dispensed at the new fueling station.

We are also supporting the development and use of hydrogen in trucks, buses, trains, river boats, cruise ships and for material handling. In 2018 we saw a significant increase in the use of hydrogen in forklifts that was driven by large retailers.

We are working to advance the hydrogen economy. Air Products is a long-standing member of the U.S. Department of

Energy's Hydrogen and Fuel Cell Technical Advisory Committee, which is aimed at advancing hydrogen and fuel cell technologies. In 2018, we joined the Hydrogen Council, a global CEO coalition for hydrogen technologies. The Council is comprised of over 50 leading companies in industrial gases, energy, transportation and other key industries that support the use of hydrogen to transition to cleaner energy. According to the Council, hydrogen could account for a significant portion of total energy consumed by 2050, substantially reduce CO<sub>2</sub> emissions by multiple gigatons, and has the

potential to power several million cars and trucks by 2030.

We also joined the new China National Alliance of Hydrogen Energy and Fuel Cell (China Hydrogen Alliance). Formed in spring 2018, the China Hydrogen Alliance promotes innovation and collaboration for progressing China's hydrogen and fuel cell industry. Air Products also serves as a vice chairman company of the International Hydrogen Fuel Cell Association, which supports the hydrogen energy blueprint outlined in the China's 13th Five-Year Plan.

## Investing to Meet Customer and Market Demand

### New Liquid Hydrogen Facilities Targeted for California and Texas

Investing in new production facilities is always a prime indicator of a company's commitment to meeting customer needs and market demand. In 2018 Air Products announced plans to do just that with new liquid hydrogen plants to be built in California and Texas. Both facilities are slated to be onstream and supplying customers in 2021.

From these new facilities liquified hydrogen will be delivered in trailers to customers in industries including: electronics, chemical and petrochemical, metals, float glass, edible fats and oils, and utilities, as well as to hydrogen fueling stations. The stations supply hydrogen into various hydrogen fueling applications such as material handling, cars, buses, medium and heavy-duty trucks and marine vehicles.

In California, Air Products is responding to increasing customer demand from several markets, including the steadily growing fleet of hydrogen fuel cell vehicles (FCV) being driven on the roads and highways in the state. This new facility will be the second Air Products' liquid hydrogen production facility in California, adding to an existing facility in Sacramento.

The new Texas facility will be located at Air Products' La Porte industrial gas plant. Liquid hydrogen will be produced with hydrogen supplied from Air Products' extensive Gulf Coast pipeline network, the largest hydrogen plant and pipeline supply network in the world. The 600-mile pipeline span stretches from the Houston Ship Channel in Texas to New Orleans, Louisiana, and supplies customers with nearly 1.5 billion standard cubic feet of hydrogen per day from over 20 hydrogen production facilities. In announcing the two new liquid hydrogen plants, Air Products pledged to continue to evaluate additional capacity needs and make investments to provide a reliable source of this vitally important product to meet customer demand.





## Water Conservation

Water conservation is critical to the health and sustainability of our planet. Experts project a 40% shortfall between water demand and fresh water supply by 2030, and by 2050, nearly three billion people will live in water-stressed areas.

Air Products cannot operate facilities around the world without adequate water supplies, and this reality drives us to be good stewards of water.

We use water primarily for cooling, to make hydrogen using the SMR process, and to provide steam and water to our customers. The steam is a co-product of our SMRs and has a significant energy efficiency advantage when compared to steam generated from boilers. Because of these uses, our water consumption is tied closely to energy use; therefore, improvements in energy efficiency can also conserve water. We also use water for safety systems (i.e., fire suppression) and cleaning, but these do not have a material impact on our water consumption.

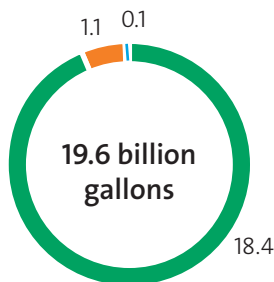
Air Products' Water COE monitors risks associated with water. Comprised of representatives from our regional environmental teams, the COE tracks developments in water permitting,

protection and quality. COE members work with local stakeholders to identify water use reduction opportunities and sourcing strategies. Key risks related to water include:

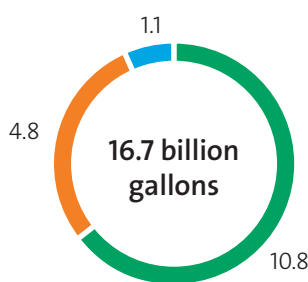
- Sufficient amounts of good quality water available for use at our facilities, as well as at the facilities that produce the energy we need to run our plants;
- Sufficient amounts of recycled water for our facilities that use gray water, including several sites in North America; and
- Increasing costs of water tariffs, although these are not expected to have a substantive impact.

We have also used the WBCSD Global Water Tool to identify operations in water stressed areas. We define a substantive water risk as the potential closure of a facility in an area of extreme water scarcity, specifically those areas where the annual renewable water supply per person is <500 m<sup>3</sup> or where the baseline water stress is extremely high (per the WBCSD Global Water Tool). In 2018, nearly 100 of our facilities were in water stressed areas.

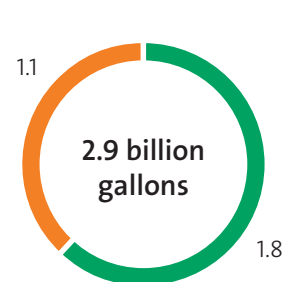
**Water Withdrawn**



**Water Consumed\***



**Water Discharged**



■ Purchased    ■ Groundwater  
■ Surface Water

■ Americas    ■ Asia    ■ EMEA

■ Treatment    ■ Surface Water

\* Includes water discharged but not returned to source

We address water risk in several ways. At most of our largest industrial gas production facilities, customers provide water to our operations under contractual arrangements. We also recycle water with many customers via steam or water export and condensate return.

We also assess potential water risk when siting our facilities and in executing long-term supply contracts. In addition to using recycled water, in some water-scarce areas we have converted to cooling with air rather than water. An example is our facility in Inner Mongolia, China that uses a closed cooling water system where water is stored underground during colder months when it is not needed for process cooling.

Increasing global water demands provide Air Products an opportunity for business. By identifying opportunities where our technology and product strengths bring cost-effective solutions for our customers,

we seek to both improve water quality and treat wastewater for reuse. Our offerings include pure oxygen aeration systems for wastewater treatment and aquaculture, oxygen for ozone generation, carbon dioxide for pH adjustment and drinking water remineralization, and ozone and advanced oxidation systems for wastewater treatment.

Air Products has established a goal to reduce water consumption by 5% on an indexed basis by 2020 from a 2015 baseline. We achieved this goal in 2017 and continued to improve water efficiency during 2018, reducing our water intensity by 8% in 2018 for a total reduction of 18% since the baseline year.

Our consumption of water, on an absolute basis, increased to 16.7 million gallons in 2018 due to increased production required to meet our customers' needs, globally.

We have achieved water efficiency improvements by identifying facilities that are consuming more water per unit production than similar facilities, conducting assessments at these facilities to identify conservation opportunities, and making appropriate changes at the plants. Improving cooling tower operations and converting to recycled gray water in our plants have contributed to much of our water conservation to date.

We have looked for opportunities to use recycled water and reduce our consumption of freshwater and have encouraged our industrial neighbors and joint venture partners to consider the use of recycled water in water stressed areas, particularly in Southern California. Across all our plants, we estimate that 7% of our water was from recycled sources in 2018.

The direct water discharges from most of our ASUs are predominantly cooling tower blowdown streams with low chemical oxygen demand (COD). In fact, most of the water we use for cooling is returned to its source through a public treatment facility and at a higher quality than when it entered our plants. Our HyCO operations typically generate higher COD wastewater streams; however, these are transferred to nearby regulated facilities where COD is effectively treated prior to the water being discharged to the environment. COD releases totaled 22 metric tonnes in 2018.

We check the status of our water sources and discharges each year using the WBCSD Global Water Tool and as part of our participation in CDP's annual water survey. Water we withdraw for use at our facilities, or discharge from our operating sites, does not significantly affect any ecosystems, habitats or water sources.

## Reducing Water Consumption in the Americas: 60 Million Gallons and Counting

In the Americas we work closely with our primary water treatment providers on projects that improve water productivity and reduce consumption. In 2018, 26 water projects were completed, saving over five million gallons of water and over \$300K in water purchases and sewerage costs. Optimizing cooling tower cycles at two facilities near Cleveland, Ohio contributed substantially to the water savings. These efforts reduced the amount of water used for flushing high mineral content water from the systems ("blowdown") and decreased the amount of fresh "make-up" water that must be added to replace the flushed water.

Over the past three years this collaboration has enabled water savings of nearly 60 million gallons, which is equivalent to the water in 90 Olympic-sized swimming pools, and cost savings of over \$850,000.





## Waste Management

Although industrial gas production does not generate a significant amount of waste, we are continually looking for ways to prevent waste generation and reduce disposal.

Definitions of hazardous waste vary by jurisdiction, so we use the local definitions in our reporting. Most of the hazardous waste we generate is from acetylene manufacturing, which results in a byproduct lime slurry. This lime slurry is often beneficially reused in other processes, such as in neutralizing water, producing bricks, and hardening materials in landfills.

Other sources of hazardous waste include spent catalysts, waste oils and solvents, waste paint and materials used to clean-up small spills. All waste is managed and treated in accordance with the regulatory requirements of the jurisdiction in which the waste is generated. Waste that cannot be recycled is disposed of in an environmentally sound and regulatory compliant manner.

In 2018, the amount of hazardous waste we generated increased by 5.6% when compared to 2017, due primarily to plant decommissioning in 2018. Waste volumes are based on invoices and collected on a global basis. All hazardous waste was shipped off-site for handling, and no hazardous waste was shipped internationally.

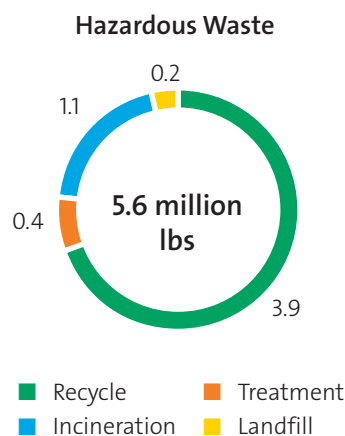
With respect to non-hazardous waste, Air Products has a complete dataset for North America that is supported by our national waste vendors. In 2018, this waste totaled 7.1 million pounds, which was 12% lower than in 2017. We are continuing to analyze information available for non-hazardous waste on a global scale.



### Reducing Plastic Waste

While Air Products does not use a lot of plastics, our employees are keen on reducing and recycling them. For example, employees at Air Products' Paris office have eliminated the use of plastic cups and installed recycling bins, recycling over 800 kilograms of waste in 2018. Plastics are also being eliminated across Southern Europe and have been completely removed from all of our Carbueros Metálicos (Spain) and Gasin (Portugal) sites, as well as our European Shared Services Center in Cornellà, near Barcelona (Spain).

Recycling is not only good for the environment, its proceeds can support social causes. For example, our employees in Hattingen, Germany are collecting plastic container covers to be recycled through the "Lids Against Polio" initiative. Proceeds from recycled lids are used to cover the cost of polio vaccinations for children in Afghanistan, Pakistan and Nigeria. Five hundred lids are about 1 kilogram of plastic—enough to cover the cost of one polio vaccine.





## Air Emissions

The production of atmospheric gases emits almost zero pollutants directly to the air. Most of our air emissions are a result of hydrogen manufacturing and utility operations that support our facilities.

We monitor and report emissions of NO<sub>x</sub>, SO<sub>x</sub>, certain toxics, hazardous air pollutants (HAPs) and VOCs in accordance with applicable regulations.

NO<sub>x</sub> and SO<sub>x</sub> are products of combustion and result primarily from the fuel we use in our boilers and SMRs. The remaining air pollutants result from the loss of chemicals used in our processes or solvents used in the maintenance of equipment.

### NO<sub>x</sub> and SO<sub>x</sub>

NO<sub>x</sub> and SO<sub>x</sub> emissions were 1,474 and 71 metric tonnes in 2018, respectively. NO<sub>x</sub> emissions decreased 6% year-on-year due to reduced boiler operations. SO<sub>x</sub> emissions increased by 3% from prior year due primarily to production increases.

### Toxic Release Inventory (TRI) and VOCs

TRI is a U.S. EPA program for tracking toxic chemicals that may pose a threat to human health and the environment. Each year, U.S. facilities in different industry sectors must report how much of each chemical is released to the environment and/or managed through recycling, energy recovery and treatment. TRI data is reported during the summer following the reporting year, and so the data we report is one year in arrears in our annual sustainability reporting.

Toxic releases totaled 0.2 million pounds in 2017 and increased compared to prior year due to production increases. Hazardous air pollutants (HAPs) for 2018 were 0.04 million pounds and decreased compared to prior year. VOCs were slightly higher at 0.12 million pounds.

### Ozone Depleting Substances and Fluorinated Gases

Air Products does not manufacture ozone depleting substances (ODS) such as hydrochlorofluorocarbons (HCFCs) or chlorofluorocarbons (CFCs). We do sell different gas mixtures that contain very small quantities of HCFCs and CFCs in cylinders for calibration of detection instruments, as allowed under the Montreal Protocol. We phased out the use of ozone depleting substances in plant refrigeration systems at our facilities in advance of legislative requirements.

Fluorinated or “F gases” are often used as a replacement for ODS. We do not make F gases, but do supply them in Europe for use as refrigerants and in mixtures for specialist applications such as calibration. We also recover, recycle and reclaim the gases for destruction.

### TRI Releases for 2018\* (millions of pounds)

Air	0.18
HAPs*	0.04
Water	0.00
Land	0.02
Total	0.20

\*TRI data is available in August of the reporting year. HAPs are a subset of TRI air releases.

## Biodiversity

Early in the planning stages of any new capital investment, from new plants or expansions to pipelines, we assess safety, human health, socio-economic, cultural and environmental impacts with an aim toward balancing benefits and minimizing impacts. Assessments also include consideration for bio-ecology, land use and ecosystem impacts, including impacts on wildlife, vegetation and environmentally important habitats such as wetlands. These assessments can influence decisions to modify a project or develop mitigation strategies to ensure the ecological health of the location and region is maintained or enhanced. Likewise, our construction practices focus on preserving the local environment by reducing the likelihood of spills or negative effects from runoff.

For our existing operations and based on information from the World Business Council for Sustainable Development Water Tool, Air Products discharges water into eight Conservation International Biodiversity Hotspots including: the Atlantic Forest, California Floristic Province, Chilean Winter Rainfall and Valdivian Forests, Indo-Burma, Mediterranean Basin, Sundaland, Tropical Andes and Tumbes- Choco-Magdalena. The water discharged into these hotspots in 2018 was insignificant, averaging <0.01% of the total volume of water contained in the associated water body.

### Examples of Air Products’ sponsorships of local ecosystems include:

- The Pool Wildlands Conservancy in Emmaus, Pennsylvania, a 72-acre wildlife sanctuary bequeathed by Air Products’ founder, Leonard Parker Pool, to the Wildlands Conservancy, which today serves as the Lehigh Valley’s premier not-for-profit environmental organization.
- Ongoing support for the 1,400-acre C. W. Milmore Wildlife Sanctuary in Pensacola, Florida.



# Care



# Care for our employees, customers and communities— protecting our license to operate and grow

## Promoting Safety, Diversity and Community Support

0

employee  
fatalities

15%

decrease in employee  
recordables

18%

decrease in contractor  
recordables

7

employee resource groups  
for diversity and inclusion

22%

women in  
global workforce

10.9%

turnover  
rate

\$6.9

million in cash contributions  
to communities

~200

STEM programs  
globally

~100,000

people touched  
by STEM programs



## Safety at Air Products

Safety. It's central to our company goal of being the safest, most diverse and most profitable industrial gas company in the world, providing excellent service to our customers. We also believe it's a moral obligation. We want our employees to return home to their families as safe and in the same condition as when they arrived for work.

Our beliefs about safety have been instituted since 1975 through our Total Safety Philosophy, which stresses that nothing is more important than safety, and that adherence to safety is a condition of employment.

Supporting this philosophy is Air Products' global EH&S Policy, which reinforces our commitment to be an industry leader in safety performance, continual improvement in safety with the goal of zero injuries or incidents, maintaining safe plants and products, managing safety risks, and publicly sharing our safety practices and results. Every employee is required to understand and adhere to our global EH&S Policy.

Year-on-year, we strive to improve safety at all our sites to benefit our colleagues, customers, and the communities where we operate. Since 2014, we have improved our lost time injury rate by more than 71% and our recordable injury rate by 50%. Our 2020 goal to lead the industrial gas industry in safety helps drive our performance.

# Safety<sup>#1</sup>



### Our Total Safety Philosophy

#### We believe that:

- **Nothing is more important than safety** . . .not production, not sales, not profits;
- **All accidents and injuries are preventable** . . .not inevitable;
- **Safety is a management responsibility** . . .and safety can be managed;
- **Safety is an individual responsibility** . . .and a condition of employment;
- **Safety is a way of life** . . . around the clock; and
- **Every task must be performed with a concern for safety** . . .for ourselves, our fellow employees, our contractors, our visitors, our customers and the communities in which we operate.

### Our Basic Safety Process (BSP) includes:

- Demonstrate safety leadership through highly visible activities.
- Clearly defined and measured safety responsibilities that promote accountability.
- Planned activities designed to help us achieve, and then maintain, safe work conditions and safe work behaviors.
- Requirements for contractors to participate in BSP activities.
- Emergency preparedness activities that help us practice and test responses.
- Performance measures that focus on key process indicators so we know that we are applying the right amount of effort at the right place, before incidents occur.

## Safety Management, Risks and Compliance

As noted in the Conserve section of this report, our global EH&S Policy and Management System applies to 100% of our locations worldwide. This system integrates corporate policies and governmental regulations, and supports the principles promoted by international standards such as ISO 45001:2018 Occupational Health and Safety Management System. There are over 250 standards in our EH&S Management System, and the majority are related to safety and/or health.

We are subject to various safety laws and regulations in the countries in which we operate. In 2018, our EH&S Corporate Assurance Group audited 32 plants globally for compliance with safety-related governmental requirements and internal standards. Senior management and the Board of Directors received these audit results, which showed no significant safety issues.

Like environmental risks, we evaluate safety risks at multiple levels. Our EH&S Risk Council reviews risks related to worker safety and health, process safety, product safety and transportation safety, as required. Our Centers of Excellence, comprised of subject matter experts in various areas of safety, identify potential risks to the Company, share best practices, and communicate any concerns to our regional businesses.

We have prescriptive processes for evaluating safety risks associated with specific jobs, new and existing processes,

new projects, new and existing products, and product transportation. These include Operating Plant Hazard Reviews, Project Hazard Reviews, Operational Readiness Inspections, Health Hazard Assessments, Product Risk Assessments, Transportation Risk Assessments, and more. Where we believe a risk may be too high, we take risk reduction measures, or cease operation or supply of a product. In addition to these formal activities, employees are accountable for controlling risks in their own daily work activities through safety work permits, job safety analyses, task safety observations and other measures.

We also set safety and health training requirements for every employee in the company based on job function and risk exposure. Ranging from basic EH&S Management System awareness, to more specific skills such as Confined Space Entry and Respiratory Protection, we build these requirements into each employee's specific training profile. Compliance is tracked in a global database and reported monthly.

Incident reports, which are tracked in a global Event Management tool, are required for near misses, accidents and injuries, and regulatory agency actions.



**Our 2020 goal:** Lead the industrial gas industry in safety as measured by recordable and lost-time incident rates.



### Safety and Health Elements of our EH&S Management System

- Safe Systems of Work
- Occupational Health Protection
- Emergency Preparedness
- Process Safety Management
- Product Stewardship
- EH&S Assurance
- EH&S Training
- Incident Reporting and Investigation
- Product Distribution
- Procurement and Contractor Control

## Worker Safety

Our Basic Safety Process, now in use for 15 years, provides the framework for employee engagement in upholding and continually strengthening our safety performance. BSP is focused on planned inspections, observations, and behavior-based activities. Employees at all levels of the Company, including those under collective bargaining agreements, engage in coordinated BSP activities, including sequential safety meetings, which are held at least quarterly for vice presidents, directors, and managers, and monthly for supervisors and their employees. The meetings provide opportunities to monitor the status of safety systems, plan and manage safety activities and improvements, and review the effectiveness of prevention activities. Conversation and feedback are encouraged through these meetings, enabling information, concerns, and decisions to flow up and down the organization. Contractors also participate in BSP activities.

With respect to trade unions, our agreements are made at the local level, and the agreements typically include health and safety considerations, such as personal protective equipment, compliance mechanisms, and the employee right to refuse unsafe work. Air Products requires union personnel to participate in BSP. As a result, union workers are engaged in health and safety committees, inspections, audits, and



accident investigations, among other activities. They also participate in required safety training.

BSP is taken one step further through our 'Master the Basics' mindset. Master the Basics gives employees a mental checklist to use before undertaking any task. That checklist includes being aware of surroundings, knowing physical limitations, following procedures, using the proper personal protective equipment, and thinking before acting. This mindset makes safety personal and actionable.

Our European Team has built on BSP and Master the Basics to develop a Life Saving Behaviors program. This program reminds employees about our Top 20 Life Saving Standards, which are the most important standards in our EH&S management system because failure to follow them even once creates a higher chance of significant injury. The program recognizes that we need every individual to be actively engaged in identifying hazardous situations and taking appropriate actions to manage safety.

## Process Safety

Staying on top of potential process safety hazards is one of the most important aspects of managing safety. To promote process safety, we apply sound engineering principles to design, construct, operate, and maintain our plants and equipment while minimizing process related hazards. Our program considers regulatory requirements, such as OSHA Process Safety Management and the EU Seveso Directive, and includes procedures, training, hazard assessments, and quantified risk analysis.

We use key performance indicators (KPIs) to measure the effectiveness of our process safety work processes and programs. These include but are not limited to process safety incidents, which are events that result in an unintentional release of material or energy. Incidents that we include in our KPIs have a high severity rating or meet at least one of three criteria: property damage above a certain threshold; a gas or chemical release above thresholds; or an incident that results in a serious injury. The indicators are based on industry reporting principles set by the American Petroleum Institute and in alignment with the Center for Chemical Process Safety.



These KPIs are considered part of the “lagging indicators” that measure performance of the process safety management program. We also measure “leading” process safety indicators that illustrate the health of our process safety management system and process safety “near misses,” enabling us to identify and prevent potentially unsafe situations.

We communicate our KPIs through regular safety meetings. Analyzing this data helps us to review our current work practices and identify opportunities for process safety improvement. In 2018, our total number of process safety events increased relative to the prior year, though our rates remained at benchmark levels when compared to our peers and customers.

## Emergency Preparedness and Crisis Management

A critical part of BSP and our risk management effort is preparing for emergencies and crisis events. Every facility is required to have a site emergency plan on which employees train and practice. The practice may be through table top exercises or drills that include the participation of local emergency responders. If a crisis involving one of our facilities or products occurs, we quickly activate our 24/7 Crisis Management System. This system involves employees at all levels of the Company—from plant workers to executives—and marshals the resources and management skills necessary to effectively respond and lead in a crisis. We also have plans across our businesses and critical functions to address potential business interruptions due to catastrophic events.

### Air Products Partners with Los Angeles Fire Department on Safety Training

Vehicle fires are unusual for Air Products, but when they happen, our response is quick and effective. This was the case during an incident in 2018 in which one of our tube trailers was transporting compressed hydrogen to a fuel cell vehicle (FCV) fueling station near Los Angeles, California. We quickly dispatched a response team to the truck and worked with local responders and authorities to resolve the incident, safely recover and remove the vehicle from the area.

California has the most hydrogen fueling stations of any state in the U.S. and continues working with auto manufacturers and government policy makers to further develop its hydrogen infrastructure. To help emergency responders prepare for hydrogen incidents, we partnered with the California Fuel Cell Partnership (CaFCP) and delivered a three-day emergency response training program to about 100 Los Angeles County Fire Department (LAFD) personnel.

The training covered the properties and hazards of hydrogen and FCVs, as well as information on the distribution of hydrogen with an emphasis on the types of product delivery trailers used and emergency response protocols. An Air Products driver from our Santa Fe Springs terminal presented on pre-trip inspections, the safety aspects of our tractors, safety during deliveries, and the key safety features of the trailer equipment.

In addition to helping the LAFD prepare for any potential emergencies, we received useful feedback on our safety programs and furthered our positive relationship with the CaFCP and LAFD.



# Life Saving Behaviors

The 'Life Saving Behaviors' listed below are derived from and intended as a reminder of our Top 20 Life Saving Standards. To progress on our collective safety journey to reach and then sustain zero accident performance, we need every individual to be actively engaged in recognizing hazardous situations and taking appropriate actions.

**Safe behaviors save lives. At Air Products we believe that each and every one of us must . . .**



**Take responsibility** for our own actions, workplace conditions and decisions, both when **working alone** and with others . . . if ever you feel unsafe you should speak up.



**Drive defensively**, be alert and focused on traffic conditions . . . **avoid distractions** and stop for a break when you feel you need it.



Only work on **electrical systems** if qualified and authorized . . . and confirm that all required precautions are in place.



Use the **safety work permit** process to identify hazards, to anticipate and prevent possible accidents . . . and if you or anyone else does not feel safe, you should discuss it with the permit issuer or supervisor.



Use **Lockout, Tagout (LOTO) & Try** to make sure that **equipment/lines** are **isolated from energy sources** and de-energized before working on them . . . apply your personal lock only when you are satisfied that all precautions are in place.



Recognize and respect the hazards of **confined or enclosed spaces** . . . follow all the steps required for entry and be properly prepared for a rescue. Never enter a confined or enclosed space unless authorized.



Identify hazards of **excavations** . . . and ensure all precautions specified on the excavation and other permits are respected.



Understand that the consequences of a **fall from height** can be life changing . . . and make sure that all specified precautions have been taken and equipment is used correctly.



Ensure that any **lifting task**, whether by cranes or other work equipment, is thoroughly planned, assessed, controlled and executed . . . and stop the operation if any problem or unexpected situation arises.



**Never override or bypass safety equipment** such as relief devices, interlocks, trips, safety instrumented systems, gas detection systems or any other protective safety devices without authorization . . . respect the original intent and importance of such safeguarding devices and make any suggestions for improvement formally.



Recognize the risks of making changes . . . and strictly follow all the steps of the **Management of Change (MOC)** process.



Understand and search for potential **asphyxiation hazards** in enclosed spaces as well as near to equipment containing gases or cryogenic liquids . . . take care and warn others.



Be aware of fire hazards whenever dealing with oxygen . . . never deviate from the procedures and be sure to maintain **cleanliness for oxygen service**.



Understand the effects of substances **hazardous to health**, on themselves and others . . . use prescribed safeguards, including Respiratory Protective Equipment (RPE) and Personal Protective Equipment (PPE) correctly.



Know the correct **Personal Protective Equipment (PPE)**, including high visibility clothing, **Flash Fire Protective Clothing (FFPC)** and **Respiratory Protective Equipment (RPE)**, to use for each task or work area . . . and use it correctly.



Recognize **'at risk'** behaviors, unsafe conditions, near misses and injuries . . . address and report them immediately, so that we can minimize injuries and learn from them.

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## Product Safety

Essential to product safety is ensuring customers and others handling our products have the full safety information they need. To collect this information, we conducted product safety reviews of all our commercial products by characterizing EH&S hazards, examining uses, and taking actions to address concerns. Safety information from these reviews is used in safety data sheets (SDS), which are a primary vehicle for communicating hazards information. We also share product hazards through labels that are compliant with the Globally Harmonized System (GHS), Safetygrams, and customer training. We are not aware of any fines in fiscal 2018 resulting from the use of our products.

The intent of the Precautionary Principle is supported through our product safety reviews and our phased process for new technology development that identifies and addresses potential risks. We also evaluate customer end-uses that are new and “high-risk,” such as near-consumer uses and food contact through an additional risk review process. The review may result in the product end-use being supported, supported with conditions, or prohibited. Sales into prohibited

product uses are forbidden, including through distributors. We also monitor and evaluate opportunities to eliminate products from our portfolio that are considered highly hazardous.

To help manage the security and risks of our highest hazard products, we have instituted customer qualification requirements. Before a customer can receive certain products, the customer must be evaluated against specific criteria to assess qualifications for handling the product.

Product Safety regulations continue to develop globally, and we monitor and respond to changes. For example, Air Products completed the registration of all required substances under the EU REACH (Registration, Evaluation and Authorization of Chemicals) legislation; ensured all products and key raw materials remained on the U.S. Toxic Substances Control Inventory (TSCA) as part of the recent modernization efforts by the U.S. EPA; and is registering required substances under Korea REACH and Taiwan REACH. We are also preparing for the new European Poison Control Center Notification requirements with pending deadlines of 2020 and 2021.

## Transportation Safety

Air Products drivers are the day-to-day “face of the company” to our customers and the public. Their hard work, unsurpassed safety focus, and professional demeanor uphold our reputation for excellence every day, everywhere. And with a global fleet that travels millions of miles each year, we’re focused on making sure our drivers get to their destinations—and back home—safely.

Driver safety is supported through the safety features of our trucks, driver training and our Data Enabled Coaching Program (DECP). The DECP relies on safety performance and vehicle efficiency

data that are collected, recorded and transmitted by event recording cameras in our trucks. DECP coaches use the data, including the videos, to give feedback to our drivers that helps them improve their driving and become safer and more efficient. The videos can also be used for incident investigation, providing an advanced level of understanding of the contributing factors of an accident and highlighting preventative coaching and training opportunities.

Despite these safety programs, accidents can happen. When they do, we report and track them in our Event Management system. We also investigate each accident



### Concerns rise over new snack

**Air Products prohibits the sale of nitrogen for this use because of our concern for the safety of the vendors and customers.**

"Dragon's Breath" is one of the newer uses for liquid nitrogen, and it's becoming common in shopping malls around the world and at festivals across the United States. At first glance, it sounds interesting and looks entertaining - light snack foods such as fruity cereal puffs, popcorn, marshmallows are soaked in liquid nitrogen. Then they're given to the customer to eat and breath out "fog" or "smoke" like a dragon.

This can be dangerous. Because of the extremely cold temperature of liquid nitrogen, there is a possibility of sustaining a cryogenic burn if the customer or vendor touches the liquid nitrogen. When ingested, it can destroy tissue in the consumer's mouth or digestive tract. And since liquid nitrogen expands rapidly once heated, if enough makes it into the stomach, it can cause perforations.

Air Products does not sell nitrogen for use in these snacks because of our concern for the safety of the vendors and customers.



and communicate lessons learned across the organization. A measure of our transportation safety performance is our preventable Vehicle Accident Frequency Rate (VAFR), which represents the number of accidents per million kilometers driven. Our VAFR was up in fiscal 2018 at 1.01, which equates to 247 accidents over 245 million kilometers or 152 million miles traveled. As in prior years, most of these accidents did not occur on roadways. For this reason, we established a new metric – our Preventable Road Accident Frequency Rate (PRAFR). In fiscal 2018, which was the first full year of data collection for this metric, our PRAFR was 0.25 or 61 road accidents over the distance traveled. In fiscal 2018, we paid \$250 in fines related to the transportation of our products.

When it's time for some of our higher-hazard materials to leave a manufacturing facility, we use our Transportation Risk Assessment (TRA) process to evaluate potential transit risks. This analysis includes a Process Safety review and evaluation of package specifications and sizes; shipment frequency, route, carriers, emergency response capabilities; and elements of safety in the supply chain.



## Improving Fleet Safety

Truck technology has come a long way in terms of safety. Our upgraded fleet has many enhanced features to improve safety, such as:

- Tire pressure monitoring systems that alert the drivers if tires are underinflated or overheating.
- Reversing sensors that increase awareness of hazards behind the trailers.
- Lane departure and fatigue monitoring systems that alert the driver if the truck strays too close the edge of the lane or if the driving style indicates that the driver's attention is starting wane.
- Collision avoidance and emergency braking systems that read conditions ahead, adjust speed automatically and can bring the vehicle to a complete stop if needed.
- Satellite navigation and positioning of the vehicle that reads the road ahead and can adjust speed.
- Fleet upgrades also promote our drivers' welfare. Predictive powertrain controls reduce driver fatigue, and improved interior cab spaces and amenities increase driver comfort.

## Safer Customer Calls

Air Products' sales team members also travel long distances to visit our customers. In 2018, our team in France wanted to find a way to help the sales team adopt safer and more economical driving styles while not tracking them. The team turned to DriveQuant, which provided smartphone-based telematics technology that can inventory and analyze driving information. The DriveQuant app included a safety score based on the number of "at risk" road events such as sudden acceleration and braking, and an eco-driving or energy efficiency score to help drivers reduce fuel consumption and emissions.

Air Products France piloted the use of DriveQuant, forming teams that competed during driving safety and eco-driving challenges, with the three best drivers rewarded for their performance. DriveQuant is currently being tested by additional sales team members across the Northern Continent of Europe.

## Our Safety Performance

Since 2014, we have improved our lost time injury rate by more than 71% and our recordable injury rate by 50%. In fiscal 2018 we set a new company record for employee recordables with a rate of 0.29, or 49 injuries per 200,000 hours worked. This rate was 15% lower than our rate in 2017. The recordable rate for our contractors also improved significantly and dropped by 18% to 0.31, or 45 injuries per 200,000 hours worked. In fiscal 2018 our lost-time incident (LTI) rates were up after significant declines the prior year. Our employee and contractor LTI rates

were both 0.07. Most importantly, we had no employee or contractor fatalities in fiscal 2018.

We continue to focus on more serious incidents by measuring and tracking Serious Injuries and Fatalities (SIFs) and Near Fatal Accidents (NFAs). These serious incidents help us quantify the severity of our work-related injury performance and can be a more meaningful measure of severity compared solely to the lost-time characterization. SIFs and NFAs are tracked on a monthly or quarterly basis and reviewed throughout the organization.

Employee SIFs are measured as a percentage of total recordable injuries. In 2018, the percentage of incidents considered to be SIFs, 14%, was slightly higher than the previous year due to the significant improvement we made in reducing the number of employee recordable injuries. Industry benchmarks indicate that this is still significantly better than the typical rate of about 20%. By reviewing SIFs monthly, we can use data to respond to trends in accidents and focus on specific improvements.

The company's Serious Incident Review Board (SIRB) routinely reviews SIFs, NFAs and significant Process Safety Events that had, or could have had, a serious impact. Comprised of the Chief Executive Officer, Executive and Senior Vice Presidents, Directors and Managers from Operations and EH&S, the SIRB ensures that safety accountabilities are reinforced through line management and that safety events are investigated and corrective actions are implemented.

## Safety Performance in 2018 vs. Prior Year

Fatalities	0	
Employee Recordable Rate <sup>1</sup>	0.29	↓ 15%
Employee LTI Rate <sup>2</sup>	0.07	↑ 18%
Contractor Recordable Rate <sup>1</sup>	0.31	↓ 18%
Contractor LTI Rate <sup>2</sup>	0.07	↓ 17%

### <sup>1</sup> Recordable Incidents

A recordable incident is a work-related injury that requires medical care beyond basic first aid treatment. Examining recordable incidents and their causes gives us a better look at the severity of all injuries and helps in our prevention efforts. Rates are per 200,000 hours worked.

### <sup>2</sup> Lost-time incidents (LTIs)

Lost-time or restricted work injuries or illnesses are typically the most serious incidents. They also are measured as part of our comprehensive efforts to create a safer workplace. Rates are per 200,000 hours worked.

## Air Products Sweeps Major Awards at 2018 CGA Annual Conference

### Team comes home with most improved safety performance, safest fleet and an environmental award

The Compressed Gas Association (CGA) is dedicated to developing and promoting safety standards and safe practices. As a result, standards are high and industry competition is fierce for the prestigious CGA awards. In 2018, Air Products won all three major awards from CGA.

The Most Improved Safety Award recognizes improvement in recordable incident rates for the prior two years. On accepting the award, Ray Bailey, vice president of EHS&Q said, "I have been blessed to be part of a company that has safety as part of its core values, and this award is further evidence of what can be achieved when there is alignment at all levels of the company and the commitment to send each and every person home in the same condition they came to work."

For the second year in a row, Air Products won the Fleet Safety Award, which is given to the company that drives more than 20 million miles per year and has the lowest accident rate for bulk transportation. Jeff Morelock, manager of Driver Safety North America, accepted the award and recognized the company's top driver in North America, Dennis Schafer, who has driven over three million miles without an accident.

Air Products also received CGA's Environmental Award for its significant water reduction in California. The plant installed and started up a reverse osmosis system that reduced the amount of incoming potable water necessary to operate the plant and reduced wastewater coming from the plant. Jim Reebel, IG-Americas senior principal environmental engineer, accepted the award and noted the 2018 savings in water could fill 55 Olympic-sized swimming pools.



# Security

The security and safety of our employees, customers, and the communities in which we operate have always been a priority. In support of these efforts, and as part of Air Products' Security Plan, we regularly communicate security expectations.

Our formal security policies and standards address employee and facility security, product security, pipeline and land transportation security, Security Vulnerability Assessments (SVAs), workplace violence, and security services for which we contract, among other areas.

## **Our Security Approach includes:**

**Security Personnel:** Air Products employs security personnel globally, including an investigation team, with much of our security staff having prior security, audit and law enforcement backgrounds. All third-party contracted security personnel are properly vetted to ensure professional services are provided around the globe.

**Security Vulnerability Assessments (SVAs):** Air Products has a regimented,

global SVA program in place supported by trained personnel and global policies and standards. The SVA process systematically assesses the risks at each facility and determines security measures needed to ensure risks are properly mitigated.

## **Chemical Facility Anti-Terrorism Standard**

**(CFATS):** Our security and process safety teams are actively engaged in the U.S. Department of Homeland Security's CFATS regulatory program. We have completed the necessary plant screenings and are reporting as required for a number of sites.

## **U.S. Customs Trade Partnership Against Terrorism (C-TPAT) Programs:**

Air Products became a certified member of the C-TPAT Program in 2003. Our most recent revalidation has been reviewed and approved by the U.S. Department of Homeland Security, Customs Border Protection. As an active member of the C-TPAT Program, we remain committed to exceeding the minimum-security criteria and continually look for ways to maintain the highest levels of security and integrity across our supply chains.

## **Global Security Incident Reporting**

**System:** We have implemented a global incident reporting system to respond to suspicious behavior and other security-related activity. All incidents are recorded and investigated by appropriate internal resources, and when appropriate, are reported to and investigated by external law enforcement agencies, including the regional Joint Terrorism Task Forces in the U.S.

## **Employee Travel Security Program:**

We use a web-based tracking tool that is available 24/7 to identify, locate and communicate with our employees traveling anywhere in the world. Employees can also contact our Security Operations Center 24/7.





## Employee Health and Wellness

We are committed to creating environments and driving behaviors that sustain the health, safety and wellness of our people.

Our Global Health and Wellness Team, consisting of medical professionals globally, works closely with our Human Resources and EH&S organizations to ensure our global standards comply with governmental regulations on topics such as blood-borne pathogens, medical records management, emergency response, fire brigade, and confined space entry rescue, among others. In the event of a health crisis, such as a pandemic, Global Health and Wellness supports our Crisis Management Team in addressing specific health aspects. They also provide a travel medicine program to help employees and family members traveling abroad, collaborating with Global Security to have the most current and relevant information available for travelers.

**Employee health and wellness is promoted through a variety of initiatives:**

**Dedicated onsite clinics:** At several rural operational sites, and at other locations where there need has been identified, for example in remote areas with poor

medical infrastructure, our team works with construction and operations teams to establish customized medical clinics.

**Health assessments and campaigns:**

Health Hazard Assessments are required at all of our facilities. In addition, our Global Health and Wellness Team provides assessments and health coaching for employees in the U.S. and Canada, including a program for our professional Air Products drivers. Every fall, influenza awareness campaigns are conducted globally, and employees are provided flu vaccines through their work sites.

**Ergonomics:** Our Ergonomic Wellness and Education (EWE) program is available to our employees across the globe to proactively address their musculoskeletal aches and pains. They can speak with a knowledgeable health professional about their discomfort and learn strategies to manage it and to speed the healing process. We also have mandatory Office Ergonomic Training and risk assessment surveys that identify potential ergonomic issues.

**Fitness facilities and programs:**

Air Products employees are encouraged to participate in fitness and exercise

programs throughout the year by our Global Health and Wellness Team, HR and Company leaders. In 2018, over 2,500 employees participated in the Virgin Pulse Global Corporate Challenge, a wellness program that involved daily movement for 100 days and included sleep, nutrition, and stress management modules. The Company also supports exercise programs for truck drivers, fitness options including walking paths, weight loss programs, and health topics in monthly safety meetings.

**Health and nutrition:** We offer healthy lifestyle programs for diverse employee groups and worksites, including healthy food options and nutritional information.

**Mental health:** Air Products has Employee Assistance Programs (EAPs) that are available to employees and their dependents globally, with many services offered at no cost. EAPs assist with a variety of lifestyle management issues, such relationships, family, finances, legal, stress, workplace conflicts and substance abuse. An internal course on stress management is available and can be taken optionally or where required by local legislation.

### Assessing the Health of Our Facilities

Every operating and production facility must have a Health Hazard Assessment (HHA) and update it every five years. The HHA process enables Air Products' facilities to determine the specific health hazards, risks and priorities at a given facility by establishing health risk profiles for job tasks and categories. This assessment can include potential health issues such as air quality; physical hazards including noise, temperature, lighting, and vibrations; and biological stressors like air-borne diseases. A specific tailored version of the HHA further facilitates the integration of our medical surveillance programs globally.



## Talent and Diversity

Air Products brings together talented people to innovate solutions for the challenges that face us, our customers, and our world. This is part of our higher purpose. So is creating a first-class company where people enjoy coming to work and are proud of what they do.

Our past and future successes rely on promoting collaboration among people of different cultures and backgrounds. We are expanding the Air Products family globally by growing in new geographies. And as we grow in new regions of the world, we bring with us our diversity and inclusion ideals to some geographies where the societal roles of minorities and women are still evolving.

### Policies and Goals

We are committed to a diverse and respectful workplace as embodied in our Employee [Code of Conduct](#), recently updated [Human Rights Policy](#), Equal Employment Policy, and Diversity and Inclusion (D&I) efforts. Our commitment is part of our company goal to be the safest, most diverse and most profitable industrial gas company in the world, providing excellent service to our customers. We put our policies, as well as our Code of Conduct, into action through procedures and required training that apply to all employees.

## Talent Management

The commitment and motivation of our people is key to our competitive advantage, so we intentionally invest in attracting, developing and rewarding a winning global team. Our “**Everyone. Everyday.**” approach to Talent Management originates from our belief that every job is important to our success, and that we must support every employee to do his or her best work every day.

**Air Products’ Talent Management framework consists of three elements:**

- **Performance Development** uses a contemporary approach that emphasizes providing employees with regular, on-going and in-the-moment feedback, recognition and coaching to help them develop and grow on-the-job. We encourage a growth mindset critical to winning in our local, regional and global markets.
- Through **Individual Career Planning**, we help employees and their managers work together to develop skills needed in their current roles as well as potential roles in the future. Using these resources, employees can own their development, while working closely with their managers for the support

and coaching needed for ongoing career opportunities.

- Through our **Talent Reviews & Succession Planning** process, we are identifying and investing in future leaders and creating a leadership pipeline for critical roles across the organization. Current leaders are accountable for developing future leaders.

Colleagues with different capabilities, cultures, perspectives, and experiences contribute to our ability to stay competitive in the ever-changing global marketplace. Demand for top talent is increasing, making recruiting, developing and retaining talent business critical.



### Celebrating International Women’s Day

International Women's Day (IWD) is a global day honoring the social, economic, cultural and political achievements of women. The day also marks a call to action for accelerating gender parity.

The 2018 theme for IWD was “Press for Progress” and was a strong call to motivate and unite friends, colleagues and whole communities to think, act and be gender inclusive.

To celebrate International Women's Day at Air Products, we profiled four women from different areas of the Company to share their career stories. We focused on the unique perspectives and experiences they bring to meeting our customers’ needs across the diverse markets we serve. Through their stories, which were shared with colleagues and other stakeholders via our web site and social media, we recognize their contributions and the daily journey we are on to build a collaborative and respectful work environment.

**Our Company Goal:** To be the safest, most diverse and most profitable industrial gas company in the world, providing excellent service to our customers.

### Diversity Goals

Reflect the places we do business and fully utilize the diversity of the available talent pool:

1. Increase representation of women in leadership globally.
2. Increase the representation of U.S. minorities in our pipeline.

### Inclusion Goals

Embed inclusive leadership practices to foster a respectful workplace where we routinely seek out diverse thinking and where people are empowered to confidently express their viewpoints.

**Key talent issues we are managing include:**

- **Filling Critical Skill and Capability Gaps**—To address this, we are intentionally managing knowledge retention and transfer (KRT), increasing our external hiring, developing our employee base, realigning our Career Development Program (CDP), and investing in leadership development through our Management Fundamentals Program (MFP) and Experienced Manager Program (EMP). We are also participating in mentoring and education programs at colleges and universities so that potential employees can learn from and about us, and if they would like to be a part of our company.
- **Facilitating Career Development**—There has been a lot of change at Air Products over the last several years, and traditional career paths have given way to new positions with expanded scope, responsibility and accountability. We are helping our employees prepare for and consider these options by increasing feedback and coaching, enhancing talent visibility and mobility, and providing individual career planning.

- **Increasing the Pace of Culture Change**—We are building a “4S” culture of safety, simplicity, speed and self-confidence. To enhance these efforts, we have aligned our competency development and recognition programs for all employees with our desired 4S culture. Our efforts around feedback and coaching, as well as external hiring also promote this cultural change.
- **Enhancing Diversity**—We are striving to create a workforce that is reflective of the places we do business. To promote diversity, we have instituted several actions, including Diversity Action Plans, Development Circles, metrics, and Unconscious Bias Training.

- **Recognition**—We encourage colleagues to recognize each other through our Global Recognition Program, which is directly aligned to our 4S culture. Employees and managers can recognize outstanding work in one of five categories – Safety, Speed, Simplicity, Self-Confidence and Inclusion – while providing feedback, creating visible examples of role modeling behavior, and building teamwork and inclusion by showing appreciation for a job well done. In fiscal 2018, over 18,000 monetary and non-monetary awards were issued through this program, reaching 47% of our eligible employee base around the world.

## CEO **ACTION** FOR DIVERSITY & INCLUSION

### Eliminating the Blind Spots of Unconscious Bias

#### Action Towards Air Products’ Most Diverse Goal

Over a year ago, the objective of becoming the “most diverse” industrial gas company in the world was added to Air Products’ company goal statement. Throughout 2018, strides were made toward reaching this goal and included training and programs around challenging employees and executive management to do a self-examination for “unconscious bias.”

Around the world, “Breaking Through the Bias” workshops guided employees to counteract bias and intentionally practice inclusion. These interactive workshops helped employees identify, understand and address unconscious bias.

Another action to address bias came from an April visit to global headquarters by the Blind Spots Tour Van. Sponsored by the CEO Action on Diversity & Inclusion™, an organization with the support of more than 600 CEOs and to which our CEO belongs, the van’s interactive format included videos, quizzes and other materials which allowed employees to gain their own insights into any unconscious bias. Employees learned how, if left unchecked, these hidden, pre-conceived notions can lead to unintentionally excluding colleagues and overlooking ideas that challenge the status quo.



## Increasing Understanding of Diversity

Related to removing bias, Air Products observed and participated in the CEO Action on Diversity & Inclusion's "Day of Understanding," which was designed to increase understanding of diversity and inclusion and to embrace differences. As part of the Day of Understanding events, Air Products' senior leaders from across the company shared personalized communications with their global teams to continue the dialogue on Diversity and Inclusion; the company created a video featuring Chairman, President and CEO Seifi Ghasemi and other senior leader perspectives; encouraged all employees to join Air Products' Inclusion Network or participate in Inclusion challenges designed to increase awareness of behaviors and skills that promote inclusiveness; and invited employees to take the CEO Action for Diversity and Inclusion's "I Act On" pledge, which is a personal commitment to tackling bias and cultivating more inclusive behaviors.

Awareness is the first step to addressing unconscious bias. Air Products pledges its commitment to continue its awareness and training efforts to ensure unconscious bias plays no impact or role in who we hire, develop and listen to, and most importantly, to interrupt and eliminate those biases to enhance inclusiveness.

## A Catalyst for Change

For the past five years Air Products has been a supporter of Catalyst, a nonprofit organization that works with companies to build workplaces that work for women. In direct support of our goal to become the most diverse industrial gas company in the world, we partnered with Catalyst to participate in their 2018 Inclusion at Work Survey. One thousand Air Products employees from around the world were invited to participate in the survey, results of which provided a baseline to help us focus our efforts to enhance inclusiveness.

## External Diversity Partners

- Catalyst
- National Action Council on Minorities in Engineering (NACME)
- National Black MBA Association (NBMBA)
- National Society of Black Engineers (NSBE)
- Society of Hispanic Professional Engineers (SHPE)
- Society of Women Engineers (SWE)
- Women in Science and Engineering (WISE)

## Diversity in Action

As we work to be the most diverse industrial gas company, we are focused on ensuring our workforce fully reflects the places we do business, that our work environment is respectful, and that employees seek out diverse perspectives and feel empowered to confidently express their viewpoint.

**Our actions are driven by our operating framework:**

### 1. Deploy innovative recruiting strategies:

In several regions we have a diverse slate policy that requires every open job to have a diverse candidate slate. As a science and engineering-based company, we have formed partnerships with local and national organizations (see sidebar) that are dedicated to developing a diverse engineering workforce. We also provide funding for scholarships to support the diversification of the overall talent pipeline, and actively source potential employees from these organizations.

### 2. Invest in the unique development needs of diverse talent:

We recognize it is imperative to address the unique development needs of women and minorities within our organization. One example of how we

are accomplishing this is through our eight-month Leadership Development Program for Diverse Talent. The program consists of small learning circles of high performing and high potential talent nominated by their management. The circles are facilitated by a male and female senior leader using educational materials.

### 3. Cultivate leadership engagement and accountability:

Businesses and functions are required to have a Diversity Action Plan that is developed and refreshed as part of the annual Talent Review process. Each quarter, business and functional leaders, along with their senior HR partners, meet with our Diversity and Inclusion/ Talent Management team to review progress against the Diversity Action Plans. Additionally, we train our leaders on inclusive leadership behaviors and unconscious bias, encouraging them to be champions and advocates using toolkits to facilitate D&I conversations with their teams.



#### 4. Foster an inclusive culture:

The secret to turning our diversity into a competitive advantage is continuing to cultivate an inclusive environment where everyone is treated with respect, diverse perspectives are shared, and colleagues are empowered to confidently express their viewpoints. Work in this area takes many forms, including leadership and employee training, workshops, mentoring, networking and professional development, and employee resource groups (ERGs).

Air Products sponsors seven ERGs that offer programs for professional and personal development and foster an inclusive environment. The ERGs are tied together through our Inclusion Network, which partners with D&I, Human Resources, and company leadership to create supportive communities that help attract and retain talent, raise cultural awareness and competence, develop critical skills and competencies, build supportive networks and contribute to the company's D&I objectives.

The ERGs and Inclusion Network sponsor activities for all employees such as workshops, training, and professional development seminars. In 2018 they also sponsored an Inclusion Challenge – a series of individual challenges designed to encourage employees to step outside of their traditional comfort zones and have experiences that could influence their thinking and behavior around diversity. A sample of the challenges included personal reflections on creating safe spaces, exploring blind spots and disability etiquette. This challenge is continuing into 2019.



#### A First for SWE and Air Products

In January 2018, SWE held its first event in China to increase its support of women engineers in the country. Air Products joined representatives of other companies at SWE's D&I Shanghai Roundtable where SWE introduced its strategic goals and global programs, international affiliates and ambassadors, and opportunities for SWE leadership positions outside of the U.S.

SWE shared the importance of driving D&I values and the impact of unconscious bias on behaviors and decision-making and how this can pose obstacles to progress and growth. Small group activities were conducted focusing on topics such as "This is a Safe Space," "Respect Differing Opinions," and "Challenge Constructively." With more than two-dozen multi-national companies attending this workshop, the networking and knowledge-sharing opportunities were plentiful.

SWE is the world's largest advocate group and catalyst for change for women in engineering and technology. Attending the conference was not only a development and knowledge-building opportunity for our employees, it was also a valuable forum for sharing ideas and bringing new perspectives back into our organization.

Through our support of SWE's international programs, Air Products is partnering to promote women in Engineering in Asia, Europe and India. Air Products has participated in international SWE events in Pune, India; Penang, Malaysia; Shanghai, China; and Madrid, Spain.

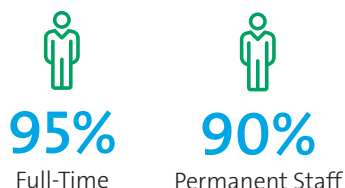
#### Our ERGs include:

- 4AP (All Asian Americans at Air Products)
- BERG (Black Employee Resource Group)
- EDGE (Ethnically Diverse Gulf Employees)
- Enable (disabilities-focused resource group)
- HOLA (Hispanic Organization of Latinos and Amigos)
- Spectrum (an LGBT resource group)
- WSN (Women's Success Network)

### Members of Collective Bargaining Units



### Work Arrangement

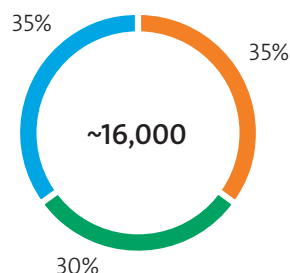


### Turnover Rate

**10.9%**

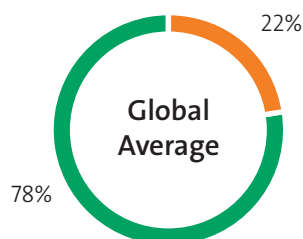
Voluntary and Involuntary Combined

### Employees



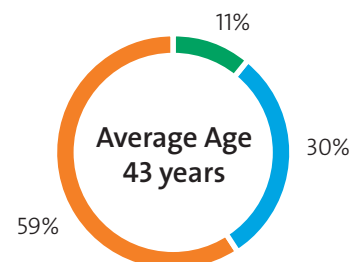
■ Americas ■ Asia ■ Europe/ROW

### Gender



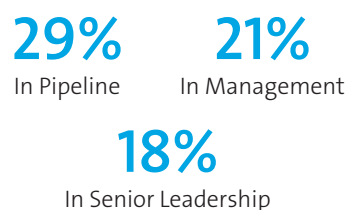
■ Male ■ Female

### Employee Age



■ < 30 years ■ 30–50 years ■ > 50 years

### Women at Air Products

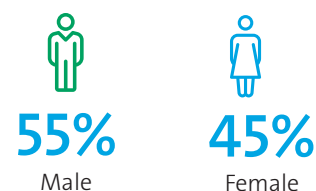


### 2018 U.S. College Hires

**50%**

Female or Minority

### 2018 U.S. CDP Hires



## Our Spectrum of Inclusion

Our ERG for Lesbian, Gay, Bisexual and Transgender (LGBT+) employees and allies, Spectrum, celebrated its 25th anniversary in 2018, having been founded just a few short years after the first National Coming Out Day. The group has focused on education, understanding and sharing their knowledge and expertise to encourage colleagues and other stakeholders to embrace diversity. For example, Spectrum has been a strong contributor to local communities, including near our global headquarters where they were recognized with the Spirit of Volunteerism Award from Allentown's Sixth Street Shelter and its Adopt-An-Apartment program.

### LGBT+ recognitions include:

- Air Products was named a 2018 DiversityInc Noteworthy Company, which recognizes the nation's top companies for diversity and inclusion management. These companies excel in such areas as hiring, retaining and promoting women, minorities, people with disabilities, LGBT and veterans.
- Air Products achieved a perfect score of 100 and was designated a "Best Place to Work" for LGBT Equality for the 2018 Corporate Equality Index (CEI).
- Air Products earned to top honor at the Annual LGBT Community Awards in 2018 near its headquarters.



## Investing in our People Leaders



Our competencies are aligned with our '4S' culture. Every colleague focuses on mastering nine competencies, and people leaders are accountable for excellence in an additional three leadership competencies.

We have intentionally invested in developing our leadership skills through our 'Lead and Inspire' program, which provides:

- **Feedback & Coaching Workshops:**  
People leaders across the company and at all experience levels participate in hands-on workshops to improve their feedback and coaching skills. The workshops have accelerated the shift to our refreshed performance development approach.

- **Leadership Development Training:**  
Air Products' flagship leadership development programs – one designed for new managers, and one for experienced managers – build leadership competencies that promote organizational performance and inclusion.
- **360 Feedback & Coaching:**  
To further enable leaders to master our competencies, we use a multi-rater feedback instrument, and certified HR professionals work as development coaches to help our managerial talent recognize and adapt their leadership styles.

### 9 Core Competencies:

All Employees

- Integrity
- Deliver Safety
- Passion to be the Best in the Industry
- Positive Attitude
- External Focus
- Drive Results
- Innovation
- Demonstrate Courage
- Develop Self & Others

### Safety

Safety is a moral responsibility. The only acceptable goal is zero accidents.

### Speed

We will act with urgency and respond quickly to our customers' needs.

### Simplicity

We will simplify our organization, work processes and decision-making.

### Self-confidence

We are a team working together to win. We will be the best in the industry.

### 3 Leadership Competencies:

Additional for Managers

- Lead and Inspire
- Manage Execution
- Strategic Mindset

## Employee Education and Training

Air Products has a globally consistent learning and development strategy to enable the talent we need and provide career development for our people. We set training and learning requirements for employees based on their roles and responsibilities, and to support current and future business needs.

We provide classroom and web-based course offerings with development tracks to help our employees grow professionally. We are migrating to a

new education system that will enable employees to access content relevant to them through recommended learning based on their job, interests and historical training. The system supports a variety of training content types including e-learning, videos, virtual reality, and more. On average, Air Products' employees completed at least 20 hours of formal training in 2018.



## Compensation and Benefits



We value our employees and strive to create a work environment where employees belong and matter. We believe our people drive our success and thus, we pay our employees fairly and equitably. Our pay practices apply equally to all employees, irrespective of gender, race, religion, disability, age or any other form of personal difference. We strive to pay competitively in local markets where we do business and compete for talent. We benchmark our compensation to ensure that we are keeping pace with the market to provide competitive pay and benefits. While our benefits vary around the globe and across positions, some of the basic benefits for full-time employees include:

- Accident insurance
- Education assistance
- Employee Assistance Programs
- Employee Recognition Programs
- Employee Referral Program
- Health plans
- Leaves of absence for personal, family, military, and educational purpose
- Life insurance
- Paid vacation and holidays
- Retirement savings plans
- Training and development

Other benefits may be available to employees depending on their location.

We also understand that everyone has commitments outside of work. Recognizing this, we offer programs that provide flexible work arrangements to help employees strike a meaningful work/life balance. Depending on the job or location, these options may include: flexible work schedules and/or compressed workweeks; reduced hours, including part-time, job sharing, or telecommuting; and paid parental leave to enable new mothers and fathers to spend time with additions to their families.

## Addressing Employee Concerns

The primary way the Company seeks employees' concerns is through one-on-one and team-based discussions between employees and managers and through our Performance Development process.

Leadership communication sessions, executive town hall meetings, feedback surveys, "Ask Leadership" channels on our company intranet, and our CorpNEWS online newsletter also encourage two-way dialogue. Country-specific and regional employee surveys are also conducted.

Employees are encouraged to report inappropriate behaviors to their manager, or an executive with whom they feel comfortable, HR, the Law Department, Corporate Audit, our ethics and compliance team contacts, or to our 24/7 [IntegrityLine](#).



## Understanding Human Rights Risks

We complete human rights assessments for our operations and supply chains. In 2018, we reviewed the potential for human rights issues, including child and forced labor, in the highest risk countries in which we operate, and we did not identify any significant risks. From a supply chain perspective, we examined human rights risks relative to procurement spend and supplier location using country-specific risk information from third-parties. No significant risks were identified, and we are not aware of any allegations of violations of human rights in our supply chain in 2018.



## Corporate Citizenship

For more than 75 years, Air Products has been building relationships and contributing to the well-being of our operating communities around the world. We do this in a variety of ways: through financial contributions from the Air Products Foundation, in-kind donations, employee directed giving, and employee volunteer engagement with nonprofit organizations. Our support priorities include education, health and human services, community and economic development, arts and culture, and environment and safety.

We work closely with community partners including not-for-profit organizations; emergency responders; elected officials; and education, business and community leaders to identify the highest impact opportunities. Our higher purpose of promoting collaboration among people of different cultures and backgrounds extends to our corporate citizenship efforts.



## Working here. Living here. Giving here.

“Working here. Living here. Giving here.” reflects the three important roles we play in improving the well-being of our communities.

**Working here:** With operations in 50 countries around the globe, we provide over 16,000 jobs to support families and local economies. Our employees work and live close to our facilities, providing economic benefits and other direct contributions to local community health and vitality.

**Living here:** We embrace our responsibility to be a good neighbor. We uphold the highest safety and environmental standards and provide resources to strengthen educational, environmental and welfare institutions.

**Giving here:** Many not-for-profit institutions around the world who share in our values receive grants from the Air Products Foundation to support their important missions. Our employees donate significant hours toward making these organizations stronger and more vibrant.

## The Air Products Foundation

The mission of the Air Products Foundation is to build meaningful relationships with charitable organizations that share the values inherent in our higher purpose and enhance positive relationships with Air Products employees, communities, customers, and shareholders. The Air Products Foundation is overseen by Trustees who are leaders at Air Products, including: Victoria Brifo, Senior Vice President and Chief Human Resources Officer; M. Scott Crocco, Executive Vice President and Chief Financial Officer; Sean D. Major, Executive Vice President, General Counsel and Secretary; Dr. Samir Serhan, Executive Vice President; and Gregory E. Weigard, Vice President and Corporate Treasurer.

Using its mission as a guide, the Air Products Foundation supports programs in our host communities throughout the U.S., in global locations where we have employees and operations, at colleges and universities where we are strategically engaged, and through employee-directed matching gifts programs.

### Community Programs

In 2018, the Air Products Foundation donated \$6.9 to over 1,300 organizations. Following are a few examples of the programs it supported.

Within our global headquarters community, the Air Products Foundation teamed up with the Lehigh Valley

IronPigs and nine cancer-support organizations for the inaugural “Strike Out Cancer Night” at Coca-Cola Park. The unique event at the minor league baseball game honored the Lehigh Valley cancer community. Air Products’ employees also volunteered at the game to support the agencies including Cancer Support Communities, Dream Come True, Pediatric Cancer Foundation, and the Women’s 5K for Cancer Support. Portions of the funds raised at the event went directly to nine cancer-support organizations.

### Helium Centennial Time Column

Air Products is a global leader in helium production. Our involvement with this vital gas dates to 1959 when the U.S.

federal government asked Air Products to engineer and construct the first helium extraction units as part of its helium conservation program. Nine years later, the Helium Centennial Time Columns Monument was erected in Amarillo, Texas to commemorate the 100th anniversary of the discovery of helium. Air Products helped sponsor the erection of the monument, and in 2018 was part of the 50-year Helium Time Column reveal celebration. The reveal was held at the Don Harrington Discovery Center (DHDC), a non-profit organization and the host of the monument that contained artifacts, letters, and knowledge from 1968 stored inside in an inert helium atmosphere. Our sponsorship was made possible by a grant from the Air Products Foundation to the DHDC through our U.S. Field Government Relations Program.

**Supporting Professional Development**

The Air Products Foundation regularly provides support in the form of donations to charitable organizations serving educational needs in some of the key industries we serve. Examples include donations to the Ceramic and Glass Industry Foundation and the Glass Manufacturing Industry Council

to help develop the next generation of glass professionals, and support of the American Foundry Society Institute to support workforce training for the metal casting industry.

**Promoting Social Welfare**

Air Products has been contributing to the economic development of our host community in Pyeongtaek, South Korea since our plant, which supplies a prominent semiconductor manufacturer, started operation in 2015. In 2018, the Air Products Foundation made a \$100,000 donation to the Pyeongtaek Council Social Welfare (PTCSW) in Pyeongtaek City. The donation, equivalent to KRW 100 million, has been re-directed by PTCSW to six social welfare organizations that promote the well-being of children, the elderly, people with physical disabilities, and for community programs. Last year in Pyeongtaek City, Air Products signed the 'Pyeongtaek District School Development Fund Agreement' to pledge support for local students' growth. In parallel, our employees regularly volunteer at an orphanage in the city and brought them gifts at Christmas.

**Talent Grants Program**

The Air Products Talent Grants Program targets eligible institutions

and organizations through strategic partnerships that help us attract, develop and retain diverse talent. Priorities of the program are aligned with the Foundation's mission and focus on higher education, national organizations and general scholarships. Additional detail about this program is provided on the next page.

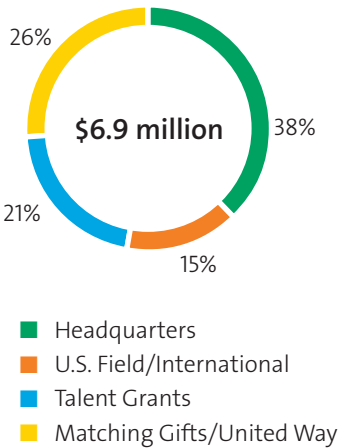
**Employee-Directed Matching Gifts**

The Air Products Foundation matches dollar-for-dollar any contribution made by an eligible U.S. employee to any eligible 501c3 nonprofit organization up to a maximum of \$10,000. One hundred percent of the matching gifts are provided to the organizations designated by our employees.

**United Way in the U.S. and Around the World**

Air Products is a strong supporter of the United Way and celebrates the important work they do in communities in the U.S. and around the world. For the 2018 United Way campaign, the Air Products Foundation matched dollar-for-dollar any contribution made by a current employee or retiree up to \$50,000. In 2018, Air Products employees and retirees donated \$3 million to United Way.

**FY18 Contributions**



## Talent Grants Program Supported by the Air Products Foundation

Our Talent Grants program is helping us attract and develop the best talent and bring our vision of being the most diverse industrial gases company in the world to fruition.

We are strengthening the pipeline of diverse engineering talent in the U.S. through partnerships with premier organizations. Our programs include pre-college outreach, scholarships and grants, mentorships, and professional development with colleges, universities and technical schools. For the past several years we have been streamlining our process for engaging with colleges and universities, targeting our efforts on key geographies such as the Gulf Coast, where we have significant operations, and ensuring we are getting the talent we want and need from the

schools. We are also engaged in career and technical programs such as SkillsUSA, World Skills, and SkillWeld UK through strategic donations from the Air Products Foundation. Plus, our partnerships complement our other activities designed to support diversity and Science, Technology, Engineering and Mathematics (STEM).

Key to our talent efforts is engaging with our external diversity partners that are noted in the Talent section of this report. For the past several years, Air Products has supported these organizations through employee volunteers, board membership, and scholarships. We also participate in conferences hosted by NSBE, SHPE and SWE. These conferences, attended by over 20,000 students and professionals in 2018, provide

opportunities for our engineering and information technology employee ambassadors and HR experts to help attendees better understand how our products benefit society and talk about their interests and career aspirations. During the conferences our teams also screen talented applicants and conduct on-site interviews. Many internships have been offered and accepted at these conferences, and new talent has joined Air Products from each of these organizations.

Building on these successes, we are expanding our efforts to enhance talent development and recruitment internationally with the support of the Air Products Foundation.

## Working, Living, and Giving Around the World

We develop stakeholder outreach plans aimed at addressing high-priority needs and maintaining positive relationships for the communities with our largest operations around the world. These plans include meetings with local leaders, facility tours, emergency response training, and support for education and philanthropy.

Our employees are also very engaged in their local communities. In 2018, Air Products employees and retirees from many of our staffed facilities were engaged in community programs. Following are some examples of community outreach and employee engagement for 2018 across the regions where we operate.

### Americas

**Lehigh Valley, Pennsylvania**  
(global headquarters)

#### **Air Products Community Internship Program**

Recognizing how difficult it is for college students to earn relevant, paid work

experience while in college, Air Products' Community Internship Program stepped in with a solution. Our strong relationship with many non-profits in our head-quarters community allowed us to see that agencies in need of help throughout the year often relied on unpaid student interns. Creating the Air Products Community Internship Program allowed area college students to gain valuable experience working at non-profit agencies while receiving a small stipend

to help with college costs. The internship opportunities also give those students exposure to different career options. Since the beginning of the program, 16 graduated students are now working full time at the non-profit agencies. It's a win for the students, the colleges who work to place students in satisfying careers, the non-profits who benefitted from the talent, and Air Products, serving as the connector to support workforce development in the Lehigh Valley.





### **Summer Start Program for urban kids who need support to enter Kindergarten**

Through a partnership with Community Services for Children and local television station PBS39, Air Products was the conduit to provide support for a summer reading program that will benefit children living in center city Allentown. Our employees often volunteer at schools throughout the region, and we have especially partnered with programs to support children in urban neighborhoods. Through the Summer Start program at The Learning Hub in downtown Allentown, children will now have the chance to get an early start on learning to read, so that they are ready for school. We know that early reading competency is a predictor of lifetime success, so our support for this program is especially important to the quality of life and the workforce development of our region.

### **First-ever LGBT Night at Lehigh Valley IronPigs (AAA affiliate of Philadelphia Phillies) sponsored by the IronPigs**

In June 2018 at Coca-Cola Park, the minor league baseball Lehigh Valley IronPigs game attracted over 9,000 fans to see the game and celebrate the first-ever LGBT Night at the ball park. Air Products' Community Relations team partnered with the employee resource group Spectrum to highlight our LGBT community. Prior to the game, former major leaguer Billy Bean held an interactive session with Air Products employees about what it was like for him to be the first major league player to come out as LGBT. Bean then also attended the game and threw out the first pitch with Air Products.

### **Partnering with My Brother's Keeper to showcase job opportunities**

In 2018 our Employee Resource Groups, BERG and HOLA, along with D&I, Talent Acquisition, and Community Relations, partnered with My Brother's Keeper for a second year in a row. The event showcased corporate and engineering career opportunities to 50 ninth and



tenth grade students from Allentown's Lincoln Leadership Academy and Roberto Clemente schools. My Brother's Keeper is a national initiative (with local chapters such as the one in Lehigh County) to address opportunity gaps faced by young men and women of color and ensure that they can reach their full potential. The students learned about engineering and related careers, and many indicated an interest in pursuing STEM opportunities following the program.

### **Across the Americas**

#### **Training student firefighters**

The Air Products Saint-Augustin site in Canada hosted more than 100 student firefighters from the Notre Dame de Foy (CNDF) Fire Academy, providing an expert overview of cryogenic product safety measures through presentations and a hands-on demonstration with liquid nitrogen. Air Products employees and emergency responder trainees also led various scenario discussions with the students and talked about appropriate response.

#### **Making the holidays a little brighter for foster children**

Each holiday season, our St. Louis Air Products facility sponsors a collection for children in real need; not just in need of a gift, but of a permanent home and family. Employees reach

out to the Missouri Court Appointed Special Advocates (CASA) agency that coordinates the collection of Christmas gifts for hundreds of children who are in the process of finding a permanent home and family. The fundraising process begins mid-summer, and CASA provides a list of needed gifts in the fall. Employees purchase many of the gifts needed to help meet the collection goal of over 80 gifts for local foster children.

#### **Helping Women and while protecting the Environment**

A recent ban on plastic bags in Chile created an opportunity to help local women and the environment. We have engaged with Fundación Más Allá de la Libertad (the Beyond Freedom Foundation) to create reusable, ecologically-friendly bags for our retail store locations. With this bag initiative, we support the reintegration of incarcerated women whose children are in the Servicio Nacional de Menores (SENAME). Through their participation in this program, the women help create reusable bags while engaging in motivational talks, workshops, management and leadership training, transformational coaching and more. The goals of the program are for the women to return to their homes, contribute to society and succeed in raising their families.



## Europe, Middle East and Africa

Our outreach programs in this region are as diverse as our people. They include supporting charitable organizations and education.

### Charities for Safety Excellence

In 2015, employees in our UK and Ireland (UKI) Region implemented a new program — Charities for Safety Excellence (CHASE). This program ties together our goal to lead the industrial gas industry in safety with our desire to support local communities. Through CHASE, charities chosen by employees are rewarded based on the safety performance of Air Products' employees at sites in UKI. Since the program was initiated, our improved safety performance has resulted in a total of £100 thousand going to local and national charities. The program was expanded to our Northern Continent region where donations totaling €30,000 were made on behalf of several facilities to numerous organizations. The charities selected for support in 2018 provide modern sea rescue services on the North Sea and Baltic Sea, fight poverty worldwide, work with the hospitalized and elderly to provide emotional support, and who are seeking a cure for a rare inherited condition that affects connective tissue. Donations are also being made to two families in France to support their seriously ill children.

### Getting chilly for a good cause

In May, at our Belgian head office in Diegem, Air Products organized a charity and community event using a new mobile PolarFit®Care trailer from the UK organization. Whole-body cryotherapy is a non-invasive method of applying cold for healing and recovery purposes. During this "Time to Get Cool" event people could pre-book a time slot online for an expert-supervised 3-minute whole-body-cryotherapy session. Participants were asked to voluntarily contribute €10 to an organization that helps make special wishes come true for terminally ill children.

### Hattingen Team hikes 20 kilometers in charity run, raising 1,000 euros to fight drought and hunger

Ten Air Products colleagues from our Hattingen, Germany team defied rain and wind, and together with about 150 other participants, ran a 20-kilometer-long race for a good cause in early December. This year the money was collected for the donation project, "Together against Drought and Hunger - Christians and Muslims in Burkina Faso." Air Products supported every kilometer walked with 5 euros per person, so that the donation sum at the end amounted to 1,000 euros. Air Products was the first company to team up for the walk in its 37-year history. This was very well received by the organizers who hope to inspire other Hattingen companies and institutions to participate in the future.

### Filling a children's hospital ward with color

As part of its corporate social responsibility initiative "Nos Mueve La Ilusión," Carbueros Metalicos completed its third project with Fundación curArte to help improve the state of mind of hospitalized children, their families and the medical staff who care for them. For this project our team collaborated with Hospital General Universitario de Alicante and decorated the walls of the children's surgical ward at the hospital with bright and positive pictures of a summer's day, small sailboats, big whales, palm islands and golden planes crossing the sky.



## 60 for 60

In celebration of the 60th anniversary of our UK business, we challenged employees to donate 60 minutes or more of their time in the spring and summer of 2018 to support the communities where they live and work.

Over 100 people participated in the program, donating on average 4.4 hours of their time and much more than the 60-minute goal. Many employees worked together to improve the outside facilities at local charities and sheltered housing locations, enthusiastically laying turf, cutting hedges, pruning, weeding, and digging, or painting and decorating. Others volunteered to clean up trash, spend time with the elderly, organise their own charity fundraising events or support or promote other events already in place.



## India

In India, Air Products has implemented a variety of impactful community programs, described below, as well as establishing sewing and incense manufacturing classes that enable women to develop skills and vocations in Kochi, Kerala, India. INOX Air Products Pvt Ltd. (INOXAP), our India joint venture with the Jain family (former owners of the Industrial Oxygen Company) also supports local communities in many ways, including providing financial support for medical insurance and eye surgery to address cataracts and eyelid deformations.

### Air Products India sponsors the Pune FLO Half Marathon

Air Products India supported the Pune FLO Half Marathon 2018 organized by the Federation of Indian Chambers of Commerce and Industry (FICCI) Ladies Organization held in October. Extending its ongoing commitment towards promoting diversity and inclusion in the workplace and providing gainful platforms for the advancement of women, Air Products India sponsored the Run for Women Empowerment. Through this annual event, the FICCI

Ladies Organization (FLO) aims to create an environment which celebrates the empowerment of women and encourages increasing employment and entrepreneurship. Over 11,000 people participated in the event including more than 100 employees from Air Products Pune. The Air Products India women's network (or UDAAN team) was a critical partner in the Pune half marathon with FLO. UDAAN members are also engaged with a local orphanage where they spend time with the children, provide clothing and install solar lights to help lower the orphanage's electricity bill.

### Nurturing young talent in India

Air Products India partnered with the College of Engineering, Pune to extend its support to MINDSPARK 2018. The event organized under the patronage of UNESCO, Digital India and the Skill India initiatives, provided opportunities for students to learn about engineering. As part of the event, Air Products India sponsored the 'Substantia Module' of the tech-festival, comprised of two events: On the Etch and Dexter's Lab. On the Etch brought together students with a passion for metallurgy to test their metallographic skills through practical

application and logical reasoning tests. Dexter's Lab explored the use of chemistry to address real life dilemmas in technology and human welfare. The festival venue also featured an "Air Products Zone" where our experts offered guidance on chemical engineering careers and employment opportunities.

### Increasing safety awareness

Employees at our Kochi facility conducted a safety awareness program in November 2018 with the support of the local village council. The program was attended by students, teachers, parents, community members and local officials. A key aim of the training was increasing children's awareness of traffic safety and awareness of road conditions.

### Responding to the flood in Kerala

The floods in 2018 in Kerala were devastating— the worst in nearly a century. To help in the response to this crisis the Air Products Foundation made a donation through the United Way to Kerala. The funds are being used to support the long-term recovery of flood affected families in a cluster of islands in the Paravur block, Ernakulam district that were inundated by flooding. Agriculture is a key income source for many families in this area, and so the donation supports organic cultivation of commonly consumed vegetables that will be sold locally or in the nearby city of Kochi.

## Asia

### Korea Team initiates country's first extended full vehicle rollover drill

In 2018, our Korea team conducted a first-ever safety event for the country. A drill simulated the overturn of a high-pressure tanker truck, an exercise designed to educate and engage local emergency responders as well as other industrial gas suppliers about distribution safety. Conducted at our Gumi plant, the drill was supervised by our Korea Supply Chain Execution team and brought together 100 representatives from the Gumi City Hall, police and fire departments, Korea Gas Safety Corporation, other industrial gases suppliers, and our key customers.

### Two Western China sites successfully host university students' practical training

In June, our Weinan and Pucheng Sites in Shaanxi Province, Western China, warmly received more than 350 graduate students from the School of Energy and Power Engineering of Xi'an Jiao Tong University (XJTU), the top university in Western China. Divided into six groups over two days, the students learned about our business, products, higher purpose and culture, and experienced our strict site safety management requirements. They also learned some of the fundamentals of our ASU processes and equipment during site tours conducted by our experienced site managers and operators during site tours.

### Expanding our LIN Ambassador Program

Our LIN (liquid nitrogen) Ambassador Program continues to blossom in China. In July, Central and Western China's first LIN Ambassador training was held at our Pengzhou plant near Chengdu. Ten employees from Chengdu, Pengzhou and Xi'an learned from two senior ambassadors about the program philosophy and objectives. The new Ambassadors performed their first demonstrations the next day at family events organized for local employees and government partners. Through knowledge sharing, training and practice, our new Ambassadors deepened their understanding of the program and demonstrated their commitment to sharing our company culture, safety philosophy, and positive energy along with the LIN knowledge to students to ignite their passion for science.



### Air Products Honored with Best Social Responsibility Brand Award 2018 in China

Air Products was honored for the fourth consecutive year with the Best Social Responsibility Brand Award for 2018. Recognizing our corporate citizenship and meaningful contributions to social development in China, standouts included our LIN Ambassador Program and collaboration with leading local universities and others to cultivate future talent and advance gas application technologies.

Receiving this honor for another year is a strong recognition of our long-term commitment and contributions to corporate social responsibility in China. We will continue to help our customers and communities build a better future with our innovative solutions that benefit the environment and enhance sustainability under the Chinese government's 13th Five-Year Plan and beyond.



### Industrial Gas Expertise Critical in Thai Soccer Team Cave Rescue

#### Air Products Joint Venture Company Comes Up BIG

For two weeks in July, 12 young boys and their soccer coach were trapped in a flooded cave in Northern Thailand. While the world followed the story and hoped for a happy outcome, Air Products' joint venture company Bangkok Industrial Gas (BIG) in Thailand acted.

When the Thai soccer team and coach were found alive but trapped in the cave after being gone for 10 days, BIG immediately contacted the Thai Navy SEALs to offer its help. Upon knowing of the urgent requirements of 200 bar oxygen, BIG managed to get needed oxygen cylinders ready and assembled a group of five technical experts within four hours, then driving 15 hours over 400 miles to reach the secluded and flooded cave.

Confident in BIG's gas supply knowledge and expertise, the Thai Navy SEALs and the government entrusted BIG with all oxygen operations. Some of the BIG technical experts also took part in the government's rescue planning team.

Following a complicated three-day rescue operation, all 12 boys and their coach were safe, back above ground, and reunited with their families.

The world celebrated the rescue and safe return of the boys and their coach. Air Products and BIG celebrated the rescue as well as the key role BIG played in this life-saving mission.





## 60 Students Attend Space Camp

As part of the UK's 60th Anniversary celebrations focusing on STEM and the community, a total of 60 students aged 11-13 were selected from six schools near our Hull, Carrington and Didcot plants to take part in Space Camp 2018. Working with education consultancy 'hi-impact', interactive workshops were held at the schools and the 60 lucky junior AirStronauts spent four nights camping under the stars in Welshpool, Wales, learning all there is to know about space and science from a team of experts.

The week was capped off with a series of exciting space balloon launches that sent the students' experiments up to the outer edges of the atmosphere. With cameras and computers strapped to each balloon, the students tracked their rise and fall back down to earth; chasing them through the countryside to retrieve their experiments.

The feedback from the students and teachers was very positive they gave an amazing overall score of 9.1 out of 10 for the event.

## Air Products and STEM

Many of our employees directly support STEM-related activities in collaboration with educational facilities, schools, colleges, universities and community groups. By attracting people to STEM careers, we are helping to build future career paths and develop strong talent pools.

Our STEM efforts target four major groups of people we are trying to reach, including students at varied grade levels, workers and communities. In 2018, we delivered about 200 STEM programs in the communities around the world where we have significant operations.

### SPARK Interest (starting school to pre-college)

Started in the 1970's to bring an understanding of the company's products to our local communities, our LIN Ambassadors programs demonstrate the magic of science and engineering to more than 5,000 students each year.

### BUILD Capabilities (college/university)

We partner with organizations that support diverse talent to inspire future scientists, engineers and skilled technical workers. Learn more in the D&I and Talent Grant Program sections of this report.

### SHARPEN Skills (workforce)

Life-long learning is essential. Air Products sponsors different educational programs for those in the workforce to continually enhance skills, including welding training and certification programs in Belgium, Poland, Slovakia, Taiwan, the U.K. and the U.S. We have also supported educational foundations to promote learning.

### ENGAGE Communities (employees/community)

Working with our host communities increases awareness of STEM opportunities as well as our products and operations. We support STEM through local community organizations and our Ambassador network.

## Our LIN Ambassador Program

At the center of our STEM activities for younger students is our LIN Ambassador Program. The Program is a way to bring an understanding of gas products to our communities. The company offers free-of-charge classes to local schools, community groups and non-profit organizations to demonstrate the magic of science and engineering through a variety of fun experiments using liquid nitrogen. Trained Air Products employees volunteer their time, conducting more than 200 LIN demonstrations each year.

In 1996, the LIN Ambassador Program was expanded to Europe where over 100,000 people participate every year in our STEM activities throughout local communities. Our Ambassadors have supported large STEM activities including two Big Bang Fair events attended by 15,000 visitors. The participating students see a LIN demonstration, perform analysis on gases in food packaging and learn about welding by experiencing a welding simulator. We also sponsored two additional Fairs attended by 95,000 people. In 2018 the LIN Ambassador Program was recognized at the UK Manufacturing Champion Awards.

The LIN Ambassador Program has been active in China since 2013. More than 3,000 students and teachers in over 50 local schools in Beijing, Tianjin, Shanghai, Guangzhou, Dongguan, Tangshan and Nanjing have participated and benefited. The core team of Ambassadors consists of experts from the company's Asia Technology Center, doctorate degree holders who professionally conduct the LIN experiments. The program is customized with different experiments according to the students' ages and needs of the communities and are run safely by employee volunteers. In 2018 the program was extended to Central and Western China.



## Supporting Youth's Passion for Science

In summer 2018, five children from a school in one of the most deprived areas in Barcelona, Escola Morera, motivated by their passion for science, had the chance to join a Science Summer Camp (Dani Jiménez Science Camps), thanks to a scholarship from our Spanish business, Carburos Metálicos.

The scholarship was awarded through a scientific contest organized with teachers and the Dani Jiménez team in which the children had to develop a project related to sustainability and zero waste. The children presented their projects in front of the classroom, their parents and the Carburos Metálicos team. They were very creative and had great ideas to better this world and take care of it.



## Supplier Sustainability

Thousands of suppliers are essential to our success. We want to continue working with quality suppliers who can help Air Products deliver value and excellent service to our customers, and who share in our commitment to ethical business practices. All suppliers are expected to abide by and conform to our Code of Conduct in their business dealings with us and to support sustainability through the principles outlined in our Sustainability Expectations of Suppliers, which were refreshed in 2018.

In total, Air Products spent almost \$7 billion in power, equipment, materials, and services with over 15,000 suppliers and service providers in 2018. Energy is the primary raw material purchased to manufacture industrial gases, particularly electricity and steam for our ASUs, and natural gas for our HyCO plants. Steel, aluminum, and capital equipment subcomponents are the primary materials procured for our equipment business. There were no significant changes in our supply chain year-on-year.

Because Air Products operates regionally, our procurement teams are local to the business and work with regional and local suppliers. We also have a central

Capital Sourcing Team, which is part of Global Engineering, that works with a variety of suppliers to design and construct large industrial gas production facilities around the world. While we do not specifically track spending with local suppliers, at least \$2 billion of our purchases are related to energy, which is used at the local level. Over \$100 million is spent with engineering and construction firms who also work primarily at the local level.

Our procurement teams have supplier qualification processes in place to ensure we receive the quality supplies and services we need. Prequalification is at the center of our supplier risk management process and includes gathering data, assessing commercial risk, completing qualification questionnaires, approving or disqualifying suppliers, and maintaining a global supplier database. Service providers are screened for safety via their policies and performance. Where permissible by law, we conduct background checks on suppliers. In addition, a sustainability checklist is used to evaluate the environmental and social aspects of suppliers; this checklist is being adjusted to further accommodate review of smaller vendors. We do not track the percentage of suppliers screened using this checklist.

In 2018, we conducted on-site evaluations of new suppliers as part of the qualification process, including many in Asia where our business is growing rapidly. Additional risk management efforts included reviewing business continuity programs to ensure each critical supplier had multiple manufacturing locations, and restricting purchases from suppliers with business continuity concerns. In addition, each time an order is placed through SAP, the supplier is automatically screened against numerous denied party lists.

If a noncompliance is identified through our ongoing monitoring, we work with the supplier to address the issue; a primary example is coordinating to improve performance and uphold safety during plant turnarounds. Over the past two years, our contractors have had only one recordable injury during outages in which nearly 500 workers across 20 disciplines worked 24/7 for weeks. We have, and will continue, to disqualify suppliers due to poor safety performance.

From a sustainability perspective we focus on suppliers that comprised 80% of our procurement spend in 2018. Of these suppliers, over 40% have sustainability programs and communicate their

progress on sustainability. Nearly 60% of our energy suppliers have demonstrated their commitment to sustainability through energy efficiency programs and transparency. We also look for opportunities to partner with our suppliers on renewable energy and efficiency as described in the Conserve section of this report.

Having assessed the human rights risks of our supply chains, we have not identified any significant risks. Most of our suppliers are in heavy industries that are not as susceptible to human rights violations, as in some other industries. However, to promote human rights in our supply chains, we have added human rights clauses to our standard terms and conditions for procurement. Also, during due diligence, we identify if our third-party intermediaries have human rights policies in place. These efforts support our compliance with the UK Modern Slavery Act of 2015 and the California Transparency in Supply Chains Act of 2010.

It is our policy and practice to provide maximum practical opportunities to diverse suppliers. In 2018, 16.7% of our procurement in the U.S. was from diverse suppliers. These include, but are not limited to, small, socially and economically disadvantaged, and other minority-owned and women-owned U.S. businesses that can provide competitive sources of materials and services. We offer advice and guidance to assist minority business firms in building relationships and becoming successful suppliers to us.



## Creating Value with our Suppliers

Our first-ever Americas Supplier Summit for current and potential suppliers provided a unique opportunity to reiterate Air Products' expectations for Safety, Integrity, Sustainability, Operational Excellence, Reliability and Quality. Over 150 supplier representatives engaged with our business, operational and functional leaders to better understand our standards and identify areas for further improvement and collaboration.

Opportunities to further reduce power costs was an important topic, particularly given that energy is essential in Air Products' overall cost stack and our ability to reliably serve our customers.

Air Products plans to build on the success of the Summit and our supplier relationships, using what we've learned and finding ways to create value together.

## Conflict Minerals

A significant program in the U.S. to address human rights atrocities in the Democratic Republic of the Congo (DRC) is the Conflict Minerals Rule under the U.S. Dodd-Frank Act. The four minerals – tungsten, tantalum, tin and gold (also called 3TG) – are used in a variety of applications, from hearing aids and pacemakers, to laptop computers and GPS devices. About 10% of the world's 3TG comes from "conflict regions," countries in and around the DRC where mining industry proceeds have been used to fund armed conflict and human rights abuses. The remaining 90% is sourced from conflict-free regions, such as Peru and China.

While the U.S. government is considering a repeal of the Conflict Minerals Rule, we are continuing our efforts to evaluate the possible presence of these minerals in our supply chains.

Each year we report on our progress in identifying Conflict Minerals in our supply chain and post a Conflict Minerals report on our website. In 2018, we identified over 5,000 components of our equipment products that potentially contained 3TGs. We contacted over 400 suppliers to determine the presence and origin of any Conflict Minerals. Response from suppliers was lower than in prior years at 38%, which may be due to the current review status of the Conflict Minerals Rule. We were unable to determine if our supply chain was conflict-free given the lack of supplier response but have added Conflict Minerals clauses to our standard contractual terms and conditions.

## About Our Report

Air Products has reported on its sustainability performance each year for the past 15 years, building on previous decades of environmental, health and safety disclosures and reporting. This is our ninth consecutive year reporting in accordance with the Global Reporting Initiative (GRI).

## Stakeholder Engagement

We engage our customers, employees, investors, and communities to understand how we can benefit each other and grow together. Meetings, presentations and ongoing dialogue with stakeholders throughout the year provide opportunities for understanding and collaboration to improve sustainability.

Air Products has been conducting stakeholder assessments since it began reporting in accordance with GRI in 2010, including:

- Evaluating sustainability issues identified in various frameworks, standards, questionnaires, customer reports and stakeholder questions;
- Interviewing internal and external stakeholders on sustainability matters;
- Reaching out to community members in person and via surveys to understand their priorities;
- Engaging our Sustainability Leadership Council in discussions about sustainability strategy; and
- Surveying sustainability subject-matter-experts who support company efforts.

## Our Key Stakeholders

Customers	Customers come to Air Products for innovative thinking and solutions to their most pressing operational challenges. Key sustainability concerns of our customers vary by business, but typically focus on how our products can help them improve energy efficiency and reduce their environmental impact.
Employees	Air Products is committed to providing a work environment where our employees can grow and thrive. We engage in regular, two-way communications with our employees through leadership dialogue sessions, executive town hall meetings, feedback surveys, “Ask Leadership” channels on our company intranet, and our employee online newsletter.
Communities	The stronger the local community, the stronger and more stable platform from which we can run our business. Our employees communicate with members of their communities on a regular basis and solicit feedback about our operations and key issues.
Investors	The only way to serve our customers with excellence, develop and reward our employees, and support our communities is to have a profitable company with satisfied shareholders. We routinely engage with investors through quarterly calls, sell-side conferences, and one-on-one meetings to ensure the investment community’s perspectives are heard and understood.
Suppliers	Air Products’ suppliers play crucial roles in our ability to deliver to our customers each and every day. Our ongoing monitoring, assessment, and engagement with suppliers provide opportunities to review sustainability-related and other concerns.
Governments and Regulators	Public policy decisions and regulations have a direct impact on our businesses and operations. Air Products supports fair, balanced and realistic policy decisions, and maintains open channels of dialogue with the local, regional and national government entities where we operate.

## Our Sustainability Priorities

Throughout the year our Sustainability Team monitors issues related to sustainability, identifying concerns to be considered for our sustainability program and reporting. Significant concerns or developments for 2018 included climate change and GHG reductions, renewable energy, commitments to eliminate fossil fuels, water stress, the circular economy, plastics use and disposal, and organizational alignment around the Sustainable Development Goals.

We are engaged with our stakeholders throughout the year and consider

their concerns in our sustainability reporting. We also reached out to select stakeholders to prioritize the sustainability issues they thought were most important to them and the Company in 2018. Our stakeholders continued to express support for sustainability, and as expected, were concerned about varying aspects of this broad initiative such as jobs, education, climate change, resource consumption, safety, technological improvements, and diversity.

### Our 2018 priorities for Sustainability:

#### Grow

- Economic Performance
- Customer Sustainability
- Ethics & Integrity
- Compliance

#### Conserve

- Energy Savings
- Distribution Efficiency
- GHG Reductions
- Water Conservation

#### Care

- Safety
- Talent & Diversity
- Community Support
- Supplier Sustainability

## Our Report Content

Air Products used GRI's Principles for Defining Report Content to develop our 2019 Sustainability Report. These principles included: stakeholder inclusiveness, sustainability context, and coverage of aspects that reflect our significant economic, environmental and social impacts. Our Sustainability Priorities, aspect boundaries, and related content within this report are provided below:

	Aspect Boundaries							Report pages
	Product Development	Sourcing	Production	Sales & Marketing	Distribution	Use/End of Life	Communities	
Grow								
Economic Performance	●	●	●	●	●		●	22
Customer Sustainability	●			●		●		24–25
Ethics & Integrity			●	●	●		●	32–33
Compliance		●	●	●	●	●		32–33, 39–40, 55–56
Conserve								
Energy Savings	●	●	●	●		●		41
Distribution Efficiency		●	●		●		●	45
GHG Reductions	●	●	●	●		●		42–44
Water Conservation	●	●	●			●	●	48–49
Care								
Safety	●	●	●	●	●	●	●	54–63
Talent & Diversity	●	●	●	●	●		●	64–70
Community Support			●				●	71–78
Supplier Sustainability	●	●						79–80



Our 2019 report has been prepared in accordance with GRI standards “core” option and is aimed at providing stakeholders with data and perspectives to understand and evaluate our performance, impacts and opportunities. The report also contains supplemental information not specified by GRI that illustrates additional aspects of our sustainability efforts.

Our 2019 report covers the period of January 1, 2018 to December 31, 2018, except where noted that fiscal year (October 1, 2017 to September 30, 2018) data is provided. Our prior year report was issued in May 2018. Please see pages 88-91 of this report for the complete GRI Index.

The scope of this report for continuing operations is global, including assets over which financial control is exercised, as reported in our consolidated audited financial statement. We exclude less than

controlling interests in joint ventures or equity affiliates.

The company has majority or wholly-owned foreign subsidiaries that operate in Canada; 16 European countries (including the United Kingdom, The Netherlands, and Spain); eight Asian countries (including China, South Korea, and Taiwan); seven Latin American countries (including Chile and Brazil); four countries in the Middle East and two African countries. The company also owns less-than-controlling interests in entities operating in Europe, Asia, Africa, the Middle East, and Latin America (including Italy, Germany, China, India, Saudi Arabia, Thailand, Oman, South Africa, and Mexico).

We have guided readers to additional information, including on our Sustainability website on [airproducts.com](https://airproducts.com), as well as other reports, such as our annual financial reports on Form 10-K

found on our Investor Relations website.

Air Products has restated energy consumption, greenhouse gas emissions, water withdrawals and water efficiency for 2016-2017 to reflect acquisitions, divestitures and improved methodologies.

Our Corporate Sustainability Director was accountable for overseeing the preparation of this report, with significant data contributions provided by business, functional and sustainability-related teams throughout the company. No GRI sector standard exists for our industry (industrial gases/materials); however, we have attempted to provide best possible disclosures based on the nature of our business and the related risks and opportunities. Questions about this report can be directed to Julie O'Brien, Air Products' Corporate Sustainability Director, at [obrienjk@airproducts.com](mailto:obrienjk@airproducts.com).

## Membership of Associations

Our management believes that our business, and thus our stakeholders, benefit from our participation in organizations that represent our industry and customers. For that reason, Air Products was active in numerous associations and organizations in 2018, including:

### Americas

- Compressed Gas Association (CGA)
- American Institute of Chemical Engineers (AIChE)
- AIChE Center for Chemical Process Safety (CCPS)
- American Welding Society (AWS)
- Catalyst
- CEO Action for Diversity & Inclusion
- Fuel Cell and Hydrogen Energy Association (FCHEA)
- Gases and Welding Distributors Association (GAWDA)
- Hydrogen and Fuel Cell Technical Advisory Committee (HTAC)
- Hydrogen Council

- Manufacturers Alliance for Productivity and Innovation (MAPI) Sustainability Council
- National Action Council for Minorities in Engineering (NACME)
- National Association of Manufacturers (NAM)
- National Black MBA Association (NBMBAA)
- National Society of Black Engineers (NSBE)
- Society of Women Engineers (SWE)
- Society of Hispanic Professional Engineers (SHPE)
- Out and Equal
- U.S. Chamber of Commerce (COCUSA)
- Veterans Job Mission

### Asia

- Asia Industrial Gases Association (AIGA)
- China Industrial Gases Industry Association (CIGIA)
- China Petroleum and Chemical Industry Federation (CPCIF)
- Malaysian Iron and Steel Industry Federation (MISIF)

### – National Alliance of Hydrogen and Fuel Cell (NAHFC) organization EMEA

- European Industrial Gases Association (EIGA)
- British Compressed Gases Association (BCGA)
- European Association of Energy-Intensive Industries (EIFEC)
- German Industrial Gases Association (IGV)
- RECS International
- Royal Association of the Dutch Chemical Industry (VNCI)
- Spanish Energy-Intensive Industry Group (AEGE)
- The Spanish Federation of the Chemical Industry (FEIQUE)
- Spanish Industrial Gases Association (AFGIM)
- UK Energy-Intensive Industries Group (EIUG)
- The Welding Institute (TWI)

## Recognition for Our Efforts

Air Products has been recognized around the world for aspects of sustainability performance. Following are the major recognitions received in 2018:

Dow Jones Sustainability Index	Member, North America Index.
Ethibel	Member EXCELLENCE Global Sustainability Index and Ethibel PIONEER and Ethibel EXCELLENCE Investment Registers.
FTSE4Good	Constituent in the FTSE4Good index.
CR's 100 Best Corporate Citizens	Included in Corporate Responsibility Magazine's 100 Best Corporate Citizens list in 2018.
ISS-oekom	Recognized as a top performer in the global corporate universe by ISS-oekom with a distinction of Prime status for our corporate sustainability practices and policies.
EcoVadis	Awarded a Gold medal as a recognition of its EcoVadis CSR (Corporate Social Responsibility) Rating.
2018 Best Social Responsibility Brand Award at the China Charity Festival	Recognized for the fourth consecutive year for corporate citizenship and outstanding contributions to social development in China.
DiversityInc Top 50	Named a 2018 DiversityInc Noteworthy Company.
Compressed Gas Association	Received the Most Improved Safety Award, Fleet Safety Award and Environmental Award.
Best Places to Work for LGBTQ	Earned a perfect score of 100 percent on the 2018 Corporate Equality Index (CEI), a national benchmarking survey and report on corporate policies and practices related to lesbian, gay, bisexual and transgender (LGBT) workplace equality, administered by the Human Rights Campaign Foundation.

## Performance Data

### Grow

Economic performance (millions of dollars, except per share)	2018	2017	2016
GAAP			
Sales	\$8,930	\$8,188	\$7,504
Operating income	\$1,966	\$1,440	\$1,535
Operating margin	22.0%	17.6%	20.5%
Net income from continuing operations attributable to Air Products	\$1,456	\$1,134	\$1,100
Net income attributable to Air Products	\$1,498	\$3,000	\$631
Capital expenditures	\$1,914	\$1,056	\$908
Return on capital employed (ROCE)	11.0%	10.1%	11.2%
Return on average shareholders' equity	13.9%	13.2%	15.4%
NON-GAAP			
Adjusted operating income <sup>(A)</sup>	\$1,942	\$1,774	\$1,620
Adjusted operating margin <sup>(A)</sup>	21.7%	21.7%	21.6%
Adjusted net income attributable to Air Products <sup>(A)</sup>	\$1,645	\$1,386	\$1,230
Adjusted EBITDA <sup>(A)(B)</sup>	\$3,116	\$2,795	\$2,622
Adjusted EBITDA margin <sup>(A)(B)</sup>	34.9%	34.2%	34.9%
Adjusted capital expenditures <sup>(A)</sup>	\$1,934	\$1,066	\$935
Adjusted ROCE <sup>(B)</sup>	12.4%	12.1%	12.4%
Adjusted return on average Air Products shareholders' equity <sup>(B)</sup>	15.7%	16.1%	17.3%
PER SHARE			
GAAP diluted earnings per share (EPS)	\$6.59	\$5.16	\$5.04
Adjusted diluted EPS <sup>(A)</sup>	\$7.45	\$6.31	\$6.64
Dividends declared	\$4.25	\$3.71	\$3.39
Book value	\$49.46	\$46.19	\$32.57
AT YEAR END			
Air Products shareholders' equity	\$10,856	\$10,086	\$7,080
Shares outstanding (in millions)	219	218	216
Shareholders	5,500	5,700	6,000
R&D spending	\$65	\$58	\$72
Patents owned	3,423	3,076	

### Conserve

Energy Consumption (MWh) <sup>(C)</sup>			
Total	50,800,000	47,600,000	46,000,000
Fuels	29,700,000	29,200,000	29,000,000
Electricity	15,600,000	14,900,000	14,100,000
Steam	5,500,000	3,500,000	2,800,000
Energy Intensity Improvement			
Air separation units	2.0%	1.6%	0.7%
Hydrogen/carbon monoxide units	0.9%	0.6%	0.3%
Greenhouse Gas Emissions (MT CO <sub>2</sub> e emitted) <sup>(C)</sup>			
Scope 1	17,300,000	16,500,000	15,300,000
Scope 2	10,000,000	9,500,000	9,160,000

	2018	2017	2016
Scope 3	5,200,000	4,900,000	5,700,000
GHG Intensity Improvement	1.5%	1.2%	0.5%
Distribution efficiency and CO <sub>2</sub> intensity improvement	16%	14%	9%
Waste (millions of pounds)			
Hazardous waste generated	5.6	4.3	5.1
Hazardous waste disposal	1.7	0.8	1.5
Non-hazardous waste disposal	7.1	8.1	8.5
Water (billions of gallons) <sup>(C)</sup>			
Water withdrawal	19.6	19.0	18.5
Gross water consumption	16.7	15.6	15.2
Water conservation intensity improvement	18%	11%	7%
Other Air Emissions (metric tonnes)			
Nitrogen oxides (NOx)	1,474	1,565	1,501
Sulfur oxides (SOx)	71	69	71
TRI releases		93	114
Environmental fines	\$17,600	\$4,100	\$7,300
<b>Care</b>			
Total employees at year end <sup>(D)</sup>	16,000	15,300	18,600
Female share of total workforce	22%	23%	23%
Global employee turnover rate	10.9%	9.5%	11.8%
Average formal training hours per employee per year	20	22	32
Employees in collective bargaining units	31%	32%	32%
Cash and product donations (millions of dollars)	6.9	6.1	6.1
United Way contributions (millions of dollars)	3	2.8	1
Safety performance <sup>(E)</sup>			
Employee recordables	49	59	86
Employee recordable injury rate (per 200,000 hours worked)	0.29	0.34	0.44
Employee lost-time incidents	12	10	34
Employee lost-time incident rate (per 200,000 hours worked)	0.071	0.06	0.18
Employee fatalities	0	0	0
Contractor recordables	45	59	64
Contractor recordable injury rate (per 200,000 hours worked)	0.31	0.38	0.49
Contractor lost-time incidents	10	10	42
Contractor lost-time incident rate (per 200,000 hours worked)	0.07	0.06	0.32
Contractor fatalities	0	0	0
Vehicle accident frequency rate (preventable accidents per one million kilometers)	1.01	0.89	0.88
Preventable Road Accident Rate (preventable road accidents per one million kilometers)	0.25	0.24	



Board of Directors			
Executive directors	1	1	1
Independent directors	7	7	7
Total board size	8	8	8
Board diversity (percent women or minority)	50%	50%	50%
Average board meeting attendance	99%	98%	97%
Allegations of Code of Conduct violations	394	293	312
Percent employees trained in Code of Conduct	100%	91%	>99%

<sup>(A)</sup> Amounts are non-GAAP measures. See reconciliation to GAAP results within Item 7, Management's Discussion and Analysis of Financial Condition and Results of Operations, of the Company's 2018 Form 10-K.

<sup>(B)</sup> Amounts are non-GAAP measures. See pages III-V of the Company's 2018 Form 10-K for reconciliation to GAAP results. Fiscal years 2016 through 2018 are presented on a continuing operations basis.

<sup>(C)</sup> Restated 2016 and 2017 data.

<sup>(D)</sup> Includes full- and part-time employees from continuing and discontinued operations.

<sup>(E)</sup> Reported on fiscal year basis.

# GRI Content Index

GRI Standard	Disclosure	Report Page #	Additional References	Omissions
GRI 101: Foundation				
General Disclosures				
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