Praxair, Inc. - Climate Change 2018

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Praxair, Inc. (Praxair or the company) was founded in 1907 and became an independent publicly traded company in 1992. Praxair was the first company in the United States to produce oxygen from air using a cryogenic process and continues to be a technological innovator in the industrial gases industry. Praxair is a leading industrial gas company in North and South America and one of the largest worldwide. Praxair's primary products in its industrial gases business are atmospheric gases (oxygen, nitrogen, argon, rare gases) and process gases (carbon dioxide, helium, hydrogen, electronic gases, specialty gases, acetylene). The company also designs, engineers, and builds equipment that produces industrial gases primarily for internal use. The company's surface technologies segment, operated through Praxair Surface Technologies, Inc., supplies wear-resistant and high-temperature corrosion-resistant metallic and ceramic coatings and powders. Praxair's sales were $11,437 million, $10,534 million, and $10,776 million for 2017, 2016, and 2015, respectively.

Praxair serves a diverse group of industries including healthcare, petroleum refining, manufacturing, food, beverage carbonation, fiber-optics, steel making, aerospace, chemicals and water treatment. In 2017, 95% of sales were generated in four geographic segments (North America, Europe, South America and Asia) primarily from the sale of industrial gases, with the balance generated from the surface technologies segment. Praxair provides a competitive advantage to its customers by continuously developing new products and applications, which allow them to improve their productivity, energy efficiency and environmental performance.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Row 1	January 1 2017	December 31 2017	No	<Not Applicable>
Row 2	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 3	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Row 4	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>

C0.3

(C0.3) Select the countries/regions for which you will be supplying data.

Argentina
Bahrain
Belgium
Bolivia (Plurinational State of)
Brazil
Canada
Chile
China
Colombia
Costa Rica
Denmark
Dominican Republic
Germany
India
Ireland
Italy
Japan
Mexico
Netherlands
Norway
Panama
Paraguay
Peru
Portugal
Puerto Rico
Republic of Korea
Russian Federation
Spain
Sweden
Taiwan (Province of China)
Thailand
United Arab Emirates
United Kingdom of Great Britain and Northern Ireland
United States of America
Uruguay

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your consolidation approach to your Scope 1 and Scope 2 greenhouse gas inventory.

Financial control

C-CH0.7

(C-CH0.7) Which part of the chemicals value chain does your organization operate in?

Row 1

Bulk organic chemicals
Please select

Bulk inorganic chemicals
Hydrogen
Oxygen
Other industrial gasses

Other chemicals
Specialty chemicals

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?
Yes

C1.1a

(C1.1a) Identify the position(s) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Director on board	The Chairperson of the Board Committee on Technology, Safety and Sustainability (TSS) is a Director on Praxair's Board. This committee is responsible for sustainability and environmental matters for Praxair. This includes climate change. This committee assists the Board in its oversight of: technology and research and development, including the use of technology in products applications; sustainability and environmental matters; and certain enterprise risks. In furtherance of these duties, the TSS Committee: reviews and evaluates Praxair's policies, programs and practices related to sustainability and the environment (including climate change) and assesses current and emerging risks; and provides oversight and guidance on certain enterprise risks that are not otherwise reviewed by the full Board of Directors or its other committees including natural disasters and plant control systems security.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Monitoring implementation and performance of objectives Monitoring and overseeing progress against goals and targets for addressing climate-related issues	At least annually, the full Board discusses the key enterprise risks identified by management, management accountability for managing or mitigating each risk, the steps being taken to manage each risk, and which Board Committees will oversee each risk area on an ongoing basis. Each Committee's calendar of recurring meeting agenda topics addresses risk areas pertinent to the Committee's subject-matter responsibilities. These areas include a regular review of the Company's sustainability program and current and emerging risks and issues related to sustainability and the environment (Technology, Safety and Sustainability Committee). Other risk areas are regularly reviewed by the full Board, including safety and environmental risk (covered at each Board meeting). In addition, risk assessments and energy cost forecasts are performed for capital investments in productive capacity; results are reported to the Board annually. In 2017, the Board was briefed on actions taken to mitigate the risks of natural disasters such as Hurricane Harvey, including on the company's business continuity planning for key production plants and enhancements of loss control standards for high value production facilities and critical equipment.

C1.2

(C1.2) Below board-level, provide the highest-level management position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Operating Officer (COO)	Both assessing and managing climate-related risks and opportunities	Quarterly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored.

Where in the org structure the position lies: Praxair's Senior Vice President (SVP) is equivalent to what CDP calls the chief operating officer. Praxair's SVP is the highest ranking executive officer responsible for sustainability, including climate change, and is a member of the Office of the Chairman, reporting directly to the CEO.

Why responsibilities for climate change have been assigned to this position: The SVP is responsible for Global Supply Systems, R and D, Global Market Development, Global Operations Excellence, GPMM, Sustainable Development, Safety, Health and Environment (SHE), Global Sales and Electronic Materials. The SVP is the position with ultimate responsibility for climate change because climate change, like other sustainable development issues, are integral to Praxair's operations. The SVP has oversight over all key aspects of operations.

Specific responsibilities of SVP w/regard to assessment and management of climate-related issues: Under the SVP's direction, Praxair routinely conducts sensitivity analyses for operational risk . For example, for Climate Change Risk, including risks from natural disasters, mitigation actions are identified. In 2017, enhancements were made to the loss control standards for high value production facilities and critical equipment. In addition, the vice president of Sustainable Development reports to the SVP regularly on progress against Praxair's 2020 sustainable development targets, which include several targets related to energy and climate change. Close monitoring of the achievement of these targets provides regular insight into the company's overall performance in the areas of energy management, GHG emissions intensity, the amount of renewable energy sourced, the benefits to customers in avoiding their GHG emissions from the use of Praxair products and applications, and the amount of revenue Praxair earns from products with climate change and other environmental and health benefits. These targets directly address the key climate-related risks and opportunities identified by Praxair's Board of Directors as material to the business.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

Yes

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues.

Who is entitled to benefit from these incentives?

Corporate executive team

Types of incentives

Monetary reward

Activity incentivized

Emissions reduction target

Comment

The Board believes culture must be driven from the top by example. As such, the Compensation Committee confirmed the importance of setting non-financial objectives to reinforce leadership's focus on maintaining an enduring culture that supports both short- and long-term sustainable results. The Compensation Committee identified the non-financial elements that were considered most important to long-term sustainable success and established annual non-financial goals with respect to those elements. Non-financial goals included continuously reducing the environmental impact of operations, meeting sustainable development performance targets, and helping our customers enhance their environmental performance. The Compensation Committee determined that the Company's performance with respect to the non-financial goals was favorable and awarded a positive 30% adjustment for the Named Executive Officers (limited by the applicable cap).

C2. Risks and opportunities

C2.1

(C2.1) Describe what your organization considers to be short-, medium- and long-term horizons.

	From (years)	To (years)	Comment
Short-term	0	2	
Medium-term	2	5	
Long-term	5	100	

C2.2

(C2.2) Select the option that best describes how your organization's processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.

Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes

C2.2a

(C2.2a) Select the options that best describe your organization's frequency and time horizon for identifying and assessing climate-related risks.

	Frequency of monitoring	How far into the future are risks considered?	Comment
Row 1	Six-monthly or more frequently	>6 years	

C2.2b

(C2.2b) Provide further details on your organization's process(es) for identifying and assessing climate-related risks.

COMPANY LEVEL RISK/OPPORTUNITY ASSESSMENT: Responses are collected in an annual survey to business management and functional leads worldwide, including sustainable development. Respondents identify risks in their area against an incidence/ severity index. The results are subjected to a range of analyses to establish priority concerns. Risks and opportunities are evaluated based on their potential financial implications up to the highest consequence, i.e., loss of life as well as the probability of occurrence. **Substantive financial impact** includes, for example, the replacement cost of a single large Praxair facility, which could be more than $200 million.

Risks are reviewed by the full Board of Directors annually. As part of that review, the Board decides which Board Committees will oversee each risk area on an ongoing basis. Each Committee then addresses its risk areas during its recurring meetings.

ASSET LEVEL RISK/OPPORTUNITY ASSESSMENT: The company level risk assessment takes into account information from the field. In addition, risks to physical assets are monitored with periodic and at least annual evaluations from external risk assessors. These risk assessments evaluate each facility worldwide over a certain size, its vulnerability to risks from severe weather, and the potential monetary risk. The data is analyzed to help determine the scope and limit of Praxair's catastrophic insurance coverage. Risk maps are also developed to identify areas prone to severe weather events, where Praxair also has assets. Finally, Praxair performs long-term assessments of energy supply reliability, costs and volatility, which are material to capital investment projects.

C2.2c

(C2.2c) Which of the following risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Praxair's 2017 Annual Report identifies governmental regulations as a risk in Section 1A Risk Factors. This risk was identified as part of the enterprise risk assessment process. Praxair is subject to regulations in a number of areas such as environmental protection, including climate change (for example, Praxair is subject to California's cap and trade program). Violations of these laws could result in substantial penalties, third party claims for property damage or personal injury, or sanctions. Therefore, Praxair assesses risks associated with both current and emerging regulations.
Emerging regulation	Relevant, always included	Praxair's 2017 Annual Report identifies governmental regulations as a risk in Section 1A Risk Factors. This risk was identified as part of the enterprise risk assessment process. Praxair is subject to regulations in a number of areas such as environmental protection, including climate change (for example, Praxair is subject to California's cap and trade program). Changes in these regulations could have an adverse impact on the business, financial position and results of operations. Therefore, Praxair assesses risks related to emerging regulations.
Technology	Relevant, always included	Praxair's 2017 Annual Report identifies technological advances as a risk in Section 1A Risk Factors. This risk was identified as part of the enterprise risk assessment process. If Praxair fails to keep pace with technological advances in the industry, including those related to the transition to a low carbon economy, customers may not continue to buy the company's products and results of operations could be adversely affected. Therefore, Praxair assesses risks related to both R&D and changing customer behavior (increasing demand for low carbon products).
Legal	Relevant, always included	Praxair's 2017 Annual Report identifies litigation and governmental investigations as a risk in Section 1A Risk Factors. This risk was identified as part of the enterprise risk assessment process. The outcome of a litigation action may adversely affect the company's financial results. While Praxair is not currently subject to climate-related litigation claims, the company recognizes that litigation claims are subject to inherent uncertainties and there exists the possibility of a material adverse impact on the company's results of operations in the future.
Market	Relevant, always included	Praxair's 2017 Annual Report identifies the cost and availability of raw materials and energy as a risk in Section 1A Risk Factors. This risk was identified as part of the enterprise risk assessment process. Energy is the single largest cost item in the production and distribution of industrial gases. Most of Praxair's energy requirements are in the form of electricity, natural gas and diesel fuel for distribution. Praxair attempts to minimize the financial impact of variability in these costs through the management of customer contracts and reducing demand through operational productivity and energy efficiency. Large customer contracts typically have escalation and pass-through clauses to recover energy and feedstock costs. Such attempts may not successfully mitigate cost variability which could negatively impact its financial condition or results of operations. For carbon dioxide, carbon monoxide, helium, hydrogen, specialty gases and surface technologies, raw materials are largely purchased from outside sources. Where feasible, Praxair sources several of these raw materials, including carbon dioxide, hydrogen and calcium carbide, as chemical or industrial byproducts. In addition, Praxair has contracts or commitments for, or readily available sources of, most of these raw materials; however, their long-term availability and prices are subject to market conditions. A disruption in supply of such raw materials could impact the company's ability to meet contractual supply commitments.
Reputation	Relevant, always included	Praxair's 2017 Annual Report identifies competitor actions as a risk in Section 1A Risk Factors. This risk was identified as part of the enterprise risk assessment process. Praxair operates in a highly competitive environment. The inability to effectively compete is a risk related to a number of factors including Praxair's reputation for product quality, reliability, technology and service.
Acute physical	Relevant, always included	Praxair's 2017 Annual Report identifies catastrophic events such as extreme weather including hurricanes and floods, as a risk in Section 1A Risk Factors. This risk was identified as part of the enterprise risk assessment process. The occurrence of catastrophic events or natural disasters such as extreme weather, including hurricanes and floods, could disrupt or delay the company's ability to produce and distribute its products to customers and could potentially expose the company to third-party liability claims. In addition, such events could impact the company's customers and suppliers resulting in temporary or long-term outages and/or the limitation of supply of energy and other raw materials used in normal business operations.
Chronic physical	Relevant, always included	Praxair's 2017 Annual Report identifies catastrophic events such as extreme weather as a risk in Section 1A Risk Factors. This risk was identified as part of the enterprise risk assessment process. The occurrence of catastrophic events or natural disasters such as extreme weather, including hurricanes and floods, resulting from longer-term shifts in climate patterns could disrupt or delay the company's ability to produce and distribute its products to customers and could potentially expose the company to third-party liability claims. In addition, such events could impact the company's customers and suppliers resulting in temporary or long-term outages and/or the limitation of supply of energy and other raw materials used in normal business operations.
Upstream	Relevant, always included	Praxair has identified upstream risks in a variety of other categories. For example, see market risks, where the cost and availability of raw materials coming from upstream suppliers could impact Praxair operations.
Downstream	Relevant, always included	Praxair has identified downstream risks in a variety of other categories. For example, see technology where the ability of Praxair to innovate to meet customer demands is crucial for the company's success.

C2.2d

(C2.2d) Describe your process(es) for managing climate-related risks and opportunities.

Process for managing climate risks: During Praxair's risk assessment process, Praxair business management and functional leads respond to an annual risk survey to identify risks in their area against an incidence/ severity index. The results are subjected to a range of analyses and combined with the results of external stakeholder engagement to establish priority concerns. Those risks considered most significant are identified and reported at least annually to executive management and to the Board, and then to shareholders in Praxair's Annual Report, see ITEM 1A RISK.

The list of risks in Praxair's 2017 10k identified climate change risk in the areas of rising energy prices; emerging environmental and GHG regulation; and risks of catastrophic events such as extreme weather. The Board decides which Board Committees will oversee each risk area on an ongoing basis. Each Committee then addresses its risk areas during its recurring meetings.

All of our risk management methods, including our targets, are intended to limit the likelihood and magnitude of increased costs (e.g., from new regulation) and reduce risks to Praxair over the target period (5 years), although there are no guarantees they will do so.

Because climate change risks were identified by the corporate risk assessment process, they are automatically considered top priorities in the annual sustainable development materiality assessment (SDMA). As part of the SDMA process, Praxair reviews all the issues potentially applicable to the company and ranks the materiality of these issues (both risks and opportunities are considered). During this process, Praxair consolidates findings from key sustainability research organizations plus information from other stakeholders.

For the most recent SDMA, a group of Praxair managers from each of our major countries and corporate functions were asked to rank the top dozen elements for 2016-2020. Six sustainable development priority factors were ultimately identified, which are mapped to Praxair's core values, strategy and growth drivers. "Energy and Climate Change" is one of these six priority factors. In 2016-7 we also gathered views from an MBA class in sustainable business at Columbia University and re-confirmed the priority factors.

Praxair has a set of 2020 sustainable development targets to manage the risks related to the priority factors. In the area of climate change, Praxair established targets related to renewable energy purchases, energy savings, greenhouse gas efficiency, the amount of revenue Praxair earns from products that provide an environmental (e.g., GHG or energy savings) or health benefit, and product stewardship (avoiding more GHG from the use of certain applications by our customers than Praxair emits). Progress against these targets is monitored regularly and results are reported at various levels, including to the Board. Executive compensation is also directly tied to achievement of these targets.

Process for managing climate opportunities: The process for managing opportunities is the same as the process for risk. Targets identified to take advantage of climate-related opportunities include earning at least 50% of revenue from Praxair's sustainable development portfolio, which includes products that bring customers environmental and social benefits (environmental benefits include energy savings and GHG emissions avoidance); and ensuring Praxair provides at least two times net benefit in GHG emissions, meaning our products help customers avoid at least twice our calculated scopes 1, 2 and 3 emissions.

Case studies: Praxair's process for managing **physical risks and opportunities** (related to extreme weather events and shifts in climate patterns) include regular assessments of assets. In 2017, flooding from a hurricane at one site in Texas resulted in minimal impact to operations. However, the event prompted Praxair to evaluate all plants sited in potential floodzones and the company updated the building specifications to raise certain assets higher above flood lines.

Praxair's process for managing **transitional risks and opportunities** (such as regulation, market and reputation) includes escalation and pass-through clauses in large customer contracts to recover energy and feedstock costs to mitigate cost variability. Praxair also has a public target to increase revenue from the company's sustainable development portfolio, which includes products and applications that help customers reduce or avoid GHG emissions. In 2017, 58% (up from 54% in 2016) of Praxair revenue came from its sustainable development portfolio.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type

Transition risk

Primary climate-related risk driver

Policy and legal: Enhanced emissions-reporting obligations

Type of financial impact driver

Policy and legal: Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description

Praxair operates in jurisdictions that have, or are developing, laws and/or regulations to reduce or mitigate the perceived adverse effects of greenhouse gas ("GHG") emissions and faces a highly uncertain regulatory environment in this area. For example, the U.S. Environmental Protection Agency ("EPA") has promulgated rules requiring reporting of GHG emissions, and Praxair and many of its suppliers and customers are subject to these rules. EPA has also promulgated regulations to restrict GHG emissions, including final rules regulating GHG emissions from light-duty vehicles and certain large manufacturing facilities, many of which are Praxair suppliers or customers. More recently, EPA promulgated carbon dioxide regulations for both new and existing power plants, which will require controls on GHG emissions from certain suppliers of power to Praxair's operations. In addition to these developments in the United States, GHGs are regulated in the European Union under the Emissions Trading System, which has wide implications for our customers and may impact certain operations of Praxair in Europe. There are also requirements for mandatory reporting in Quebec, Canada, which apply to certain Praxair operations and will be used in developing cap-and-trade regulations on GHG emissions. These regulations, as well as similar regulations that have been proposed in Ontario, Canada, are expected to impact certain Praxair facilities in Canada. Climate change and energy efficiency laws and policies are also being widely introduced in jurisdictions throughout Latin America, Mexico and parts of Asia. China has announced plans to launch a national carbon emissions trading system, though it does not appear the regulations will have a direct impact on GHG emissions from Praxair facilities. Among other impacts, such regulations are expected to raise the costs of energy, which is a significant cost for Praxair. Legislation that limits GHG emissions may impact growth by increasing operating costs and/or decreasing demand.

Time horizon

Short-term

Likelihood

More likely than not

Magnitude of impact

Medium

Potential financial impact

100000000

Explanation of financial impact

Among other impacts, cap and trade schemes are expected to raise the cost of energy, which is a significant cost for Praxair. Also, legislation that limits GHG emissions may impact growth in this area by increasing operating costs and/or decreasing demand. For example, if energy prices rise 10%, energy costs to Praxair would rise proportionally and could exceed $100 million. Praxair attempts to minimize the financial impact of variability in these costs through the management of customer contracts and reducing demand through operational productivity and energy efficiency. Large customer contracts typically have escalation and pass-

through clauses to recover energy and feedstock costs. Such attempts may not successfully mitigate cost variability which could negatively impact its financial condition or results of operations.

Management method
To manage risks from current and potential GHG emission regulation, Praxair actively monitors regulatory developments, increases relevant resources and training as needed; consults with vendors, insurance providers and industry experts; incorporates GHG provisions in commercial agreements; conducts regular sensitivity analyses of the impacts of potential energy and raw material cost increases; presents to the Office of the Chairman and Board on various cost scenarios under different potential GHG tax regimes; and explores renewable energy options. Praxair's commercial contracts also routinely provide rights to recover increased electricity, natural gas and other costs that are incurred by the company. Additionally, Praxair sets corporate energy and GHG targets to manage the risks of an uncertain regulatory environment. These targets drive us to continuously seek opportunities to reduce energy use and GHG emissions. For example: we have a target to save 8 million MWH of electricity and avoid 5 million MT CO2e, 2009-2020. At the end of 2017, cumulative savings were 5.5 million MWH of electricity and 3.4 million MT CO2e avoided. All of our risk management methods, including our targets, are intended to limit the likelihood and magnitude of increased cost from new regulation and reduce the risks to Praxair over the target period (5 years), although there is no guarantee that they will do so.

Cost of management
100000

Comment
Praxair believes it will continue to mitigate potential costs through the pass through clauses of its product supply contracts. For the most part, the management of these potential risks has zero additional financial impact and are managed within Praxair's current human and capital resources and budgets. In addition, Praxair invested in internal consulting to improve its Sustainable Development Management System and reporting. The cost of this was less than $100,000.

Identifier
Risk 2

Where in the value chain does the risk driver occur?
Direct operations

Risk type
Physical risk

Primary climate-related risk driver
Acute: Increased severity of extreme weather events such as cyclones and floods

Type of financial impact driver
Reduced revenue from decreased production capacity (e.g., transport difficulties, supply chain interruptions)

Company- specific description
The occurrence of catastrophic events or natural disasters such as extreme weather, including hurricanes and floods, could disrupt or delay Praxair's ability to produce and distribute its products to customers and could potentially expose the company to third-party liability claims. In addition, such events could impact the company's customers and suppliers resulting in temporary or long-term outages and/or the limitation of supply of energy or other raw materials used in normal business operations.

Time horizon
Medium-term

Likelihood
About as likely as not

Magnitude of impact
Medium-high

Potential financial impact
200000000

Explanation of financial impact
The most important risk is to human safety. On the financial side, the replacement cost of a single large Praxair facility could be more than $200 million. On a long-term average annual basis, the Praxair, Inc. portfolio could sustain potentially over $3 million in hurricane losses.

Management method
To manage these risks, Praxair evaluates direct and indirect business risks through business impact analysis, then establishes appropriate priorities and policies; invests in facilities with suitably resilient design and technology; consults with vendors, insurance providers and industry experts; and conducts regular reviews of the business risks with management. Finally, Praxair works with its insurance provider to evaluate the risk from all perils including natural hazards such as extreme weather, windstorm and flooding.

The insurer uses rigorous standards based on their own scientific research and proven solutions to identify and quantify exposures to Praxair assets. Based on their recommendations, Praxair may make investments in infrastructure that adapts to or mitigates risks from anticipated climate change. For example: Based on information from our insurance provider and past investments in resilient design, some of our newest plants are built to withstand winds of 118 mph and critical equipment is raised to specific flood level standards. Our risk management methods limit the potential likelihood and magnitude of a disruption in production capacity due to extreme weather events. When constructing a new site, evaluations provided by our insurance provider can reduce risk in less than one year.

Cost of management
20000

Comment
Praxair annually spends in excess of $20,000 above normal business costs to study its natural catastrophe risk. The risk analysis service provides, among other items, detailed evaluations by geography of emerging hurricane and flooding vulnerability and likelihood of incidence of extreme weather.

Identifier
Risk 3

Where in the value chain does the risk driver occur?
Customer

Risk type
Transition risk

Primary climate-related risk driver
Reputation: Shifts in consumer preferences

Type of financial impact driver
Reputation: Reduced revenue from decreased demand for goods/services

Company- specific description
Praxair uses energy and seeks to continually improve its energy efficiency; and its applications often bring energy efficiency, as well as environmental and GHG improvements, to customer processes. Some of our customers are seeking to reduce GHG emissions in their supply chain and ask Praxair to provide information, e.g. through the CDP Supply Chain program, and/or to help meet their targets. If Praxair does not or cannot meet these expectations the company could lose business from that customer.

Time horizon
Short-term

Likelihood
Unlikely

Magnitude of impact
Low

Potential financial impact
1000000

Explanation of financial impact
The estimated financial implication could be over $1 million in annual sales.

Management method
Praxair manages reputational risks by communicating with customers and the public to demonstrate that its applications create a net GHG benefit. For example, Praxair invested in research to calculate and validate its Carbon Footprint. Praxair's carbon productivity was calculated for 5 signature Praxair products: Hydrogen used to make ultra-low sulfur diesel fuel (used in vehicles with diesel particulate filters); Oxygen used to optimize combustion in steelmaking; Krypton to insulate thermal windows; Argon sold for welding; and specialty coatings to make thermal barriers for industrial gas turbine and jet engine efficiency. In 2017, these markets contributed 12% of sales. Praxair applications enabled customers and their end users to avoid 69 million metric tons of CO2e – an amount that exceeded all Praxair GHG emissions by 44 million metric tons. We promote this research in public communications to help tell our story and manage the reputational risk from our GHG emissions profile (see www.praxair.com/our-company/sustainable-development/white-papers and our Sustainable Value Report and Annex, which we publish annually). By being transparent about the GHG impacts of our operations and the GHG benefits of our applications, Praxair limits both the likelihood and magnitude of reduced demand for our products and services due to damage to our reputation. We communicate with our stakeholders regularly, which reduces our risk on an ongoing basis.

Cost of management
50000

Comment
Praxair conducted the research in-house with subject-matter experts. We paid external providers for validation audits. This amount was less than $50,000.

Identifier
Risk 4

Where in the value chain does the risk driver occur?
Supply chain

Risk type
Transition risk

Primary climate-related risk driver
Market: Increased cost of raw materials

Type of financial impact driver
Market: Abrupt and unexpected shifts in energy costs

Company- specific description
Increases in the cost of energy and raw materials and/or disruption in the supply of these materials could result in lost sales or reduced profitability. Energy is the single largest cost item in the production and distribution of industrial gases. Most of Praxair's energy requirements are in the form of electricity, natural gas and diesel fuel for distribution. Praxair attempts to minimize the financial impact of variability in these costs through the management of customer contracts and reducing demand through operational productivity and energy efficiency. Large customer contracts typically have escalation and pass-through clauses to recover energy and feedstock costs. Such attempts may not successfully mitigate cost variability which could negatively impact its financial condition or results of operations. The supply of energy has not been a significant issue in the geographic areas where Praxair conducts business. However, regional energy conditions are unpredictable and may pose future risk. For carbon dioxide, carbon monoxide, helium, hydrogen, specialty gases and surface technologies, raw materials are largely purchased from outside sources. Where feasible, Praxair sources several of these gases, including carbon dioxide, hydrogen and calcium carbide, as chemical or industrial byproducts. In addition, Praxair has contracts or commitments for, or readily available sources of, most of these raw materials; however, their long-term availability and prices are subject to market conditions. A disruption in supply of such raw materials could impact the company's ability to meet contractual supply commitments.

Time horizon
Short-term

Likelihood
About as likely as not

Magnitude of impact
Medium

Potential financial impact
100000000

Explanation of financial impact
Energy availability and price is unpredictable and may pose unforeseen future risks. For example, if energy prices rise 10%, energy costs to Praxair would rise proportionally and could exceed $100 million. In addition, if raw materials became unavailable and Praxair was unable to meet its contractual obligations to customers, the company could potentially incur a loss up to the limits of its contractual liability.

Management method
Praxair performs long-term assessments of energy supply cost and reliability when making capital investment decisions to help manage the risk of energy supply and cost volatility, which are material to the internal rate of return and net present value of capital investment projects. Praxair also includes escalation and pass-through clauses in many customer contracts to recover energy and feedstock costs. Praxair pursues a range of actions to secure multiple sources of raw materials. For example, in Texas, Praxair uses a 2.5 billion standard cubic foot high-purity hydrogen storage cavern. This, together with sourcing by-product hydrogen, provides Praxair and our customers with confidence that we can provide a reliable service over our long-term contracts. Finally, Praxair pursues energy efficiency, invests in renewable energy and has energy and GHG targets to mitigate risks related to energy cost and availability. We have targets in each of these areas that we report on annually on our website. Praxair's management methods reduce the likelihood that disruptions in the supply of energy will have a major impact on operational cost. These investments may also reduce the potential magnitude of such disruptions. We make investments in energy efficiency and renewable energy annually, which mitigates potential risk on an ongoing basis.

Cost of management
100000

Comment
Praxair believes it will continue to mitigate potential costs through the pass through clauses of its product supply contracts. For the most part, the management of these potential risks has minimal additional financial impact and are managed within Praxair's current human and capital resources and budgets. In addition, Praxair invested in internal consulting to improve its Sustainable Development Management System and reporting. The cost of this was less than $100,000.

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?
Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier
Opp1

Where in the value chain does the opportunity occur?
Customer

Opportunity type
Products and services

Primary climate-related opportunity driver
Development and/or expansion of low emission goods and services

Type of financial impact driver
Increased revenue through demand for lower emissions products and services

Company- specific description
Governmental regulation of GHG and other emissions; renewable fuel standards in the EU and U.S.; the need for infrastructure build out in mature and developing economies (especially with the levels of growth being experienced in global mega-cities) - all these provide Praxair with market opportunities in applications like water technologies, carbon capture and sequestration (CCS) and industrial gases. The renewable energy market is a growth area for Praxair. Praxair supports the photovoltaics market, a key player in the growth of renewable energy. We offer a complete portfolio of solar-grade atmospheric, specialty and dopant gases, delivery systems and sputtering targets, to help customers meet today’s economic and environmental demands and position them to exceed these demands in the future. For example, Praxair manufactures Argon, a critical gas used in solar wafer production. Praxair also supplies Silane, a key raw material for the thin film deposition of amorphous and polysilicon films in the solar industry. Solar energy: Praxair sales are forecasted to grow from $60 million at ~ 5% per year. 2nd generation biofuels use industrial and specialty gases at many points in their supply chain and provided a potential ~$100 million gases market in 2017. Resilient markets are projected to grow to 33% of revenue by 2020, from 27% currently. In 2017 revenue terms, this increase is equivalent to $600 million.

Time horizon
Short-term

Likelihood
More likely than not

Magnitude of impact
Medium

Potential financial impact
1000000000

Explanation of financial impact
Our sustainable growth portfolio – applications that help customers improve their sustainability performance – was 58% of Praxair’s 2017 revenue. The potential financial implications can be calculated from the size of the market and the size of Praxair's opportunity. The global water and wastewater network market is expected to grow at a compound annual growth rate of 9.6% from

2014 to 2020. Wastewater is an $80 million end market for Praxair and is growing at more than 10% per year.

Strategy to realize opportunity
Praxair's research and development is directed toward developing new and improved methods for the production and distribution of industrial gases and the development of new markets and applications for these gases. The R&D group has set a target for 2016-2020 that Praxair's sustainability portfolio should exceed 50% of revenue. In 2017, Praxair's sustainability portfolio was 58% of revenue, or $6.6 billion. By setting targets for our sustainable growth portfolio, Praxair is able to increase the likelihood and magnitude of new environmental regulations leading to increased demand for our products and applications. We expect these opportunities to materialize within the next 3 years.

Cost to realize opportunity
0

Comment
There was no additional cost for actions taken, outside of regular budgeted staff and business costs in this area, including for R and D. A portion of the total R and D expenditure in 2017 ($93 million) went to develop the applications and processes described in this section. An external auditor was paid to validate claims for CO2e avoided from Praxair oxygen and hydrogen applications, and this was less than $50,000 in fees.

Identifier
Opp2

Where in the value chain does the opportunity occur?
Customer

Opportunity type
Markets

Primary climate-related opportunity driver
Access to new markets

Type of financial impact driver
Increased revenues through access to new and emerging markets (e.g., partnerships with governments, development banks)

Company- specific description
Changes in precipitation extremes are leading to water shortages, especially in mega-cities where there are population pressures. This in turn leads to stricter regulation of water quality, as we are seeing in emerging economies such as China. This presents market opportunity for Praxair to increase revenue through access to new markets as we develop and deliver customized systems to help industrial plants and municipalities meet their wastewater management goals. We work directly with our customers to provide beginning-to-end treatment methods, from needs assessment and treatment strategy to equipment design, installation and industrial supply. We offer a wide range of applications that treat and reuse process water, all while maximizing treatment capacity, reducing VOC emissions, improving safety and reducing costs. Also, as the global demand for potable water continues to rise and fresh water supplies are quickly depleting, we are advancing industrial technology to make this life-sustaining resource accessible to a growing population. Last year alone, we helped bring clean drinking water to more than 230 million people around the world.

Time horizon
Short-term

Likelihood
More likely than not

Magnitude of impact
Medium

Potential financial impact
10000000

Explanation of financial impact
The potential financial implications can be calculated from the size of the market and the size of Praxair's opportunity. The global water and wastewater network market is expected to grow at a compound annual growth rate of 9.6% from 2014 to 2020. Wastewater is an $80 million end market for Praxair and is growing at more than 10% per year. This represented a market opportunity of about $10 million in 2017.

Strategy to realize opportunity
Praxair's water technology offerings are supported by a business development group, which is actively investing in innovation and business development. Praxair has identified the need for massive water infrastructure development. For example: Praxair has signed a long-term gas supply contract with Gao Bei Dian Water Recycling Plant of Beijing Drainage Group Co., Ltd. Praxair will build, own and operate a vacuum pressure swing adsorption unit to supply gaseous oxygen to the plant for its wastewater treatment

and recycling processes. The plant treats wastewater from municipal drainage and uses the recycled product as cooling water for local power plants as well as for landscaping needs throughout the city. The plant helps to mitigate water shortages and supports the city's sustainable development efforts. To maintain this innovation stream, Praxair R and D developed a target that Praxair's sustainability portfolio should exceed 50% of sales, 2016-2020. In 2017, our sustainability portfolio was 58% of revenue or $6.6 billion. By setting a target for our sustainability portfolio, Praxair is able to increase the likelihood and magnitude of our opportunity to increase demand for products and applications that help companies manage changes in precipitation extremes. We expect these opportunities to materialize within the next 3 years.

Cost to realize opportunity
0

Comment
There was zero additional cost for actions taken, outside of regular budgeted staff and business costs in this area, including for R and D. A portion of the total R and D expenditure in 2017 ($93 million) went to develop the applications and processes described in this section.

Identifier
Opp3

Where in the value chain does the opportunity occur?
Customer

Opportunity type
Products and services

Primary climate-related opportunity driver
Shift in consumer preferences

Type of financial impact driver
Better competitive position to reflect shifting consumer preferences, resulting in increased revenues

Company- specific description
As more and more companies and individuals acknowledge climate change and its impacts, they are demanding new products and services to mitigate the effects of climate change, or plan for adaptation. These play out in different ways in different geographies, but they include the need for infrastructure build outs for water systems; technology to provide more resource efficiency; and energy security and reliability. These place Praxair in a better market position, as we provide gases into all these markets, e.g., nitrogen to make lighter composites to make aircraft more fuel efficient; alloys to make wind turbines more durable; CO2 to make water more potable and to clean wastewater systems. These gases are some of the gases sold into Praxair's end-markets in electronics (8% revenue), aerospace (3%) and "other" (10%), and that provide growth opportunities as markets continue to grow for climate-related technologies. Many of these applications are part of Praxair's new strategic focus on faster growing resilient end-markets, which include food, beverage, healthcare, specialty gases, environmental and aerospace. Overall, these end-markets have expanded to 27% of our sales, with several countries, like Brazil and Canada, already close to our 33% target.

Time horizon
Current

Likelihood
More likely than not

Magnitude of impact
Medium

Potential financial impact
600000000

Explanation of financial impact
Solar energy: Praxair sales are forecasted to grow from $60 million at ~ 5% per year. 2nd generation biofuels use industrial and specialty gases at many points in their supply chain and provided a potential ~$100 million gases market in 2017. Resilient markets are projected to grow to 33% of revenue by 2020, from 27% currently. In 2017 revenue terms, this increase is equivalent to $600 million.

Strategy to realize opportunity
Praxair is actively investing in innovation and business development in order to meet customer demand for products with a lower carbon footprint. For example, to maintain an environmental innovation stream, Praxair has a target that our sustainability portfolio - applications that bring customers sustainability benefits - should exceed 50% of revenue, 2016-2020. In 2017, Praxair's sustainability portfolio was 58% of revenue, or $6.6 billion. This focus on environmental innovation is yielding positive market results. Praxair's Global Market Development organization raises awareness of applications within our sustainability portfolio across a broad range of markets and regions. For example, in photovoltaics, Praxair is developing and promoting the use of its products

throughout the PV supply chain. We also raise awareness by providing information about products in our sustainability portfolio on our website. For example, we show how Praxair CO2 can be used in industrial applications where the carbon is chemically "fixed" and not emitted to the atmosphere; see Praxair.com/our-company/sustainable-development/climate-change. By working towards the sustainability portfolio target, Praxair is able to increase the likelihood and magnitude of our opportunity to meet consumers' demands for climate friendly products and applications. We expect these opportunities to materialize regularly, as we are constantly looking for ways to increase our sustainable growth portfolio.

Cost to realize opportunity

0

Comment

There was no additional cost for actions taken, outside of regular budgeted staff and business costs in this area, including for R and D. A portion of the total R and D expenditure in 2017 ($93 million) went to develop the applications and processes described in this section.

C2.5

(C2.5) Describe where and how the identified risks and opportunities have impacted your business.

	Impact	Description
Products and services	Impacted	Praxair identified expansion of low emission products and services as an opportunity in C2.4a. This opportunity is integrated into Praxair's business strategy through the establishment of a 5-year target to earn more than 50% of revenue from products with an environmental and health benefit (sustainable development portfolio). Magnitude of Impact: In 2016, revenue from this portfolio was 54%; in 2017, 58%. This represents $6.6 billion in revenue.
Supply chain and/or value chain	Not yet impacted	Praxair identified increased cost of raw materials and energy as a risk in C2.3a. As we describe in the company's 2017 Annual Report, the potential for supply chain disruption exists in some areas and could impact our own operations as well as our suppliers and customers. This may be a reason why we have historically been asked by customers to fill out CDP's supply chain survey, which we have done. To date, the supply of energy has not been a significant issue in the geographic areas where Praxair conducts business. However, regional energy conditions are unpredictable and may pose future risk. Praxair has not experienced a disruption in supply of raw materials that could have a substantive financial impact. However, there is a medium likelihood this could occur in the short term, i.e., over the next 1 to 2 years.
Adaptation and mitigation activities	Impacted for some suppliers, facilities, or product lines	Praxair identified extreme weather as a risk in C2.3a. As a result of the effects of hurricanes, Praxair runs disaster planning exercises as part of crisis management. One Praxair site in Texas was flooded during a recent hurricane. The company elevated assets above flood plain here and in other select locations as an adaptation measure. The magnitude of the impact was minimal as there was no loss of production time.
Investment in R&D	Impacted	Praxair identified expansion of low emission products and services as an opportunity in C2.4a. This opportunity is integrated into Praxair's business strategy through the establishment of a 5-year target to earn more than 50% of revenue from products with an environmental and health benefit (sustainable development portfolio). Achievement of this target is reliant on the ability of the R and D organization to continue to innovate to find low carbon solutions for Praxair customers. Magnitude of Impact: In 2016, revenue from this portfolio was 54%; in 2017, 58%. This represents $6.6 billion in revenue.
Operations	Impacted	Praxair's operations are impacted by climate risk in 2 areas: compliance with laws and regulations and sustainable productivity. Praxair operates in jurisdictions that have, or are developing, laws and/or regulations to reduce or mitigate the perceived adverse effects of greenhouse gas (“GHG”) emissions and faces a highly uncertain regulatory environment in this area. This risk is identified in C2.3a (policy and legal). New regulations could impact the cost of operations, particularly the cost of energy. The magnitude of the impact is up to $100,000,000, as new regulations could significantly increase the cost of energy.
Other, please specify	Please select	

C2.6

(C2.6) Describe where and how the identified risks and opportunities have factored into your financial planning process.

	Relevance	Description
Revenues	Impacted	Praxair identified expansion of low emission products and services as an opportunity in C2.4a. This opportunity is integrated into Praxair's business strategy through the establishment of a 5-year target to earn more than 50% of revenue from products with an environmental and health benefit (sustainable development portfolio). Achievement of this target is reliant on the ability of the R and D organization to continue to innovate to find low carbon solutions for Praxair customers. Source of revenue is regularly factored into financial planning. Magnitude of Impact: In 2016, revenue from this portfolio was 54%; in 2017, 58%. This represents $6.6 billion in revenue in 2017, a $900 million increase from the previous year.
Operating costs	Impacted	To mitigate the risks identified in C2.3a related to operations (such as increased operating costs from new regulation), Praxair tracks and sets targets related to sustainable productivity. This includes the energy and GHG savings from improving processes. These projects are regularly factored into financial planning. Magnitude of Impact: In 2017, these projects saved more than $100 million.
Capital expenditures / capital allocation	Impacted for some suppliers, facilities, or product lines	Praxair identified extreme weather as a risk in C2.3a. As a result of the effects of hurricanes, Praxair runs disaster planning exercises as part of crisis management. Allocation of capital for maintaining and improving fixed assets is regularly factored into financial planning. One Praxair site in Texas was flooded during a recent hurricane. The company elevated assets above flood plain here and in other select locations as an adaptation measure. The magnitude of the impact on manufactured capital was minimal as there was no loss of production time.
Acquisitions and divestments	Not impacted	Praxair did not make any major acquisitions in 2017 because of the merger discussions with Linde.
Access to capital	Not impacted	Other factors besides climate risks and opportunities impact Praxair's ability to access capital. Praxair has not had any challenges accessing capital and does not expect to in the future.
Assets	Impacted for some suppliers, facilities, or product lines	Praxair identified extreme weather as a risk in C2.3a. As a result of the effects of hurricanes, Praxair runs disaster planning exercises as part of crisis management. The operation of Praxair plants, a primary company asset, is regularly factored into financial planning. One Praxair site in Texas was flooded during a recent hurricane. The company elevated assets above flood plain here and in other select locations as an adaptation measure. The magnitude of the impact on manufactured capital was minimal as there was no loss of production time.
Liabilities	Impacted for some suppliers, facilities, or product lines	Liabilities are regularly factored into financial planning. Praxair pays for insurance and insurance services to assess sites in areas prone to natural disaster. These services are obtained at reasonable cost and have influenced certain siting decisions when considering building new plants. The magnitude of impact has been moderate as only certain facilities are impacted.
Other	Please select	

C3. Business Strategy

C3.1

(C3.1) Are climate-related issues integrated into your business strategy?

Yes

C3.1a

(C3.1a) Does your organization use climate-related scenario analysis to inform your business strategy?

Yes, qualitative

C-AC3.1b/C-CE3.1b/C-CH3.1b/C-CO3.1b/C-EU3.1b/C-FB3.1b/C-MM3.1b/C-OG3.1b/C-PF3.1b/C-ST3.1b/C-TO3.1b/C-TS3.1b)

(C-AC3.1b/C-CE3.1b/C-CH3.1b/C-CO3.1b/C-EU3.1b/C-FB3.1b/C-MM3.1b/C-OG3.1b/C-PF3.1b/C-ST3.1b/C-TO3.1b/C-TS3.1b)
Indicate whether your organization has developed a low-carbon transition plan to support the long-term business strategy.
No, we do not have a low-carbon transition plan

C3.1c

(C3.1c) Explain how climate-related issues are integrated into your business objectives and strategy.

i. Influence: Energy & climate change-related initiatives, goals and targets are integrated into Praxair's overall business strategy. The overall business strategy is influenced by the energy & climate change risks and opportunities identified during Praxair's annual risk assessment process, as well as performance against energy & climate change goals and targets. Our corporate GHG targets are the main components of our business strategy influenced by climate change concerns.

Praxair has a Sustainable Development Management System (SDMS) in place to drive the internal process for collecting SD performance data, which includes energy and GHG data. Performance data is reviewed monthly by the businesses and senior management and quarterly by the executive leadership team, which defines and executes our overall SD strategy. Energy & GHG emissions performance, risks and opportunities are considered in the development of Praxair's SD targets.

The vice president of Sustainable Development also reports SD performance information at least twice per year to the CEO and the Executive Leadership SD Steering Committee, and annually to the Board of Directors Committee on Technology, Safety and Sustainability.

ii. Link of Business Strategy to Emissions Reduction Target: All of Praxair's 2020 targets related to climate change are linked to the company's business strategy. For example, Praxair's Annual Report identifies cost of energy in Item 1A Risk Factors because energy is a large cost item for Praxair. Energy influences our corporate strategy, which led us to set an energy savings target to save 8 million MWH of electricity (cumulative), 2009-2020. At the end of 2017, we have saved 5.5 million MWH of electricity (cumulative).

iii. Business Decisions: Praxair has a 20% stake in Uno-X Hydrogen, which operates hydrogen fueling stations in Norway. Norway is considering a ban on gas and diesel vehicles by 2025. Praxair's extensive hydrogen production and distribution capabilities will play an important role in establishing a supply network for a future hydrogen car fleet in Norway. In 2016, Praxair signed a strategic alliance with Uno-X to install 20 hydrogen fueling stations across Norway by 2020. The investment in the joint venture was a significant business decision influenced by regulatory risks and the emerging market for hydrogen for fuel cell applications. This investment decision is relevant in each year beween 2016 and 2020 as the hydrogen fueling stations are being built.

iv. Aspects: Praxair's sustainable development strategy has been influenced by regulatory changes in the U.S. and around the world, which require GHG reporting and/or cap and trade; the identified regulatory, physical and reputational risks including cost and availability of energy; and the opportunities to Praxair's business from applications that enable CO2 emissions to be avoided.

v. Short-Term Strategy: Climate change concerns have influenced Praxair's short- and medium-term (0-5 years) business strategy, most importantly by serving as the driver for the development of corporate GHG targets. The achievement of these targets is part of the management variable compensation goals.

Our focus on achieving these targets aligns directly with cost savings initiatives. Praxair has developed environmental KPIs to understand environmental and GHG costs in operations. Our productivity organization saves over 5% off our gross cost stack each year. In 2010 we started to report the environmental savings from productivity projects. By 2017, we realized $100 million gross savings from GHG and energy projects, totaling 375,000 MT CO2e saved. Tracking environmental productivity allows us to see the relationship between different activities, such as reducing energy and reducing water and/or waste.

vi. Long-Term Strategy: Defined as more than 6 years in the future; we see long-term business opportunity from innovation that takes advantage of opportunities presented by climate change mitigation. With Praxair's business model, much of the environmental benefit we provide customers is energy efficiency. Praxair has created measurement systems in operations and in R&D that allow us to explore the GHG costs and benefits of any operational improvement or innovation project. We have a target that more than 50% revenue should come from our sustainability portfolio, 2016-2020, i.e., from products that bring sustainability benefit. In 2017, our

sustainability portfolio was 58% of revenue, or $6.6 billion.

Climate change concerns have also influenced our long-term risk mitigation practices. To mitigate against the potential increase in the price of energy, and as part of operational eco-efficiency, Praxair continues to invest aggressively in energy efficiency. We have a long-term target: From 2009–2020, achieve cumulative savings in excess of $500 million, 8 million MWH and 5 million MT CO2e. Through 2017, cumulative savings were more than $410 million, 5.5 million MWH and 3.4 million MT CO2e avoided, on track for meeting this goal. We also perform energy cost forecasts and risk assessments for capital projects to manage risks associated with the long-term reliability of energy supplies.

vii. Strategic Advantage: The focus on energy efficiency and GHG emissions reductions reduces Praxair's risk from higher energy costs, and is a significant contributor to our operational and financial results and Praxair's industry-leading operating margin and return on capital.

COMPETITIVE ADVANTAGE: GHG goals are a clear sign of leadership in our sector – evidenced by recognition received from CDP and others. Energy efficiency directly drives business results by providing Praxair's customers with a lower cost solution to industrial gas production than they typically can generate/supply on their own, which allows us to win more customers, among other benefits.

Praxair invested in the calculation of the carbon productivity of our major products and applications (e.g., oxygen in the steel industry), and the validation and communication of this information to our customers and other stakeholders. We invested in research on climate change mitigation technologies that include industrial energy efficiency, 2nd generation biofuels and applications for solar cells. This information is very valuable to our customers and other stakeholders and differentiates us in our sector.

Employee environmental engagement is a key part of our employee engagement strategy. Employees at all levels work to help Praxair achieve the company-wide GHG targets. Praxair is using environmental data and analytics to connect with employee values and the company mission, and to drive results in productivity and eco-efficiency, improve decision making and gain competitive advantage. Employee environmental engagement is helping save money, energy and GHG emissions, reduce other resource consumption, improve safety and operational discipline, and is driving environmental innovation.

C3.1d

(C3.1d) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenarios	Details
Other, please specify (IEA Bridge Scenario)	How scenario analysis was selected and results: Praxair chose the IEA Bridge Scenario. The scenario assumes energy sector emissions peak by around 2020 while maintaining economic growth. Praxair emissions also continue to increase, but are more than offset by the benefits we provide to our customers. The scenario also assumes energy efficiency contributes 49% of the GHG savings in 2030. Our research has shown that energy efficiency has a faster ROI than investing in renewable energy. This scenario allows for a more gradual shift to renewable energy, which is in line with Praxair's current strategy. We do not anticipate reputational or regulatory risk based on this scenario. However, in terms of physical risks, severe weather events such as hurricanes may become more prevalent. Our contingency and emergency response plans have been updated and protect against a loss in revenue due to such events. Despite this, increased spending on resiliency may become necessary. Time Horizon considered: now to 2030. 2020 is consistent with Praxair's current sustainable development strategy and targets. Looking beyond 2020, we will consider the results of the scenario analysis when establishing our next set of 5-year targets (2021-2025). Business Areas considered as part of the scenario analysis: All business units within Praxair were considered as part of the scenario analysis, with particular focus on air separation and hydrogen plants. How results informed strategy/ Case study: The results of the scenario analysis reinforced the selection of Praxair's priority factors as part of the Sustainable Development Materiality Assessment and the current focus on GHG efficiency, renewable energy purchases, helping customers avoid emissions and sustainable productivity/energy savings. For example, related to helping customers avoid GHG emissions, Praxair expanded its long-term hydrogen supply agreement with Motiva Enterprises LLC. Under this new agreement, Praxair will increase the amount of hydrogen it supplies to Motiva's approximately 600,000 barrel per day refinery in Port Arthur, Texas. Motiva completed a hydrocracker and diesel hydrotreater capacity expansion in 2016, and this agreement secures the additional hydrogen required to support that expansion, as well as the ongoing needs of the refinery. Hydrogen is used by refiners to produce ultra-low sulfur diesel (ULSD) and other clean transportation fuels. Demand for these fuels continues to increase as companies comply with stricter environmental regulations and standards. The use of ULSD, particularly with a diesel filter, has been shown to significantly reduce GHG emissions from diesel trucks.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?
Both absolute and intensity targets

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number
Abs 1

Scope
Scope 1+2 (location-based) +3 (upstream & downstream)

% emissions in Scope
100

% reduction from base year
100

Base year
2016

Start year
2016

Base year emissions covered by target (metric tons CO2e)
24665000

Target year
2020

Is this a science-based target?
No, and we do not anticipate setting one in the next 2 years

% achieved (emissions)
100

Target status
Underway

Please explain
Praxair has a 5-year target, running from beginning of 2016 to the end of 2020 (inclusive) to enable annually two times the amount of our own calculated Scope 1+2+3 GHG emissions to be avoided by customers or their end users from certain signature products. We must achieve this target each year. In 2017, our emissions were 24,665,000 MT, meaning our target was to enable at least 49,330,000 MT to be avoided. (24,665,000 MT CO2e * 2 = 49,330,000 MT CO2e). We calculated the carbon productivity of 5 signature products in 5 markets, including Hydrogen sold to make ultra-low sulfur fuel (used in vehicles with diesel particulate filters), Oxygen sold to optimize combustion in steelmaking, Krypton sold to insulate windows, Argon for welding, and specialty coatings to make thermal barriers for industrial gas turbine and jet engine efficiency. These markets contributed 12% of sales in 2017 and enabled customers to avoid 69 million metric tons CO2e in 2017, which means we met the target for 2017. Praxair does not calculate customer GHG emissions. So we express this target as 100% reduction of twice our 2017 emissions (Scope 1+2+3). % emissions in scope is 100, since the target is measured against our total Scope 1+2+3 footprint. For Scope 3, we only include emissions categories we consider relevant in our calculation. This target is part of Praxair's 5-year sustainable development targets, which run 2016 to 2020. The target year is 2020 because we must achieve this target each of the 5 years. We report 100% achievement because the target was achieved in 2017.

C4.1b

(C4.1b) Provide details of your emissions intensity target(s) and progress made against those target(s).

Target reference number
Int 1

Scope
Scope 1

% emissions in Scope
88

% reduction from baseline year
2

Metric
Metric tons CO2e per metric ton of product

Base year
2015

Start year
2016

Normalized baseline year emissions covered by target (metric tons CO2e)
100

Target year
2020

Is this a science-based target?
No, and we do not anticipate setting one in the next 2 years

% achieved (emissions)
0

Target status
Underway

Please explain
For 2016-2020, Praxair has a target to improve the Scope 1 GHG intensity of our hydrogen plants by 2%. We report performance against this target in terms of % improvement off a baseline of 100. We consider product intensity by business unit to be business confidential. When we established our 2020 target for Praxair's hydrogen plants, we expected emissions intensity to deteriorate in 2016 and 2017, then improve 2018 through 2020. As part of our efforts to achieve this target, Praxair is investing in more by-product hydrogen, which is less GHG-intensive than other sources of hydrogen. These sources, coupled with Praxair's energy efficiency efforts, will improve the GHG intensity of Praxair's hydrogen plants. The scope is all 22 of Praxair hydrogen facilities worldwide. In 2017, Praxair achieved a 2.4% improvement over 2016, resulting in performance against a baseline of 100 of -0.3%. Based on our projections, we are on track to meeting the target by 2020.

% change anticipated in absolute Scope 1+2 emissions
7

% change anticipated in absolute Scope 3 emissions
0

Target reference number
Int 2

Scope
Scope 1

% emissions in Scope
3

% reduction from baseline year
7.5

Metric

Metric tons CO2e per metric ton of product

Base year
2015

Start year
2016

Normalized baseline year emissions covered by target (metric tons CO2e)
100

Target year
2020

Is this a science-based target?
No, and we do not anticipate setting one in the next 2 years

% achieved (emissions)
5

Target status
Underway

Please explain
For 2016-2020, Praxair has a target to improve GHG efficiency from Scope 1 trucking by 7.5%. This target combines weighted results for bulk and packaged gas trucking performance. We report performance against this target in terms of % improvement off a baseline of 100. We expect the amount of product to be delivered to increase over time, proportional to our increase in products produced. At the same time, we are making great strides at delivering these products more efficiently. These factors are expected to offset each other, resulting in no significant change in Scope 1 emissions from trucking through 2020. Praxair is on track to achieving our trucking GHG intensity target. Our combined bulk and packaged gas trucking achieved a 1.7% improvement in efficiency in 2017 compared to 2016 and a cumulative 5% improvement over the baseline.

% change anticipated in absolute Scope 1+2 emissions
0

% change anticipated in absolute Scope 3 emissions
0

C4.2

(C4.2) Provide details of other key climate-related targets not already reported in question C4.1/a/b.

Target
Renewable energy consumption

KPI – Metric numerator
500,000 MWH

KPI – Metric denominator (intensity targets only)
n/a

Base year
2015

Start year
2016

Target year
2020

KPI in baseline year
498000

KPI in target year
500000

% achieved in reporting year

100

Target Status
Underway

Please explain
Praxair's renewable energy target is to source more than 500,000 MWH of renewable electricity annually, 2016-2020. We count renewable electricity sourced through power purchase agreements that guarantee hydro, wind and solar energy. (Note, we do not include in this target the renewable energy that Praxair consumes from electricity delivered from power grids. In 2017, we estimated about 30% of our total electricity purchases from the grid were from renewable sources.) Praxair sourced 503,000 MWh renewable energy, including hydropower in New York state, Mexico and Brazil, and wind power in India. This amount exceeds our target of 500,000 MWH. This renewable electricity represents about 2% of all Praxair electricity use.

Part of emissions target
N/a

Is this target part of an overarching initiative?
No, it's not part of an overarching initiative

Target
Energy productivity

KPI – Metric numerator
MWH energy saved

KPI – Metric denominator (intensity targets only)
n/a

Base year
2009

Start year
2010

Target year
2020

KPI in baseline year
0

KPI in target year
8000000

% achieved in reporting year
69

Target Status
Underway

Please explain
This long-term target is to achieve cumulative energy savings in excess of $500 million, 8 million MWH and 5 million MT CO2e from a baseline of 2009. Praxair is on track to meeting this target. At the end of 2017, Praxair achieved a cumulative $410 million in savings from energy efficiency, 5.5 million MWH electricity and 3.4 million MT CO2e avoided. Praxair's strong focus on energy efficiency also resulted in natural gas savings of 1.9 million MMBTUs.

Part of emissions target
int1 - This target supports Praxair's hydrogen intensity target.

Is this target part of an overarching initiative?
No, it's not part of an overarching initiative

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.
Yes

C4.3a

(C4.3a) Identify the total number of projects at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of projects	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	0	0
To be implemented*	42	9690
Implementation commenced*	415	107000
Implemented*	1889	375000
Not to be implemented	0	0

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Activity type
Energy efficiency: Processes

Description of activity
Process optimization

788 voluntary projects from 22 different countries providing permanent improvements to energy requirements for turbines, compressors, fans, and other primary process equipment, improvement to heat transfer efficiency and control equipment for process efficiency and reliability optimization.

Estimated annual CO2e savings (metric tonnes CO2e)
298000

Scope
Scope 1
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
61000000

Investment required (unit currency – as specified in CC0.4)
37600000

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
788 voluntary projects from 22 different countries providing permanent improvements to energy requirements for turbines, compressors, fans, and other primary process equipment, improvement to heat transfer efficiency and control equipment for process efficiency and reliability optimization.

Activity type
Energy efficiency: Processes

Description of activity
Process optimization

72 projects around the globe that reduced product CO2 and ODS's emissions through reducing transfers, process efficiency,

system integrity and refrigerant replacements

Estimated annual CO2e savings (metric tonnes CO2e)
29000

Scope
Scope 1
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
2503000

Investment required (unit currency – as specified in CC0.4)
1200000

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
72 projects around the globe that reduced product CO2 and ODS's emissions through reducing transfers, process efficiency, system integrity and refrigerant replacements. Also includes projects to secure alternative raw material sources for lower internal process energy consumption, lower power use for equipment maintenance, and similar items.

Activity type
Energy efficiency: Building services

Description of activity
Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
300

Scope
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in CC0.4)
81000

Investment required (unit currency – as specified in CC0.4)
500000

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
21 voluntary projects providing permanent reduction in power consumption for lighting retrofits, HVAC controls and building power improvements.

Activity type
Other, please specify (Transportation fleet projects)

Description of activity
<Not Applicable>

Estimated annual CO2e savings (metric tonnes CO2e)
35000

Scope

Scope 1

Voluntary/Mandatory
Please select

Annual monetary savings (unit currency – as specified in CC0.4)
35600000

Investment required (unit currency – as specified in CC0.4)
3200000

Payback period
1-3 years

Estimated lifetime of the initiative
Ongoing

Comment
739 voluntary projects from 20 countries worldwide provided permanent reduction in diesel and gasoline use from fuel efficiency or route efficiency programs, on-site tank size optimization, trailer size optimization and truck modifications such as fairings & skirts for fuel efficiency

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment
Dedicated budget for energy efficiency	As energy is a significant portion of Praxair's cost stack, Praxair pursues energy efficiency rigorously and in several areas. Praxair's sustainable productivity organization measures the environmental savings in our productivity work. In 2017, energy and GHG efficiency projects resulted in savings of more than $100 million and 375,000 MT CO2e avoided. These projects contributed to a reduction in electricity use of 598,000 MWh as well as reductions in natural gas and fuel use. Each business unit has a significant capital budget for energy efficiency projects, which in 2017 was around $100 million.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?
Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation
Group of products

Description of product/Group of products
Praxair has a target to demonstrate and validate customer carbon productivity for selected products. Praxair's carbon productivity has been calculated for five signature Praxair products in five markets: 1) Hydrogen (H2) sold to make ultra-low sulfur diesel fuel (ULSD). When used in trucks fitted with diesel particulate filters, it eliminates black carbon. Environmental agencies, including a joint 2011 UNEP and World Meteorological Association report: "Integrated Assessment of Black Carbon and Tropospheric Ozone," see the elimination of black carbon as being the crucial short-term strategy to reduce the rate of global warming. 2) Krypton sold to insulate thermal windows. 3) Oxygen (O2) sold to optimize combustion in steel making. 4) Argon for welding. 5) Specialty coatings to make thermal barriers for industrial gas turbine and jet engine efficiency. These applications allow Praxair customers and their end users to avoid Scope 1 and Scope 2 energy-related GHG emissions.

Are these low-carbon product(s) or do they enable avoided emissions?
Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions
Other, please specify (See Praxair website)

Other: We provide a full description of our methodologies, including emission factors, assumptions and global warming potentials, at http://www.praxair.com/our-company/sustainable-development/white-papers.

% revenue from low carbon product(s) in the reporting year
12

Comment
These five applications enabled customers and their end users to avoid 69 million metric tons of their Scope 1+2 CO2e in 2017. This includes 10 million MT avoided by the use of oxygen in steel making, 42 million MT avoided by the use of hydrogen in ultra-low sulfur diesel, 15 million MT avoided from the use of specialty coatings to make thermal barriers for industrial gas turbine and jet engine efficiency, and 2 million MT avoided from Krypton in windows and Argon in welding.

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start
January 1 2015

Base year end
December 31 2015

Base year emissions (metric tons CO2e)
8199000

Comment
Praxair has selected 2015 as its base year. While Praxair conducted a GHG inventory prior to 2015, 2015 is the base year for the company's 2020 Sustainable Development Targets. This is the year against which our emissions are tracked.

Scope 2 (location-based)

Base year start
January 1 2015

Base year end
December 31 2015

Base year emissions (metric tons CO2e)
12640000

Comment
Praxair has selected 2015 as its base year. While Praxair conducted a GHG inventory prior to 2015, 2015 is the base year for the company's 2020 Sustainable Development Targets. This is the year against which our emissions are tracked.

Scope 2 (market-based)

Base year start
January 1 2015

Base year end
December 31 2015

Base year emissions (metric tons CO2e)
12530000

Comment
Praxair has selected 2015 as its base year. While Praxair conducted a GHG inventory prior to 2015, 2015 is the base year for the company's 2020 Sustainable Development Targets. This is the year against which our emissions are tracked.

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.

ISO 14064-1
The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
US EPA Mandatory Greenhouse Gas Reporting Rule
Other, please specify (California ARB Reg for Rptg of GHG Emiss)

C5.2a

(C5.2a) Provide details of the standard, protocol, or methodology you have used to collect activity data and calculate Scope 1 and Scope 2 emissions.

Reporting of GHG emissions by major sources is required by the California Global Warming Solutions Act of 2006 (AB 32). The Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (MRR) is applicable to electricity generators, industrial facilities, fuel suppliers, and electricity importers. A summary of reported GHG emissions data reported under MRR are made public each year, and the data used by the Cap-and-Trade Program and included in California Greenhouse Gas Inventory. Certain Praxair sites in California are required to report under this regulation. For these sites, we abide by the reporting requirements of this rule to ensure consistency when reporting this data to all stakeholders.

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Row 1

Gross global Scope 1 emissions (metric tons CO2e)
8820000

End-year of reporting period
<Not Applicable>

Comment

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based
We are reporting a Scope 2, location-based figure

Scope 2, market-based
We are reporting a Scope 2, market-based figure

Comment

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Row 1

Scope 2, location-based
12836000

Scope 2, market-based (if applicable)
12705000

End-year of reporting period
<Not Applicable>

Comment
Praxair bases our external reporting of Scope 2 emissions on the location-based method. For the purposes of responding to CDP, we report Scope 2 using the market-based approach by calculating the amount of CO2e that we could deduct for the facilities operating under power purchase agreements for renewable energy. We deducted 131,000 metric tons CO2e from our Scope 2 location-based total to arrive at the market-based value.

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?
Yes

C6.4a

(C6.4a) Provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure.

Source
Electricity use at very small sites

Relevance of Scope 1 emissions from this source
No emissions excluded

Relevance of location-based Scope 2 emissions from this source
Emissions are not relevant

Relevance of market-based Scope 2 emissions from this source (if applicable)
Emissions are not relevant

Explain why the source is excluded
Praxair has several very small office sites, many with 1-2 people. We estimated the emissions from these sites and, as they represent less than 1% of our Scope 2 emissions, consider them to be de minimis.

C6.5

(C6.5) Account for your organization's Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
Praxair's largest purchased good is energy, such as electricity to operate our facilities and natural gas to make hydrogen, which we purchase from byproduct sources where possible. Details on our energy purchases and emissions are provided elsewhere in this report. Other goods and services purchased by Praxair include logistics and transportation services, office infrastructure requirements and administrative benefits and services. In the rows below, we detail our largest upstream emissions from the purchase of capital goods and upstream energy-related emissions. In 2012 and 2013, we estimated emissions from our consumption of paper using the U.S. EPA's WARM methodology. These emissions, along with emissions from the remaining upstream goods and services, are less than 0.1% of our Scope 3 footprint and are considered to be not relevant when compared to our energy-related activities.

Capital goods

Evaluation status
Relevant, calculated

Metric tonnes CO2e
515000

Emissions calculation methodology
The principal material Praxair procures for capital projects is steel. Based on our annual spend, we used our Steelfirst subscription to calculate the price of carbon steel per country. The weight of steel was then calculated as price per ton divided into spend. Related GHG emissions were calculated by multiplying the weight of the carbon steel using a GHG emission factor derived from the U.S. EPA (0.87 MT CO2e/ per MT carbon steel).

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status
Relevant, calculated

Metric tonnes CO2e
2199000

Emissions calculation methodology
The methodology used is based on the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, Category 3. For electricity, we prorated the fuel mix ratios in those 7 countries where we use more than 1 billion KW. These 7 countries represent more than 87% of our total electricity usage. We extrapolated this mix to the remaining 13% of our electricity usage. We then assumed a Tand D loss rate of 7%, based on information from the U.S. Department of Energy. We then added in emissions from upstream natural gas.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation

Upstream transportation and distribution

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
In 2013, two transportation projects were evaluated: one very large project in Russia and one medium-sized project in the U.S. For each project, distance traveled was recorded for road, rail and sea. Emissions factors per mode of transportation were used from CEFIC/ ECTA March 2011 Guidelines for Measuring and Managing CO2 Emissions from Freight Transport Operations, and GHG emissions were determined per project. The average GHG emissions per project were multiplied by the number of oversized and heavy capital equipment transportation projects. This was multiplied by 1.2 to determine GHG emissions from 100 percent of capital equipment purchased. The number likely overstates the emissions as 20 percent is from far smaller capital equipment transportation projects. These emissions represented less than 1.5% of our Scope 3 footprint in both 2013 and 2014. Therefore, we did not calculate these emissions for subsequent years and deem them not relevant.

Waste generated in operations

Evaluation status
Relevant, calculated

Metric tonnes CO2e
14000

Emissions calculation methodology
The methodology used is based on the Greenhouse Gas Protocol's Corporate Value Chain (Scope 3) Accounting and Reporting Standard. Using the average data method according to this standard, Praxair uses waste volumes provided by waste vendors and multiplies the waste treated by third parties for each waste treatment method by the associated emission factors. The amount of waste treated by third parties is recorded in our EKPI database according to the waste treatment methods (landfill, recycled, other). To calculate the CO2e emissions resulting from waste treated in landfills, Praxair multiplies the total amount of waste in this category by an emissions factor provided by the EPA, which is associated with the municipal waste mix in the United States. The IPCC suggests that any CO2e emissions associated with recycling should not be included in Scope 3 inventories. Therefore, Praxair uses an emissions factor of 0 for recycled waste treated by third parties. The small amount of waste which is not landfilled or recycled is calculated equally as if it were landfilled.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation
Emissions from waste generated in operations is relevant to Praxair. We have a Zero Waste program that encourages all sites to reduce waste and eliminate sending waste to landfill. Participation in this program is growing and through this program, we track waste data and the GHG benefits from reducing waste.

Business travel

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
Praxair estimated emissions from business travel in 2012 and 2013. These emissions were about 9,000 metric tons CO2e, representing 0.3% of our Scope 3 footprint. Since our level of business travel has not changed significantly compared to 2013, we did not recalculate these emissions. We do not consider these emissions to be relevant to our Scope 3 footprint.

Employee commuting

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
Praxair calculated GHG emissions from employee commuting for 2012 through 2014. In each year, emissions totaled less than 2% of total Scope 3 emissions. As emissions from employee commuting are not relevant to our Scope 3 footprint, we did not calculate these emissions for 2016.

Upstream leased assets

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
Praxair estimated emissions from leased office space in 2012 and 2013. These emissions were about 15,000 metric tons CO2e in 2013, representing 0.5% of our measured Scope 3 footprint. Since the square footage of leased office space has not changed significantly compared to 2013, we did not recalculate these emissions. We do not consider these emissions to be relevant to our Scope 3 footprint.

Downstream transportation and distribution

Evaluation status
Relevant, calculated

Metric tonnes CO2e
282000

Emissions calculation methodology
Praxair products are delivered by pipeline, through on-site product production, and by truck. A small portion is delivered by train and ship. Product delivered by Praxair trucks is reported as Scope 1. About half of Praxair's truck miles each year are driven by contractors. Contractor miles driven are collected in each country and business or region and tracked as part of Praxair’s safety program. Praxair’s Scope 3 emissions resulting from delivery of products by third-party carriers were derived by assuming contractor fuel efficiency is equivalent to the prior year Praxair driving fuel efficiency. This miles per gallon value was then multiplied by total miles driven and converted to GHGs using an EPA emission factor for diesel fuel.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
100

Explanation

Processing of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Guidance for this category is based on the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, section 6.4. Praxair is at the beginning of many value chains (for carbonated beverage companies, refineries, electronics, aerospace, automotive, healthcare, steel making, etc.). Praxair provides many intermediate products with many downstream applications, each of which has a very different GHG profile. The effort involved in determining Scope 3 emissions from processing of our products is not reasonable, and for this reason, we are unable to reasonably estimate the downstream emissions associated with the various end uses of our products. For these reasons, we do not report emissions in the following categories: processing of sold products, use of sold products, and end of life treatment of sold products. Emissions from our CO2 sales to the food industry may be traceable. This market segment is a subset of our food and beverage end market, which is 9% of our annual revenue. Actual CO2 volumes are business confidential. However, customers have requested this information as part of CDP's Supply Chain program and we have provided it to them.

Use of sold products

Evaluation status

Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Guidance for this category is based on the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, section 6.4. Praxair is at the beginning of many value chains (for carbonated beverage companies, refineries, electronics, aerospace, automotive, healthcare, steel making, etc.). Praxair provides many intermediate products with many downstream applications, each of which has a very different GHG profile. The effort involved in determining Scope 3 emissions from use of our products is not reasonable, and for this reason, we are unable to reasonably estimate the downstream emissions associated with the various end uses of our products. For these reasons, we do not report emissions in the following categories: processing of sold products, use of sold products, and end of life treatment of sold products. As noted in CC3.2a, the use of a number of our products/applications helps customers reduce their GHG emissions, i.e., the use of our products does not generate emissions but helps others reduce theirs. Emissions from our CO2 sales to the food industry may be traceable. This market segment is a subset of our food and beverage end market, which is 9% of our annual revenue. Actual CO2 volumes are business confidential. However, customers have requested this information as part of CDP's Supply Chain program and we have provided it to them.

End of life treatment of sold products

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
Guidance for this category is based on the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, section 6.4. 47% of Praxair's raw materials are non-greenhouse gas atmospheric gases, extracted directly from the air and ultimately returned to the atmosphere with no GHG impact. In addition, Praxair is at the beginning of many value chains (for carbonated beverage companies, refineries, electronics, aerospace, automotive, healthcare, steel making, etc.). Praxair provides many intermediate products with many downstream applications, each of which has a very different GHG profile. The effort involved in determining Scope 3 emissions from end-of-life treatment of our products is not reasonable, and for this reason, we are unable to reasonably estimate the downstream emissions associated with the various end uses of our products. For these reasons, we do not report emissions in the following categories: processing of sold products, use of sold products, and end of life treatment of sold products. Emissions from our CO2 sales to the food industry may be traceable. This market segment is a subset of our food and beverage end market, which is 9% of our annual revenue. Actual CO2 volumes are business confidential. However, customers have requested this information as part of CDP's Supply Chain program and we have provided it to them.

Downstream leased assets

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
Praxair does not have any downstream leased assets.

Franchises

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
Praxair does not have any franchises.

Investments

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation
An estimate of Praxair's share of GHG emissions from joint ventures where we own less than 50% was made for 2012 and 2013 based on assuming the same output per $ revenue in our JV's as in our own business. In 2014 and 2015, we owned only a small share in a joint venture, and our share of revenue in JV's is only a fraction of our total revenue. We estimated emissions from JV's to be less than 1% of our Scope 3 footprint and, therefore, consider them not relevant.

Other (upstream)

Evaluation status

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

Other (downstream)

Evaluation status

Metric tonnes CO2e

Emissions calculation methodology

Percentage of emissions calculated using data obtained from suppliers or value chain partners

Explanation

C6.7

(C6.7) Are carbon dioxide emissions from biologically sequestered carbon relevant to your organization?

No

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure
0.00189

Metric numerator (Gross global combined Scope 1 and 2 emissions)
21656000

Metric denominator
unit total revenue

Metric denominator: Unit total
11437000000

Scope 2 figure used
Location-based

% change from previous year
6

Direction of change
Decreased

Reason for change
Revenue increased at a faster pace than emissions: Total Scope 1+2 emissions increased by 2% from the previous year, while revenue increased 9%. The increase in GHG emissions was kept in check due to Praxair's focus on energy efficiency. Praxair implemented 1,889 efficiency projects that reduced fuel use in transportation activities and reduced consumption of electricity and natural gas. These projects, which Praxair counts as part of sustainable productivity (see projects described in C4.3b) resulted in GHG savings of 375,000 MT and an overall improvement in GHG efficiency.

Intensity figure
0.31

Metric numerator (Gross global combined Scope 1 and 2 emissions)
21656000

Metric denominator
metric ton of product

The denominator is based on a proprietary formula that establishes the weights of air separation products on an energy equivalent basis.

Metric denominator: Unit total
69387000

Scope 2 figure used
Location-based

% change from previous year
3

Direction of change
Decreased

Reason for change
Volume of product increased at a faster pace than GHG emissions. With increased revenue, Praxair produced more product in 2017 than in 2016. The increase in GHG emissions was kept in check due to Praxair's focus on energy efficiency. Praxair implemented 1,889 efficiency projects that reduced fuel use in transportation activities and reduced consumption of electricity and natural gas. These projects, which Praxair counts as part of sustainable productivity (see projects described in C4.3b) resulted in GHG savings of 375,000 MT and an overall improvement in GHG efficiency.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization have greenhouse gas emissions other than carbon dioxide?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	8748000	IPCC Fourth Assessment Report (AR4 - 20 year)
N2O	37000	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	34000	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	1000	IPCC Fourth Assessment Report (AR4 - 100 year)

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
North America	7892000
South America	88000
Europe	117000
Asia, Australasia, Middle East and Africa	723000

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
Air Separation Units (ASUs)	338000
Hydrogen Plants	7795000
CO2 Plants	307000
Packaged Gas	107000
Electronics and Surface Technologies	20000
Helium Plants	0
Trucking	249000
Corporate Offices	4000
Standard Plants (plants at customer sites - we only use electricity at these locations)	0

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Net Scope 1 emissions , metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	8567000	<Not Applicable>	This figure include all Scope 1 emissions from production activities - emissions from corporate offices and transportation were deducted from the figure reported in C6.1 as these are not "chemical production activities."
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Electric utility generation activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

C7.5

(C7.5) Break down your total gross global Scope 2 emissions by country/region.

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)	Purchased and consumed electricity, heat, steam or cooling (MWh)	Purchased and consumed low-carbon electricity, heat, steam or cooling accounted in market-based approach (MWh)
North America	6290000	6228000	12842000	363000
South America	663000	653000	3478000	64000
Europe	1332000	1332000	3513000	0
Asia, Australasia, Middle East and Africa	4551000	4492000	6796000	76000

C7.6

(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.

By business division

C7.6a

(C7.6a) Break down your total gross global Scope 2 emissions by business division.

Business division	Scope 2, location-based emissions (metric tons CO2e)	Scope 2, market-based emissions (metric tons CO2e)
Air Separation Units (ASUs)	10220000	
Hydrogen Plants	1252000	
CO2 Plants	156000	
Packaged Gas	117000	
Electronics and Surface Technologies	65000	
Helium Plants	17000	
Trucking	0	
Corporate Offices	6000	
Standard Plants (ASUs on customer sites)	1003000	

C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7

(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization's total gross global Scope 2 emissions by sector production activity in metric tons CO2e.

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	12830000	12699000	This figure include all Scope 2 emissions from production activities - emissions from corporate offices were deducted from the figure reported in C6.3 (energy use in office spaces is not a chemical production activity).
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

C-CH7.8

(C-CH7.8) Disclose the percentage of your organization's Scope 3, Category 1 emissions by purchased chemical feedstock.

Purchased feedstock	Percentage of Scope 3, Category 1 tCO2e from purchased feedstock	Explain calculation methodology
Natural gas	0	Praxair does not measure Scope 3 emissions from natural gas feedstock. Praxair procures byproduct hydrogen wherever feasible. For example, Praxair's facility in Freeport, Texas, will capture and recover byproduct streams from Dow Chemical and provide high purity hydrogen back to Dow and other customers. By recovering the byproduct hydgrogen rather than producing hydrogen from reforming natural gas, Praxair avoids 1.5 million MT GHG per year of direct GHG emissions (Since Praxair is using the byproduct hydrogen, it is not available to Dow for use as a fuel, which means Dow will consume additional natural gas. If we take into account the additional natural gas consumption by Dow, the overall saving is 300,000 MT GHG per year.) Praxair assumes that the avoided emissions from the use of byproduct streams largely offsets the upstream Scope 3 emissions from purchased natural gas.

C-CH7.8a

(C-CH7.8a) Disclose sales of products that are greenhouse gases.

	Sales, metric tons	Comment
Carbon dioxide (CO2)	0	Praxair considers sales volume information business confidential.
Methane (CH4)	0	Praxair does not sell methane.
Nitrous oxide (N2O)	0	Praxair considers sales volume information business confidential.
Hydrofluorocarbons (HFC)	0	Praxair does not sell HFCs.
Perfluorocarbons (PFC)	0	Praxair does not sell PFCs.
Sulphur hexafluoride (SF6)	0	Praxair considers sales volume information business confidential.
Nitrogen trifluoride (NF3)	0	Praxair considers sales volume information business confidential.

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Increased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined) and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption		<Not Applicable>		
Other emissions reduction activities	375000	Decreased	2	Emissions decreased 2% due to energy efficiency and other GHG emissions reduction activities. This percent was derived by dividing 375,000 MT CO2e saved by Praxair's 2016 Scope 1+2 total of 21,229,000 MT CO2e * 100 to arrive at 2%. We do not count new purchases of renewable energy here, because we are using the location-based method for Scope 2 accounting.
Divestment		<Not Applicable>		
Acquisitions		<Not Applicable>		
Mergers		<Not Applicable>		
Change in output	849000	Increased	4	Praxair's total production increased from 2016 to 2017 by 6%. Also, due to customer requirements, one plant mostly runs on naphtha, which is more GHG emissions-intensive than other sources of hydrogen. The ratio of MT product to MT emissions for this new plant is 1:11, as opposed to the Praxair-wide average for hydrogen plants of 1:5. The increase in production, combined with customer requirements for feedstock use, led to a 4% increase in GHG emissions, 2016 to 2017.
Change in methodology		<Not Applicable>		
Change in boundary		<Not Applicable>		
Change in physical operating conditions		<Not Applicable>		
Unidentified		<Not Applicable>		
Other		<Not Applicable>		

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Location-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 25% but less than or equal to 30%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertakes this energy-related activity
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	Yes
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	No

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	0	2813900	2813900
Consumption of purchased or acquired electricity	<Not Applicable>	503000	24897000	25400000
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	0	1229000	1229000
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Total energy consumption	<Not Applicable>	503000	28939900	29442900

C-CH8.2a

(C-CH8.2a) Report your organization's energy consumption totals (excluding feedstocks) for chemical production activities in MWh.

	Heating value	Total MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	2465900
Consumption of purchased or acquired electricity	<Not Applicable>	25388000
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	1229000
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	<Not Applicable>
Total energy consumption	<Not Applicable>	29082900

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	Yes
Consumption of fuel for co-generation or tri-generation	No

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Fuels (excluding feedstocks)
Natural Gas

Heating value
HHV (higher heating value)

Total fuel MWh consumed by the organization
2303000

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
2189000

MWh fuel consumed for self-generation of steam
114000

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
<Not Applicable>

Fuels (excluding feedstocks)
Fuel Oil Number 2

Heating value
HHV (higher heating value)

Total fuel MWh consumed by the organization
7900

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

MWh fuel consumed for self-generation of steam
7900

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
<Not Applicable>

Fuels (excluding feedstocks)
Diesel

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization
340000

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
340000

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
<Not Applicable>

Fuels (excluding feedstocks)
Naphtha

Heating value
HHV (higher heating value)

Total fuel MWh consumed by the organization
163000

MWh fuel consumed for the self-generation of electricity
0

MWh fuel consumed for self-generation of heat
163000

MWh fuel consumed for self-generation of steam
0

MWh fuel consumed for self-generation of cooling
0

MWh fuel consumed for self- cogeneration or self-trigeneration
<Not Applicable>

C8.2d

(C8.2d) List the average emission factors of the fuels reported in C8.2c.

Diesel

Emission factor
22.4

Unit
lb CO2e per gallon

Emission factor source
U.S. EPA AP 42

Comment

Fuel Oil Number 2

Emission factor
223

Unit
lb CO2 per gallon

Emission factor source
U.S. EPA AP 42

Comment

Naphtha

Emission factor
8.5

Unit
kg CO2 per gallon

Emission factor source
U.S. EPA AP 42

Comment

Natural Gas

Emission factor
120

Unit
lb CO2e per 1000 cubic ft3

Emission factor source
U.S. EPA AP 42

Comment

C8.2f

(C8.2f) Provide details on the electricity, heat, steam and/or cooling amounts that were accounted for at a low-carbon emission factor in the market-based Scope 2 figure reported in C6.3.

Basis for applying a low-carbon emission factor
Power Purchase Agreement (PPA) without energy attribute certificates

Low-carbon technology type
Wind
Hydropower

MWh consumed associated with low-carbon electricity, heat, steam or cooling
503000

Emission factor (in units of metric tons CO2e per MWh)
0

Comment
Under the market-based approach for Scope 2, Praxair considers emissions from this electricity to be zero. Praxair purchased 503,000 MWH of renewable electricity in 2017 - from hydropower and wind projects - through PPAs with utility suppliers. This does not include the renewable electricity that is part of the grid mix.

C-CH8.3

(C-CH8.3) Disclose details on your organization's consumption of feedstocks for chemical production activities.

Feedstocks
Natural gas

Total consumption
159577200000

Total consumption unit
cubic feet

Inherent carbon dioxide emission factor of feedstock, metric tons CO2 per consumption unit
0.05

Heating value of feedstock, MWh per consumption unit
0.01

Heating value
HHV

Comment

Feedstocks
Other, please specify (Not applicable)

Total consumption
0

Total consumption unit
metric tons

Inherent carbon dioxide emission factor of feedstock, metric tons CO2 per consumption unit
0

Heating value of feedstock, MWh per consumption unit
0

Heating value
HHV

Comment
Praxair is an industrial gases company and more than 98% of our feedstock is ambient air (that is, not derived from fossil fuels). As CDP does not have an option for non-fossil fuel feedstocks, CDP has instructed us to choose "Other, please specify" and to explain that more than 98% of our feedstock can not be classified as fuels. We report natural gas only, as this is half of the remaining feedstock. Other feedstocks (oil, biomass and waste) represent less than 1% each of Praxair's feedstock consumption. No comment is available for C-CH8.3a, but as there is no option for non-fossil fuel feedstocks in that question, we do not account for the 98.6% of our feedstock that is air. We only account for the 1.4% of feedstock that is derived from natural gas, oil, biomass and waste.

C-CH8.3a

(C-CH8.3a) State the percentage, by mass, of primary resource from which your chemical feedstocks derive.

	Percentage of total chemical feedstock (%)
Oil	0.1
Natural Gas	1.2
Coal	0
Biomass	0
Waste	0.1
Fossil fuel (where coal, gas, oil cannot be distinguished)	0
Unknown source or unable to disaggregate	0

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

Description
Energy use

Metric value
5500000

Metric numerator
MWH energy saved, cumulative, 2009-2020

Metric denominator (intensity metric only)
n/a

% change from previous year
1

Direction of change
Increased

Please explain
Praxair has a target to save 8 million MWH energy, 2009 to 2020. At the end of 2017, we had saved a cumulative 5.5 million MWH, on track for meeting the target. We track these savings through our sustainable productivity organization.

C-CH9.3a

(C-CH9.3a) Provide details on your organization's chemical products.

Output product
Specialty chemicals

Production (metric tons)

Capacity (metric tons)

Direct emissions intensity (metric tons CO2e per metric ton of product)

Electricity intensity (MWh per metric ton of product)

Steam intensity (MWh per metric ton of product)

Steam/ heat recovered (MWh per metric ton of product)

Comment
Praxair considers this information business confidential.

C-CH9.6

(C-CH9.6) Disclose your organization's low-carbon investments for chemical production activities.

Investment start date
January 1 2017

Investment end date
December 31 2017

Investment area
R&D

Technology area
Radical process redesign

Investment maturity
Pilot demonstration

Investment figure

Low-carbon investment percentage
Please select

Please explain
Praxair considers the investment figure and percentage to be business confidential. This low-carbon investment enables a reduction in GHG emissions and NOx. The reduced GHG emissions include 30-50% reduced CO2 emissions versus the traditional methods. This investment is expected to meet Praxair's typical hurdle rates for return on capital.

Investment start date
January 1 2017

Investment end date
December 31 2017

Investment area
R&D

Technology area
Radical process redesign

Investment maturity
Full/commercial-scale demonstration

Investment figure

Low-carbon investment percentage
Please select

Please explain
Praxair considers the investment figure and percentage to be business confidential. This low-carbon investment enables a reduction in GHG emissions due to power savings. This investment is expected to meet Praxair's typical hurdle rates for return on capital.

Investment start date
January 1 2017

Investment end date
December 31 2017

Investment area
R&D

Technology area
Waste heat recovery

Investment maturity
Full/commercial-scale demonstration

Investment figure

Low-carbon investment percentage
Please select

Please explain
Praxair considers the investment figure and percentage to be business confidential. This low-carbon investment enables a reduction in GHG emissions due to increased efficiency. This investment is expected to meet Praxair's typical hurdle rates for return on capital.

Investment start date
January 1 2017

Investment end date
December 31 2017

Investment area
R&D

Technology area
Radical process redesign

Investment maturity
Pilot demonstration

Investment figure

Low-carbon investment percentage
Please select

Please explain
Praxair considers the investment figure and percentage to be business confidential. This low-carbon investment enables a reduction in GHG emissions by capturing the combustion gases. This investment is expected to meet Praxair's typical hurdle rates for return on capital.

Investment start date
January 1 2017

Investment end date
December 31 2017

Investment area
R&D

Technology area
Radical process redesign

Investment maturity
Pilot demonstration

Investment figure

Low-carbon investment percentage
Please select

Please explain
Praxair considers the investment figure and percentage to be business confidential. This low-carbon investment enable a reduction in GHG emissions due to power savings. This investment will also provide project cost savings.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 and/or Scope 2 emissions and attach the relevant statements.

Scope
Scope 1

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
FINAL eKPI Assurance Statement - 2018 -2017 data.pdf

Page/ section reference
1 and 2

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

Scope
Scope 2 location-based

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Type of verification or assurance
Limited assurance

Attach the statement
FINAL eKPI Assurance Statement - 2018 -2017 data.pdf

Page/ section reference
1 and 2

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

C10.1b

(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.

Scope
Scope 3- at least one applicable category

Verification or assurance cycle in place
Annual process

Status in the current reporting year
Complete

Attach the statement
FINAL eKPI Assurance Statement - 2018 -2017 data.pdf

Page/section reference
1-2

Relevant standard
ISO14064-3

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?
Yes

C10.2a

(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C5. Emissions performance	Year on year change in emissions (Scope 2)	ISO 14064-3	An independent third-party auditor verified the change in Scope 2 emissions was a 0.3 percent decrease, 2016 to 2017. FINAL eKPI Assurance Statement - 2018 -2017 data.pdf

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?
Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.
California CaT
Québec CaT

C11.1b

(C11.1b) Complete the following table for each of the emissions trading systems in which you participate.

California CaT

% of Scope 1 emissions covered by the ETS
1.4

Period start date
January 1 2017

Period end date
December 31 2017

Allowances allocated
124445

Allowances purchased
0

Verified emissions in metric tons CO2e
74524

Details of ownership
Facilities we own and operate

Comment
Allowances were not purchased in calendar year 2017 but will be purchased in 2018.

Québec CaT

% of Scope 1 emissions covered by the ETS
0.56

Period start date
January 1 2017

Period end date
December 31 2017

Allowances allocated
21597

Allowances purchased
28449

Verified emissions in metric tons CO2e
49272

Details of ownership
Facilities we own and operate

Comment
Quebec's system requires us to obtain credits for CO2 that leaves as product. Emissions not including product are substantially lower than the 49,272 reported above.

C11.1d

(C11.1d) What is your strategy for complying with the systems in which you participate or anticipate participating?

Praxair is covered by California's Greenhouse Gas Cap and Trade program and Quebec's Cap and Trade program. Praxair's strategy for complying with these systems is imbedded in our overall climate strategy. The company has enterprise-wide energy and climate goals that require GHG intensity improvements at hydrogen plants and energy savings from all business units. These goals are achieved through a range of emissions reduction measures, e.g. use of abatement technology and increase in energy efficiency. Praxair also has a 5-year target to plant or preserve one million trees with conservation groups. These projects help us manage project-based carbon credits and are part of our overall purchase strategy for allowances.

In Quebec's cap and trade program, companies must have allowances for GHG emissions as well as any CO2 leaving as product. Our strategy in Quebec is to minimize the GHG emissions from Praxair's facility through energy efficiency initiatives. Praxair carefully manages its free credit allocation to cover these emissions. Praxair must also plan to purchase either allowances or offset credits to cover CO2 leaving our facility as product.

In California, Praxair purchases some of its allowances as forestry credits from The Nature Conservancy.

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

Yes

C11.2a

(C11.2a) Provide details of the project-based carbon credits originated or purchased by your organization in the reporting period.

Credit origination or credit purchase

Credit purchase

Project type

Forests

Project identification

The Rio Bravo Climate Action Project, a 15,550-acre area of tropical forest located in northwest Belize, registered by The Nature Conservancy. This is Praxair's sixth year with this project and sixth purchase of the same number of credits.

Verified to which standard

VCS (Verified Carbon Standard)

Number of credits (metric tonnes CO2e)

667

Number of credits (metric tonnes CO2e): Risk adjusted volume

667

Credits cancelled

Yes

Purpose, e.g. compliance

Voluntary Offsetting

C11.3

(C11.3) Does your organization use an internal price on carbon?

Yes

C11.3a

(C11.3a) Provide details of how your organization uses an internal price on carbon.

Objective for implementing an internal carbon price

Stakeholder expectations

Identify and seize low-carbon opportunities

GHG Scope

Scope 1

Scope 2

Application

Praxair's internal carbon price was developed to help communicate to stakeholders the environmental and social impacts from Praxair's hydrogen production for its use in hydrodesulfurization during the production of ultra low sulfur diesel fuel (ULSD). The hydrogen is used to remove sulfur that otherwise would be emitted into the atmosphere as sulfur dioxide. Moving forward, the internal carbon price may be used to identify and assess low carbon opportunities. We expect this information could be used especially in our ASU and hydrogen businesses when siting new plants to inform emissions control technology and equipment decisions.

Actual price(s) used (Currency /metric ton)

59

Variance of price(s) used

A uniform price is currently being used. As the application of the internal price evolves, the price may also evolve over time.

Type of internal carbon price

Shadow price

Impact & implication

Praxair participated in a project with Villanova University to assess the social and environmental impacts from Praxair's hydrogen production for its use in hydrodesulfurization during the production of Ultra Low Sulfur Diesel Fuel (ULSD). The hydrogen is used to remove sulfur that otherwise would be emitted into the atmosphere as sulfur dioxide, SO2. The study concluded that there are social and environmental costs that come from Praxair’s production of hydrogen for ULSD, but the use of this hydrogen has far more benefits than the social and environmental costs it takes to produce. Praxair’s production of H2 used in hydrodesulfurization results in a net benefit of $960 million in social impacts, and $391 million in environmental impacts, which attests to the beneficial nature of this process. Establishing the internal price of carbon has helped to reveal the true impacts of Praxair's hydrogen production. While the price has not yet impacted our business, we are just beginning to consider how the cost of carbon can be applied to various internal decision-making processes. We expect the internal price could eventually help us set and meet future carbon goals.

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement
Innovation & collaboration (changing markets)

Details of engagement
Run a campaign to encourage innovation to reduce climate impacts on products and services

% of suppliers by number
5

% total procurement spend (direct and indirect)
25

% Scope 3 emissions as reported in C6.5
73

Rationale for the coverage of your engagement
Energy providers (utilities) are chosen for engagement because they represent the largest portion of Praxair's Scope 3 GHG footprint. Fuel and energy related emissions represent 73% of Praxair's Scope 3 footprint. Praxair participates in energy efficiency and energy reduction programs offered by electricity suppliers. Praxair is able to implement technology solutions through these programs that otherwise might not be cost effective.

Impact of engagement, including measures of success
Engaging with energy providers is a win-win for Praxair. Many utility companies are required by state renewable portfolio standards to ensure that a percentage of electricity they sell comes from renewable sources. Working with their customers (like Praxair), utilities can achieve this by incentivizing energy efficiency, which can reduce the amount of non-renewable power needed. Praxair, by participating in these programs, reduces energy use and avoids GHG emissions, and saves money. Cost savings is a primary driver for these programs. For Praxair, energy is a large cost factor, representing 25-30 percent of Praxair's operational costs. We measure the success of this engagement by the amount of energy we save (MWH). For example, Praxair installed a state of the art air separation unit at their Ecorse, Michigan site. The new 1600 tons per day oxygen plant was designed by the engineering and supply systems groups at the Praxair Technology Center in Buffalo, NY. The new unit improves the site argon production efficiency by over 20%, resulting in over 100 million kilowatt-hour savings per year. Local power provider DTE Electric Company supported this improvement with a large energy efficiency incentive payment.

Comment

C12.3

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

Direct engagement with policy makers
Trade associations

C12.3a

(C12.3a) On what issues have you been engaging directly with policy makers?

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Clean energy generation	Support	Praxair met with the U.S. Congress and state and local officials, including in California, to discuss clean energy generation for fuel cell technologies.	Praxair seeks to promote public policies that encourage the use of hydrogen fuel cells as zero-emission sources of energy.
Energy efficiency	Support	Praxair met with the U.S. Congress and state and local officials to discuss energy efficiency.	Continued federal and state funding for fossil fuel energy efficiency technology development.

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

No

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

Praxair maintains a detailed oversight process to ensure our activities are conducted in a legal, ethical and transparent manner. This includes oversight by the Chief Compliance Officer and an annual program review by the Board of Directors. Praxair's Government Relations department provides regular reporting on such activities to the Chief Compliance Officer and reports to the General Counsel.

In addition, all Praxair employees participate in annual training regarding issues related to doing business with the government, complying with anti-trust and competition laws, and the FCPA.

Finally, there is coordination with the VP & Chief Sustainability Officer and General Counsel to ensure consistency of public policy advocacy with Praxair's sustainability strategy, including our energy and GHG strategy. The VP & Chief Sustainability Officer works closely with Government Relations and participates in cross-functional groups to review advocacy positions that have an environmental or climate change impact. In turn, Government Relations has a seat on the Sustainable Development Council, which meets quarterly.

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication
In voluntary sustainability report

Praxair 2017 Sustainable Value Report

Status
Complete

Attach the document
praxair-2017-sustainable-value-report.pdf

Content elements
Governance
Strategy
Emission targets
Other metrics

Publication
In voluntary sustainability report

Praxair 2017 GRI Annex

Status
Complete

Attach the document
praxair-2017-gri-annex.pdf

Content elements
Emissions figures
Emission targets
Other metrics

Publication
In other regulatory filings

2017 Amended 10-K

Status
Complete

Attach the document
Praxair Amended 10K 2018.pdf

Content elements
Governance
Strategy
Other, please specify (Executive compensation)

Publication
In mainstream reports

Praxair 2017 10-K

Status
Complete

Attach the document
Praxair 2018 10-K.pdf

Content elements
Risks & opportunities
Other, please specify (Results of Operations)

C14. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

C14.1

(C14.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Senior Vice President	Chief Operating Officer (COO)

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

Praxair Inc. sees inquiries such as this as opportunities. Building on over a century of technological and business innovation, we are eager to showcase our Eco-Efficiency and Green Technologies portfolio and demonstrate how we might support customers sustainability efforts and help improve environmental performance, increase energy efficiency and increase production process throughput or yield. In 2017 50% of our revenue came from environmental innovation (our recently expanded eco-efficiency applications portfolio). Note that in 2017, we aligned our ECO Portfolio methodology across market segments, in particular for waste reduction and minimization of rework. For example, metal fabrication shielding gases, food freezing, and all HyCO refining applications are now included in the ECO Portfolio. If the 2016 revenues from environmental innovations were updated to reflect the expanded ECO Portfolio to be compared against 2017, the result would be 50% as well. Praxair has a GHG goal to improve our customer carbon productivity, backed by a target to enable each year at least 2X the GHG avoided than was emitted in all Praxair operations. Sources of direct GHG emissions (Scope 1, principally from H2 production, also other sources including truck driving) and indirect GHG emissions (Scope 2, principally from air separation) totaled 25 MM MT CO2e in 2017. Praxair measures and validates customer carbon productivity for selected applications, including: argon for welding and krypton for window insulation; oxygen for steelmaking; and hydrogen used by oil refiners to make ultra-low sulfur diesel (ULSD) in trucks fitted with a diesel particulate filter. In 2017, these five applications, which represent 12% of revenue, enabled 69 million MT CO2e to be avoided, or a 44 million MT net benefit. Praxair applications therefore can be said to enable more than 2X more GHG emissions to be avoided than were emitted from all global operations, or a >2X carbon productivity.

Reference page 5 of the Praxair 2017 Sustainable Value Report (SVR), which is located online in our sustainable development reporting center: http://www.praxair.com/our-company/sustainable-development/reporting-center , and Praxair Sustainable Development targets and performance on our web site: http://www.praxair.com/our-company/sustainable-development/targets-and-performance

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	11437000000

SC0.2

(SC0.2) Do you have an ISIN for your company that you would be willing to share with CDP?

Yes

SC0.2a

(SC0.2a) Please use the table below to share your ISIN.

	ISIN country code (2 letters)	ISIN numeric identifier and single check digit (10 numbers overall)
Row 1	US	74005P1049

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

Requesting member

ARKEMA

Scope of emissions

Scope 1

Emissions in metric tonnes of CO2e

20

Uncertainty (±%)

20

Major sources of emissions

Packaged gases. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified

No

Allocation method

Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made

This figure represents best effort to allocate distribution miles. For Scope 1 emissions: If product was transported by truck, estimated miles driven to deliver product, if possible. We assumed a fuel rate of 5 miles per gallon and converted gallons to CO2e using the EPA conversion rates. NOTE: This conversion factor will over-estimate the CO2e in two ways: (1) the 5 MPG is conservative; (2) the product being delivered to a particular customer may be part of a less than a full truckload delivery (ie multiple deliveries to several customers from the same truckload of product). Both will improve the impact product CO2e per delivery mile driven. For package/cylinder gases, allocation of miles when there are multiple products and shipments for multiple customers in an area is a significant challenge. In most cases, these emission allocations are not included.

Requesting member

ARKEMA

Scope of emissions
Scope 2

Emissions in metric tonnes of CO2e
373

Uncertainty (±%)
20

Major sources of emissions
Packaged gases. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to capture sales volume to customers from disparate systems. For Scope 2 Emissions: Each business provided the volume of product(s) sold to each customer and the primary supply plant. We used a benchmark conversion factor for energy used in the production per unit of product and then country emission factors (EFs) to determine the CO2e per product. Scope 2 emissions are calculated for product nitrogen and oxygen only.

Requesting member
Braskem S/A

Scope of emissions
Scope 1

Emissions in metric tonnes of CO2e
2429

Uncertainty (±%)
20

Major sources of emissions
Liquid nitrogen, pipeline gaseous nitrogen, pipeline oxygen, liquid carbon dioxide, package gases. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. CO2 is sourced as a byproduct and purified, then liquefied for transport. Praxair has long been a practitioner of what is called "Byproduct Synergy", which is leveraged in our CO2 sourcing. Example: http://www.praxair.com/news/2015/praxair-and-delaware-city-refining-sign-long-term-supply-agreement Praxair also sources a portion of CO2 from ethanol fermentation (a biomass source). In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to allocate distribution miles. For Scope 1 emissions: If product was transported by truck, estimated miles driven to deliver product, if possible. We assumed a fuel rate of 5 miles per gallon and converted gallons to CO2e using the EPA conversion rates. NOTE: This conversion factor will over-estimate the CO2e in two ways: (1) the 5 MPG is conservative; (2) the product being delivered to a particular customer may be part of a less than a full truckload delivery (ie multiple deliveries to several customers from the same truckload of product). Both will improve the impact product CO2e per delivery mile driven. For package/cylinder gases, allocation of miles when there are multiple products and shipments for multiple customers in an area is a significant challenge. In most cases, these emission allocations are not included.

Requesting member
Braskem S/A

Scope of emissions
Scope 2

Emissions in metric tonnes of CO2e
13212

Uncertainty (±%)

Major sources of emissions
Liquid nitrogen, pipeline gaseous nitrogen, pipeline oxygen, liquid carbon dioxide, package gases. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. CO2 is sourced as a byproduct and purified, then liquefied for transport. Praxair has long been a practitioner of what is called "Byproduct Synergy", which is leveraged in our CO2 sourcing. Example: http://www.praxair.com/news/2015/praxair-and-delaware-city-refining-sign-long-term-supply-agreement Praxair also sources a portion of CO2 from ethanol fermentation (a biomass source). In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to capture sales volume to customers from disparate systems. For Scope 2 Emissions: Each business provided the volume of product(s) sold to each customer and the primary supply plant. We used a benchmark conversion factor for energy used in the production per unit of product and then country emission factors (EFs) to determine the CO2e per product. Scope 2 emissions are calculated for product nitrogen and oxygen only.

Requesting member
Companhia de Concessões Rodoviárias - CCR

Scope of emissions
Scope 1

Emissions in metric tonnes of CO2e
3

Uncertainty (±%)
20

Major sources of emissions
Packaged gases. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to allocate distribution miles. For Scope 1 emissions: If product was transported by truck, estimated miles driven to deliver product, if possible. We assumed a fuel rate of 5 miles per gallon and converted gallons to CO2e using the EPA conversion rates. NOTE: This conversion factor will over-estimate the CO2e in two ways: (1) the 5 MPG is conservative; (2) the product being delivered to a particular customer may be part of a less than a full truckload delivery (ie multiple deliveries to several customers from the same truckload of product). Both will improve the impact product CO2e per delivery mile driven. For package/cylinder gases, allocation of miles when there are multiple products and shipments for multiple customers in an area is a significant challenge. In most cases, these emission allocations are not included.

Requesting member
Companhia de Concessões Rodoviárias - CCR

Scope of emissions

Scope 2

Emissions in metric tonnes of CO2e
0.02

Uncertainty (±%)
20

Major sources of emissions
Packaged gases. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to capture sales volume to customers from disparate systems. For Scope 2 Emissions: Each business provided the volume of product(s) sold to each customer and the primary supply plant. We used a benchmark conversion factor for energy used in the production per unit of product and then country emission factors (EFs) to determine the CO2e per product. Scope 2 emissions are calculated for product nitrogen and oxygen only.

Requesting member
Intel Corporation

Scope of emissions
Scope 1

Emissions in metric tonnes of CO2e
141

Uncertainty (±%)
20

Major sources of emissions
Liquid nitrogen and packaged electronics process gases. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to allocate distribution miles. For Scope 1 emissions: If product was transported by truck, estimated miles driven to deliver product, if possible. We assumed a fuel rate of 5 miles per gallon and converted gallons to CO2e using the EPA conversion rates. NOTE: This conversion factor will over-estimate the CO2e in two ways: (1) the 5 MPG is conservative; (2) the product being delivered to a particular customer may be part of a less than a full truckload delivery (ie multiple deliveries to several customers from the same truckload of product). Both will improve the impact product CO2e per delivery mile driven. For package/cylinder gases, allocation of miles when there are multiple products and shipments for multiple customers in an area is a significant challenge. In most cases, these emission allocations are not included.

Requesting member
Intel Corporation

Scope of emissions
Scope 2

Emissions in metric tonnes of CO2e
0

Uncertainty (±%)
20

Major sources of emissions
Liquid nitrogen and packaged electronics process gases. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to capture sales volume to customers from disparate systems. For Scope 2 Emissions: Each business provided the volume of product(s) sold to each customer and the primary supply plant. We used a benchmark conversion factor for energy used in the production per unit of product and then country emission factors (EFs) to determine the CO2e per product. Scope 2 emissions are calculated for product nitrogen and oxygen only.

Requesting member
Koninklijke Philips NV

Scope of emissions
Scope 1

Emissions in metric tonnes of CO2e
6

Uncertainty (±%)
20

Major sources of emissions
Liquid helium. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to allocate distribution miles. For Scope 1 emissions: If product was transported by truck, estimated miles driven to deliver product, if possible. We assumed a fuel rate of 5 miles per gallon and converted gallons to CO2e using the EPA conversion rates. NOTE: This conversion factor will over-estimate the CO2e in two ways: (1) the 5 MPG is conservative; (2) the product being delivered to a particular customer may be part of a less than a full truckload delivery (ie multiple deliveries to several customers from the same truckload of product). Both will improve the impact product CO2e per delivery mile driven. For package/cylinder gases, allocation of miles when there are multiple products and shipments for multiple customers in an area is a significant challenge. In most cases, these emission allocations are not included.

Requesting member
Koninklijke Philips NV

Scope of emissions
Scope 2

Emissions in metric tonnes of CO2e
0

Uncertainty (±%)
20

Major sources of emissions

Liquid helium. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to capture sales volume to customers from disparate systems. For Scope 2 Emissions: Each business provided the volume of product(s) sold to each customer and the primary supply plant. We used a benchmark conversion factor for energy used in the production per unit of product and then country emission factors (EFs) to determine the CO2e per product. Scope 2 emissions are calculated for product nitrogen and oxygen only.

Requesting member
PepsiCo, Inc.

Scope of emissions
Scope 1

Emissions in metric tonnes of CO2e
922

Uncertainty (±%)
20

Major sources of emissions
Liquid nitrogen, liquid carbon dioxide, and package gases. Nitrogen is produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. CO2 is sourced as a byproduct and purified, then liquefied for transport. Praxair has long been a practitioner of what is called "Byproduct Synergy", which is leveraged in our CO2 sourcing. Example: http://www.praxair.com/news/2015/praxair-and-delaware-city-refining-sign-long-term-supply-agreement Praxair also sources a portion of CO2 from ethanol fermentation (a biomass source). In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to allocate distribution miles. For Scope 1 emissions: If product was transported by truck, estimated miles driven to deliver product, if possible. We assumed a fuel rate of 5 miles per gallon and converted gallons to CO2e using the EPA conversion rates. NOTE: This conversion factor will over-estimate the CO2e in two ways: (1) the 5 MPG is conservative; (2) the product being delivered to a particular customer may be part of a less than a full truckload delivery (ie multiple deliveries to several customers from the same truckload of product). Both will improve the impact product CO2e per delivery mile driven. For package/cylinder gases, allocation of miles when there are multiple products and shipments for multiple customers in an area is a significant challenge. In most cases, these emission allocations are not included.

Requesting member
PepsiCo, Inc.

Scope of emissions
Scope 2

Emissions in metric tonnes of CO2e
2483

Uncertainty (±%)
20

Major sources of emissions
Liquid nitrogen, liquid carbon dioxide, and package gases. Nitrogen is produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. CO2 is sourced as a byproduct and purified, then

liquefied for transport. Praxair has long been a practitioner of what is called "Byproduct Synergy", which is leveraged in our CO2 sourcing. Example: http://www.praxair.com/news/2015/praxair-and-delaware-city-refining-sign-long-term-supply-agreement Praxair also sources a portion of CO2 from ethanol fermentation (a biomass source). In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to capture sales volume to customers from disparate systems. For Scope 2 Emissions: Each business provided the volume of product(s) sold to each customer and the primary supply plant. We used a benchmark conversion factor for energy used in the production per unit of product and then country emission factors (EFs) to determine the CO2e per product. Scope 2 emissions are calculated for product nitrogen and oxygen only.

Requesting member
Signify NV

Scope of emissions
Scope 1

Emissions in metric tonnes of CO2e
37

Uncertainty (±%)
20

Major sources of emissions
Liquid nitrogen, liquid oxygen, onsite oxygen, and liquid argon. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to allocate distribution miles. For Scope 1 emissions: If product was transported by truck, estimated miles driven to deliver product, if possible. We assumed a fuel rate of 5 miles per gallon and converted gallons to CO2e using the EPA conversion rates. NOTE: This conversion factor will over-estimate the CO2e in two ways: (1) the 5 MPG is conservative; (2) the product being delivered to a particular customer may be part of a less than a full truckload delivery (ie multiple deliveries to several customers from the same truckload of product). Both will improve the impact product CO2e per delivery mile driven. For package/cylinder gases, allocation of miles when there are multiple products and shipments for multiple customers in an area is a significant challenge. In most cases, these emission allocations are not included.

Requesting member
Signify NV

Scope of emissions
Scope 2

Emissions in metric tonnes of CO2e
3711

Uncertainty (±%)
20

Major sources of emissions
quid nitrogen, liquid oxygen, onsite oxygen, and liquid argon. Atmospheric products (nitrogen, oxygen, argon) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the

gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to capture sales volume to customers from disparate systems. For Scope 2 Emissions: Each business provided the volume of product(s) sold to each customer and the primary supply plant. We used a benchmark conversion factor for energy used in the production per unit of product and then country emission factors (EFs) to determine the CO2e per product. Scope 2 emissions are calculated for product nitrogen and oxygen only.

Requesting member
The Coca-Cola Company

Scope of emissions
Scope 1

Emissions in metric tonnes of CO2e
5132

Uncertainty (±%)
20

Major sources of emissions
Liquid nitrogen, liquid carbon dioxide, and package gases. Atmospheric products (nitrogen, oxygen) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. LCO2 is sourced as a byproduct and purified, then liquefied for transport. Praxair has long been a practitioner of what is called "Byproduct Synergy", which is leveraged in our CO2 sourcing. Example: http://www.praxair.com/news/2015/praxair-and-delaware-city-refining-sign-long-term-supply-agreement Praxair also sources a portion of CO2 from ethanol fermentation (a biomass source). In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to allocate distribution miles. For Scope 1 emissions: If product was transported by truck, estimated miles driven to deliver product, if possible. We assumed a fuel rate of 5 miles per gallon and converted gallons to CO2e using the EPA conversion rates. NOTE: This conversion factor will over-estimate the CO2e in two ways: (1) the 5 MPG is conservative; (2) the product being delivered to a particular customer may be part of a less than a full truckload delivery (ie multiple deliveries to several customers from the same truckload of product). Both will improve the impact product CO2e per delivery mile driven. For package/cylinder gases, allocation of miles when there are multiple products and shipments for multiple customers in an area is a significant challenge. In most cases, these emission allocations are not included.

Requesting member
The Coca-Cola Company

Scope of emissions
Scope 2

Emissions in metric tonnes of CO2e
3243

Uncertainty (±%)
20

Major sources of emissions
Liquid nitrogen, liquid carbon dioxide, and package gases. Atmospheric products (nitrogen, oxygen) are produced by separating air using energy in cooling towers, then liquefying the gas with further cooling and compression for transportation. LCO2 is sourced as a byproduct and purified, then liquefied for transport. Praxair has long been a practitioner of what is called "Byproduct Synergy",

which is leveraged in our CO2 sourcing. Example: http://www.praxair.com/news/2015/praxair-and-delaware-city-refining-sign-long-term-supply-agreement Praxair also sources a portion of CO2 from ethanol fermentation (a biomass source). In addition to the energy cost of the products, which provides an indirect GHG cost, there is the direct GHG cost of transporting the gases in trucks.

Verified
No

Allocation method
Allocation based on the volume of products purchased

Please explain how you have identified the GHG source, including major limitations to this process and assumptions made
This figure represents best effort to capture sales volume to customers from disparate systems. For Scope 2 Emissions: Each business provided the volume of product(s) sold to each customer and the primary supply plant. We used a benchmark conversion factor for energy used in the production per unit of product and then country emission factors (EFs) to determine the CO2e per product. Scope 2 emissions are calculated for product nitrogen and oxygen only.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

European Industrial Gases Association position paper - Indirect CO2 emissions compensation:

Benchmark proposal for Air Separation Plants

IEA country CO2 emission factor 2014

US EPA eGRID2014

EPA diesel fuel CO2 emission factor

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges
Doing so would require we disclose business sensitive/proprietary information	Much of Praxair's "carbon" cost is the energy cost to produce the product. Energy is considered a feedstock in the Industrial Gas sector, and is also Praxair's main cost, so energy costs per product will always be a sensitive business issue in the Industrial Gas sector. For the purpose of external reporting, emissions are allocated using published industry standard emission factors for production where those factors are available through benchmark studies.

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?
No

SC1.4b

(SC1.4b) Explain why you do not plan to develop capabilities to allocate emissions to your customers.

Our ability to allocate emissions is sufficient to give customers a reasonably accurate representation of the carbon footprint of our product supply. Praxair products tend to represent a crucial part of a customer product, but a very small portion of their cost stack.

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

No

SC3.1

(SC3.1) Do you want to enroll in the 2018-2019 CDP Action Exchange initiative?

No

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2017-2018 Action Exchange initiative?

No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services, if so, what functionality will you be using?

Yes, I will provide data

SC4.1a

(SC4.1a) Give the overall percentage of total emissions, for all Scopes, that are covered by these products.

SC4.2a

(SC4.2a) Complete the following table for the goods/services for which you want to provide data.

Name of good/ service
Oxygen

Description of good/ service

Type of product
Final

SKU (Stock Keeping Unit)

Total emissions in kg CO2e per unit

±% change from previous figure supplied

Date of previous figure supplied

Explanation of change

Methods used to estimate lifecycle emissions
Please select

Name of good/ service
Hydrogen

Description of good/ service

Type of product
Final

SKU (Stock Keeping Unit)

Total emissions in kg CO2e per unit

±% change from previous figure supplied

Date of previous figure supplied

Explanation of change

Methods used to estimate lifecycle emissions
Please select

Name of good/ service
Argon

Description of good/ service

Type of product
Please select

SKU (Stock Keeping Unit)

Total emissions in kg CO2e per unit

±% change from previous figure supplied

Date of previous figure supplied

Explanation of change

Methods used to estimate lifecycle emissions
Please select

SC4.2b

(SC4.2b) Complete the following table with data for lifecycle stages of your goods and/or services.

SC4.2c

(SC4.2c) Please detail emissions reduction initiatives completed or planned for this product.

Name of good/ service	Initiative ID	Description of initiative	Completed or planned	Emission reductions in kg CO2e per unit
Oxygen for steel making	Initiative 1	White Paper to show energy and CO2e avoided by the use of Praxair oxygen in steelmaking. Impact of Blast Furnace 02 Enrichment. http://www.praxair.com/our-company/safety-and-environment/product-stewardship/more-oxygen-more-green	Completed	
Oxygen	Initiative 2	Praxair's proprietary CONOx system is a practical, low capital cost technology for refiners searching for a way to reduce emissions. Reference Praxair.com: http://www.praxair.com/industries/refining/fluid-catalytic-cracker-fcc-emissions-reduction	Completed	
Hydrogen in ultra-low sulfur diesel (ULSD) fuel production	Initiative 3	Hydrogen is provided to refiners to allow them to meet air quality regulations and to hydrotreat diesel fuel to make ultra-low sulfur diesel (ULSD) fuel. This can be burned without emitting sulfur. Hydrogen provides an additional benefit to ULSD, which is that in combination with a now mandated diesel particulate filter, it eliminates black carbon (BC). Reduction in BC is seen by policy-makers as being a crucial step to delay global temperature increase. Praxair website with more ULSD information: http://www.praxair.com/our-company/safety-and-environment/product-stewardship/less-carbon-more-green	Completed	
Oxygen in glass production	Initiative 4	Praxair has made great strides in getting the ancient craft of making glass ready for the twenty-first century. With our full range of industrial gases, technologies and equipment, we successfully converted the first large container glass furnace to an oxy-fuel burner. Oxy-fuel melting improves glass quality and helps save money by burning less fuel more efficiently. It also drastically reduces NOx emissions. https://www.youtube.com/watch?v=jJpA-EkC4tY	Completed	
Oxygen, Nitrogen, Argon	Initiative 5	Production emissions reduction: ongoing research and developments leading to reduction in power to produce atmospheric gases. Reference Praxair Sustainable Development targets and performance: http://www.praxair.com/our-company/sustainable-development/targets-and-performance	Ongoing	
Hydrogen	Initiative 6	Production emissions reduction: ongoing research and developments leading to improvements in production energy efficiencies. Reference Praxair Sustainable Development targets and performance: http://www.praxair.com/our-company/sustainable-development/targets-and-performance	Ongoing	
Bulk and packaged gases	Initiative 7	Distribution emissions reduction: ongoing research and developments leading to improvements in distribution efficiencies. Reference Praxair Sustainable Development targets and performance: http://www.praxair.com/our-company/sustainable-development/targets-and-performance	Ongoing	
Onsite, merchant and packaged gases	Initiative 8	Renewable energy: ongoing effort to source a portion of energy used in gas production from renewable sources. Reference Praxair Sustainable Development targets and performance: http://www.praxair.com/our-company/sustainable-development/targets-and-performance	Ongoing	

SC4.2d

(SC4.2d) Have any of the initiatives described in SC4.2c been driven by requesting CDP Supply Chain members?

No

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	Public or Non-Public Submission	I am submitting to	Are you ready to submit the additional Supply Chain Questions?
I am submitting my response	Public	Investors Customers	Yes, submit Supply Chain Questions now

Please confirm below

I have read and accept the applicable Terms