Northrop Grumman Corp - Climate Change 2019

C0. Introduction

C0.1

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

Northrop Grumman Corporation is a publicly owned company whose common stock is listed on the New York Stock Exchange (NYSE: NOC). Northrop Grumman is a leading global security company providing innovative systems, products and solutions in autonomous systems, cyber, C4ISR, strike, and logistics and modernization to government and commercial customers worldwide. We offer a broad portfolio of capabilities and technologies that enable us to deliver innovative products, systems and solutions for applications that range from undersea to outer space and into cyberspace. We participate in many high-priority defense and government programs in the United States and abroad. We conduct most of our business with the U.S. Government, principally the Department of Defense (DoD) and intelligence community. We also conduct business with foreign, state and local governments and commercial customers. Northrop Grumman established its environmental sustainability program, greeNG, in 2008 to reduce the company's environmental footprint by improving operational efficiency and integrating environmental sustainability practices into all our operations. Our greeNG Program strives to expand environmental sustainability awareness throughout our organization, supporting our corporate values and meeting the expectations of our diverse set of stakeholders. greeNG is a catalyst for environmentally sustainable performance that drives long-term affordability into our operations, benefiting our customers as well as our shareholders. Northrop Grumman has committed to the following 2020 environmental sustainability goals: a 30% reduction in absolute GHG emissions from 2010 levels, a 20% reduction in potable water use from 2014, and a 70% solid waste diversion rate from landfill.

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 2018	December 31 2018	Yes	3 years

C0.3

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

Australia
Belgium
Canada
Denmark
France
Germany
Italy
Japan
Netherlands
Norway
Republic of Korea
Saudi Arabia
Switzerland
United Arab Emirates
United Kingdom of Great Britain and Northern Ireland
United States of America

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.

Operational control

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) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board-level committee	The highest level of responsibility resides with Northrop Grumman's Policy Committee of the Board of Directors (BoD). The Policy Committee is comprised of 6 independent directors who assist the BoD in overseeing policy, government relations and corporate responsibility, which includes review and oversight of the Company's environmental sustainability program. This committee is responsible for identifying and evaluating global security, political, and budget issues as well as trends (including environmental and climate-related) that could impact the business. In addition, the BoD oversees our risk management activities and its Committees provide oversight of our risk management process, including the Enterprise Risk Management Council (ERMC), which oversees 10K identified risks, like extreme weather and natural disasters, which are climate-related; and the Compensation committee that establishes the annual non-financial metrics, including our ghg, water, and waste metrics.

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 risk management policies Setting performance objectives Monitoring implementation and performance of objectives Overseeing major capital expenditures, acquisitions and divestitures Monitoring and overseeing progress against goals and targets for addressing climate-related issues	The Policy Committee oversees policy, government relations, corporate responsibility , and environmental sustainability. Generally on an annual basis, the Policy Committee is provided a comprehensive update on the environmental sustainability program. This includes financial investments; annual project completions; progress towards 2020 climate-related greenhouse gas, water, and waste goals; developments on climate-related risks; disclosure programs; and future initiatives. In addition, the Compensation Committee of the Board of Directors oversees the annual non-financial metric for environmental sustainability which is an element of our compensation program. This metric emphasizes the importance of implementing projects to reduce GHG, water, and waste projects across the company.

C1.2

(C1.2) Provide the highest management-level 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 Executive Officer (CEO)	Both assessing and managing climate-related risks and opportunities	Annually
Risk committee	Both assessing and managing climate-related risks and opportunities	Annually

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 (do not include the names of individuals).

Per our Proxy Statement (p 15.): At the company level, the Board of Directors and its Committees provide oversight of the Company's risk management processes, including the Enterprise Risk Management Council (ERMC). The ERMC is chaired by the CEO and is comprised of all members of the Corporate Policy Council (includes the , CTO, CFO, CHRO, CGBDO, VP General Counsel, VP Communications, VP Government Relations, and the five sector presidents), the Chief Accounting Officer, Chief Compliance Officer, Secretary, head of Internal Audit and Treasurer. Climate-related issues are included within the ERMC responsibilities as a result of its oversight of Northrop Grumman's integrated, company-wide risk management process. The ERMC seeks to ensure that the Company has identified the most significant risks and implemented effective mitigation plans for each; this includes climate-related risks related to natural disasters, environmental laws and regulations, and Company reputation. In addition, climate-related issues may be elevated to and addressed by the Policy Committee of the Board of Directors which has responsibility for identifying and evaluating environmental sustainability impacts and trends that could impact the company's business. Certain members of the ERMC have responsibility for specific risks and are responsible for assessing risks, developing and executing risk mitigation plans, and monitoring status and trends. Specific climate-related issues such as natural disaster, environmental and regulatory, and Security including the Business Continuity Program are the responsibility of the CFO, VP General Counsel, and President of Enterprise Services respectively. [LMB1] The ERMC meetings consist of updates from certain members on the risks they manage and includes changes in the risks since the last meeting, risk mitigation efforts, or other potential risks that have been identified. For example, natural and environmental disaster risks are monitored at the site/asset level as a part of the Business Continuity Program through the use annual inspections and risk modelling, among other actions. Specifically, risk modelling is actively used at some of our coastal sites, like those in Melbourne and St. Augustine, FL to analyse how hurricanes of different sizes and scope might disrupt business operations. Any material changes in these results, trends, or risk management approach may be included in the update provided to the ERMC as the committee regularly monitors all risk factors for the company.

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 (do not include the names of individuals).

Who is entitled to benefit from these incentives?
Corporate executive team

Types of incentives
Monetary reward

Activity incentivized
Emissions reduction project

Comment
As noted in the 2019 Proxy Statement, under our Annual Incentive Plan, we use a mix of financial and non-financial metrics to measure our performance for purposes of determining award payout to our Named Executive Officers (including the CEO, CFO, COO, and others), (or as CDP refers to it the Corporate Executive Team) annually. Environmental Sustainability is one of six non-financial metrics that is measured in terms of reductions in absolute greenhouse gas emissions, potable water use consumption, and improvement in solid waste diversion. Performance against non-financial metrics can result only in a downward adjustment to the financial metric score.

Who is entitled to benefit from these incentives?
All employees

Types of incentives
Monetary reward

Activity incentivized
Emissions reduction project

Comment
Non-financial metrics influence bonus payments to all eligible employees. Environmental Sustainability is one of six non-financial metrics that is measured in terms of reductions in absolute greenhouse gas emissions and potable water use consumption, and improvement in solid waste diversion.

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	1	
Medium-term	1	5	
Long-term	5	10	

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	Annually	3 to 6 years	

C2.2b

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

- The Board of Directors oversees our risk management activities and its Committees provide oversight of our multi-disciplinary risk management process led by the Enterprise Risk Management Council (ERMC), which manages the Company's integrated, company-wide risk management processes. The ERMC is comprised of all members of the Corporate Policy Council, the Chief Accounting Officer, Chief Compliance Officer, Secretary, head of Internal Audit and Treasurer. The ERMC seeks to ensure that the Company has identified the most significant risks and implemented effective mitigation plans for each; this includes climate-related risks such as those related to natural disasters, environmental laws and regulations, and Company reputation. Certain members of the ERMC have responsibility for specific risks and are responsible for assessing risks, developing and executing risk mitigation plans, and monitoring status and trends. The ERMC meetings consist of updates from certain members on the risks they manage and includes changes in the risks since the last meeting, risk mitigation efforts, or other potential risks that have been identified.
- At the facility (asset) level, the Business Continuity Program leverages annual physical security surveys to evaluate risks and opportunities and their potential impacts to the company, personnel, and/or operations. The survey's risk factors include climate-related such as natural disasters and also includes non-climate related risk factors such as disease control and/or outbreaks. Risks are evaluated to determine if the risk is acceptable or if investment in controls is required. In addition to business continuity planning at the asset level (individual facilities), risk and opportunities are addressed by the environmental sustainability program through site-specific greenhouse gas, energy, water, and solid waste assessments. These assessments provide more thorough understanding of site-specific risks to environmental sustainability indicators (e.g. water availability) as well as opportunities to improve the efficiency, minimize emissions, and/or reduce the risks to facility operations (e.g. through water conservation initiatives).
- Business Impact Analysis is performed annually to assess the potential risk size and scope, prioritize recovery order of sites and business processes, and identify gaps in recoverability. The analysis assesses the impact to the company by determining the financial, reputational and known legal impact if recovery is not achieved.
- Through the Business Continuity Program, all site/asset risks are consolidated and evaluated at the site and sector-leadership levels to determine the relative significance of the risk, if the risk is acceptable, or if investment in controls is required. All risks identified, whether climate-related or not, are prioritized based on probability, business impact, and recovery time.
- Our Annual Report, Item 1A: Risk Factors, lists factors that may have material adverse effect on our financial position, results of operations and/or cash flows. Specific to the Business Impact Analysis process at the site/asset level, the impact is determined on a scale of low, medium, or high based on a percentage of the company's annual sales with medium and high impacts representing a substantive financial impact.

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	Northrop Grumman's Enterprise Risk Management Council includes current regulations as part of its risk assessment and management programs. Environmental matters, including unforeseen costs associated with compliance could have a material adverse effect on our reputation and our financial position, results of operations and/or cash flows. Our operations are subject to and affected by a variety of federal, state, local and foreign environmental laws and regulations, including as they may be changed over time. Compliance with these environmental laws and regulations requires, and is expected to continue to require, significant operating and capital costs. For example, we may be subject to increased cost of emissions mitigation or reporting obligations in locations with existing climate-related regulations. We have major operations in California including our El Segundo, Manhattan Beach, Redondo Beach, Palmdale, Sunnyvale, and other sites that may be subject to existing climate-related regulations within the state, specifically programs like Assembly Bill 32, Green House Gas Solution of Act (Chaptered 2006). Internationally, where we have major operations such as in Australia, we assess programs such as the Australia National Greenhouse and Energy Reporting Requirements to ensure our local operations are meeting climate-related reporting requirements, if applicable.

	Relevance & inclusion	Please explain
Emerging regulation	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council includes emerging regulations as part of its risk assessment and management programs. Environmental matters, including unforeseen costs associated with compliance, could have a material adverse effect on our reputation and our financial position, results of operations and/or cash flows. Our operations are subject to and affected by a variety of federal, state, local and foreign environmental laws and regulations, including as they may be changed over time. Compliance with these environmental laws and regulations requires, and is expected to continue to require, significant operating and capital costs. We have major operations in California including our El Segundo, Manhattan Beach, Redondo Beach, Palmdale, Sunnyvale, and other sites that may be impacted by increased cost of emissions mitigation or reporting obligations resulting from evolving climate-related regulatory environment within the state.
Technology	Not relevant, explanation provided	Our customers (the U.S. Government, principally the Department of Defense and intelligence community, and foreign governments) define the priorities and specifications for the products and services required to meet their evolving mission requirements. Northrop Grumman's products and services are designed specifically to meet contractual requirements of our customers and thus, due to the nature of our business and customers' requirements this risk type is not relevant.
Legal	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council (ERMC) includes legal risks as part of its risk assessment. Potential legal risks may include the filling of legal claims due to serv ice disruption or product delivery delays resulting from climate-related physical risks such as natural and environmental disasters that could impact our ability to meet our commitments to customers. Per CDP's definition of climate-related legal risks (climate-related litigation claims), this does not currently impact Northrop Grumman.
Market	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council includes market risks as part of its risk assessment and management programs, and our Strategy organization continually assesses global security trends and how that may impact our customer's needs. For example, the opening of arctic shipping routes requires maritime products, such as our Marine Navigation Radar Turning Units , that can withstand the extreme temperatures in these areas. In connection with our U.S. Government contracts, we are required to procure certain materials, components and parts from supply sources approved by the customer. We also are facing increased and changing regulatory requirements, both domestically and internationally, many of which apply to our subcontractors and suppliers. In some cases, there may be only one supplier for certain components. If a sole source supplier cannot meet our needs or is otherwise unavailable, we may be unable to find a suitable alternative. Climate-related issues have an impact on global stability and security and is one of many macro-trends that are considered in business strategy as an influencer on the current and future needs of our customers.
Reputation	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council includes reputational risks as part of its risk assessment and management programs. Northrop Grumman remains committed to sustainable performance through effective environmental stewardship, strong corporate citizenship, devotion to diversity and inclusion and maintenance of high standards of ethics, business conduct and corporate governance. They are integral to our culture and fundamental to our business and our interactions with customers, employees, suppliers and the communities where we operate. As stated in our 2018 Corporate Responsibility Report, talent management is key to our near- and long-term growth. Without a best culture workplace, which includes strong environmental management, we may not be able to attract and retain the most diverse talent from top colleges and the labor market. Our environmental sustainability program and 2020 goals specifically address climate-related issues of greenhouse gas emissions reductions, potable water conservation, and solid waste diversion and help ensure we are minimizing our impact on the environment.
Acute physical	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council includes acute physical risk as part of its risk assessment and management programs. Our business is subject to disruptions caused by natural disasters that could adversely affect our overall financial position. We have significant operations located in regions that may be exposed to damaging storms and other natural disasters. One example is our St. Augustine, Florida Aircraft Integration Center of Excellence where the E-2D Hawkeye aircraft is manufactured. This facility is located in North Florida, near coastal waterways, and subject to hurricanes and tropical storms. Natural and environmental disasters could also disrupt the critical infrastructure needed for normal business operations.
Chronic physical	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council includes chronic physical risks as part of its risk assessment and management programs. We leverage insurance modeling systems to determine the maximum windstorm and earthquake exposure when designing new buildings and use this as a basis for annual insurance coverage. An example of considering chronic risks is represented in the design of the new Building 100 at our St. Augustine, Florida site. The design requirements included the capability to withstand an ultimate wind speed of 130 mph into the building structure design and the roof-mounted, integrated solar panels.
Upstream	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council includes upstream (supply chain) risks as part of its risk assessment and management programs. We rely on other companies to provide raw materials and major components and subsystems for our products and to produce hardware elements and sub-assemblies, provide software and intellectual property, and perform some of the services we provide to our customers, and to do so in compliance with all applicable laws, regulations and contract terms. Disruptions or performance problems caused by our subcontractors and suppliers, or a misalignment between our contractual obligations to our customers and our agreement with our subcontractors and suppliers could have various impacts on the company, including on our ability to meet our commitments to customers. Our subcontractors and suppliers are also subject to natural and environmental disasters that could affect their ability to deliver or perform under a contract. Anticipating Hurricane Irma in 2017, Northrop Grumman established a crisis management team to prepare. Through our risk management process, the site had already identified potential supply chain issue with fuel delivery that is required to run generators supporting mission critical systems. The crisis management team worked to have extra fuel delivered days in advance in order.
Downstream	Not relevant, explanation provided	Downstream climate-related issues are not relevant to Northrop Grumman at this time. Northrop Grumman's products and services are designed to meet contractual requirements of our customers including the U.S. Government, principally the Department of Defense and intelligence community. Due to the nature of our business and customer specific requirements this downstream climate-related risks are not relevant to our products and services.

C2.2d

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

- The company performs detailed Business Impact Analysis on the work performed within our buildings. When possible we establish contingency plans in case our personnel or buildings are unavailable due to risks such as climate-related natural disasters. When we are unable to mitigate the issues, the risk is elevated on our annual resilience report to the sector and company leadership for key decision-making on whether to accept the risk or invest in controls to transfer or mitigate. The decision is generally based on the cost of investment and the impact to the corporation. Efforts to manage climate-related risks also create opportunities for the company. To capitalize on these opportunities, Northrop Grumman's environmental sustainability program (greeNG) was created and collaborates internally to analyze, address, and pursue potential opportunities from resource efficiency to stakeholder engagement. By working towards our 2020 goals of a 30% reduction in greenhouse gas emissions from a 2010 base year, a 20% potable water use reduction from a 2014 base year, and 70% solid waste diversion from landfill, we are actively reviewing and implementing initiatives that not only reduce our environmental footprint, but are also opportunities that can positively influence the company through cost savings, resiliency, or company reputation.
- Business Impact Analysis is performed annually to assess the potential risk size and scope, prioritize recovery order of sites and business processes, and to identify gaps in recoverability. Through the Business Continuity Program, all site/asset risks are consolidated and evaluated at the site and sector leadership levels to determine if the risk is acceptable or if investment in controls is required. All risks identified, whether climate-related or not, are prioritized based on probability, business impact, and recovery time. Per 2.4a, our climate-related opportunities focus on efficiency in our direct operations. These opportunities are driven by Northrop Grumman's environmental sustainability program and in partnership with other internal organizations (e.g. Facilities Management). Opportunities are evaluated on factors including the benefit to our 2020 goals, cost savings for the company, stakeholder engagement, etc. Efficiency projects are prioritized for investments based on these evaluating factors as well as other factors such as current goal performance and capital availability.
- One example of applying this process to a physical risk includes preparation for acute risks from extreme weather events. We have significant operations located in regions that may be exposed to damaging storms and other natural disasters. An example includes our Melbourne, Florida Manned Aircraft Design Center of Excellence. This facility is located in North Florida, near coastal waterways, and subject to hurricanes and tropical storms. This physical risk is reviewed by the ERMC and assessed by the Business Continuity Program through a Business Impact Analysis which assesses the potential risk size and scope of a hurricane disrupting operations. A response plan is developed includes detailed strategies and protocols for preemptive tactical and post-event activity. Those strategies were put into action when Hurricane Irma made landfall September 2017, impacting our Melbourne facility and tens of thousands of Northrop Grumman employees. As a result of the Business Impact Analysis, risk handling and preparation by the Business Continuity Program, and oversight by the ERMC, the company was prepared to safeguard the health and safety of its employees before, during and after the hurricane. Five days before the hurricane made landfall, crisis management teams met and messaging distributed to employees. Two days before landfall, corporate aircraft transported vital supplies to employees and fuel trucks delivered the supply needed to operate generators running mission critical systems and during the hurricane these generators kept mission critical systems online. After the hurricane passed, first response teams arrived to sites as did RVs for business resumption purposes.
- One example of applying our risk management process to a transition risk includes increased operating costs due to compliance requirements. As a result of California Executive Order B-29-15 Drought Response that was signed by Governor Brown on April 1, 2015, we worked with our California site teams to perform an analysis to understand the financial impacts of the Executive Order on drought restrictions and drought utility charges on our operations. To mitigate the risk, we accelerated site water use assessments and also accelerated our water conservation project investment plan which resulted in $2.5 million being authorized for water conservation measures in order to mitigate the risk and impact of any potential drought restrictions.

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
Physical risk

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

Type of financial impact
Reduced revenue and higher costs from negative impacts on workforce (e.g., health, safety, absenteeism)

Company- specific description
Our business is subject to disruption caused by natural and/or environmental disasters that could adversely affect our revenues, profitability and our overall financial position. We have significant operations located in regions that may be exposed to damaging storms and other natural disasters. Examples include our St. Augustine, Florida Aircraft Integration Center of Excellence where the E-2D Hawkeye aircraft is manufactured and our Melbourne, Florida Manned Aircraft Design Center of Excellence. These facilities are located in coastal Florida, near coastal waterways, and are subject to hurricanes and tropical storms. Natural and environmental disasters could also disrupt the critical infrastructure needed for normal business operations.

Time horizon
Medium-term

Likelihood
More likely than not

Magnitude of impact
Medium-low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
750000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
The financial impact represents the impact to our Melbourne, FL operations during Hurricane Irma and includes lost production hours, employee time off and overtime, post-event cleanup, etc.

Management method
The Business Continuity Program is designed to enable the company to respond effectively to unanticipated events (e.g. natural disasters) with an emphasis on the protection of people, information and assets as well as continuity of mission. At the facility (asset) level, the Business Continuity Program leverages annual physical security surveys known as a Business Impact Analysis, to evaluate risks and opportunities and their potential impacts to the company, personnel, and/or operations. The Business Impact Analysis helps prioritize the recovery order of business assets and sites, identify gaps in recoverability, and help determine potential financial, reputational, and known legal impacts if recover is not achieved. For example, during Hurricane Irma, the company executed this process at the Melbourne, FL facility, which helped ensure important safeguards were in place to protect employees and assets during and after the hurricane. Safeguards included proactive communication to employees five days before the hurricane; the transport of vital supplies to employees and delivering fuel trucks to operate generators for mission critical systems two days before landfall; and sending first responder teams and RVs after the hurricane to help resume business operations. There is n o additional cost in managing risks of extreme weather events as our Business Continuity Program is part of our regular course of business.

Cost of management
0

Comment

Identifier
Risk 2

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

Risk type
Physical risk

Primary climate-related risk driver
Chronic: Changes in precipitation patterns and extreme variability in weather patterns

Type of financial impact
Increased operating costs (e.g., inadequate water supply for hydroelectric plants or to cool nuclear and fossil fuel plants)

Company- specific description
The effects of climate change have the potential to impact the cost of utilities at our sites as cities cope with and plan for the cycles of drought, extreme heat, and flash floods which are putting a strain on natural resources and critical infrastructure. For example, in California, water utilities are assessing drought fees on customers and adding a surcharge for users that exceed their established allocations as a way to better manage drought risks. Additionally, California rate payers may be impacted by higher utility costs should the state proposed AB 1054 legislation take effect. This program is designed as an insurance fund to help electric utilities cover the cost of asset damage resulting from the increasing frequency of wildfires in California. This legislation, if passed, would likely result in the utilities imposing additional fees and rate increases on rate payers like our sites. Our California sites in El Segundo, Manhattan Beach, Redondo Beach, Palmdale, and Sunnyvale, among others, could see higher operating costs as a result of the fees described above being assessed for utility services.

Time horizon
Current

Likelihood
More likely than not

Magnitude of impact
Low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
2300000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
Estimated financial impact is based on the company's 2014 base year water usage and projecting an average rate increase of 4.1% per year for water over 10 years (per the DOE FEMP Annual Price Escalation Rate report from September 2017).

Management method
Northrop Grumman's 2020 environmental sustainability goals for greenhouse gas emissions reduction and potable water use reduction assist in managing the climate-related risks associated with increasing costs of utilities. Through these goals, we are driving operational efficiency and cost savings throughout our company, reducing energy consumption and conserving water; we are also reducing the future impacts of rising utility costs as a result of issues such as the California drought. Each year we implement potable water conservation projects to drive performance to our 2020 potable water use reduction goal. From 2015-2018, we have implemented targeted conservation projects estimated to save 157 million gallons of water by investing approximately $5 million. We use this figure as our cost of management. For example, in 2018 one of our California sites implemented air cooled instead of single pass water cooled pumps which will conserve approximately 3 million gallons of water per year.

Cost of management
5000000

Comment

Identifier
Risk 3

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
Increased operating costs (e.g., higher compliance costs, increased insurance premiums)

Company- specific description
Environmental matters, including unforeseen costs associated with regulatory compliance, could have a material adverse effect on our reputation and our financial position, results of operations, and/or cash flows. Our operations are subject to and affected by a variety of federal, state, local and foreign environmental laws and regulations, including as they may be changed over time. We have major operations in California including our El Segundo, Manhattan Beach, Redondo Beach, Palmdale, Sunnyvale, and other sites that may be subject to existing climate-related regulations within the state, specifically programs like Assembly Bill 32, Green House Gas Solution of Act (Chaptered 2006). Sites in the South Coast Air Quality Management District are subject to Rule 1100 which requires replacement of boilers to meet NOx concentration limits. Internationally, where we have major operations such as in Australia, we assess programs such as the Australia National Greenhouse and Energy Reporting Requirements to ensure our local operations are meeting climate-related reporting requirements, if applicable.

Time horizon
Medium-term

Likelihood
About as likely as not

Magnitude of impact
Medium-low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
18000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
The estimated financial impact represents a single example higher compliance costs as a result of new regulations from the South Coast Air Quality Management District are subject to Rule 1100 for NOx concentration limits. The estimated cost represents replacement of approximately 40 boilers in our California operations at an average estimated unit cost, of $450,000.

Management method
Northrop Grumman manages this risk through the company's Environmental, Health & Safety (EHS) and greeNG Environmental Sustainability organizations. The EHS team heads the company's efforts to provide a safe and healthy workplace for our employees and to ensure that we conduct our operations in an environmentally responsible manner and that we conduct our business activities in accordance with applicable legal requirements. To manage potential greenhouse gas emissions reporting obligations the greeNG environmental sustainability program was established in 2008. Our current, and second, greenhouse gas emissions-reduction goal is to reduce emissions by 30% from 2010 to 2020. By proactively and voluntarily reducing our emissions, we are minimizing exposure to future environmental regulations from the federal government and states (e.g. AB 32) where we do business. The cost of management represents the 2018 investments in emissions reductions activities that enable the company to minimize its greenhouse gas emissions and meet its 2020 reduction goal. Last year this included 78 greenhouse gas emissions reductions projects focused on energy efficiency for building services that will reduce annual emissions by approximately 6,716 MTCO2e; these projects have an average payback of 1.9 years.

Cost of management
3900000

Comment

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?
Direct operations

Opportunity type
Resource efficiency

Primary climate-related opportunity driver
Use of more efficient production and distribution processes

Type of financial impact
Reduced operating costs (e.g., through efficiency gains and cost reductions)

Company-specific description
Resource efficiency, driven by Northrop Grumman's environmental sustainability program and 2020 goals, creates an opportunity for reduced operating costs at our sites. Each year we invest in our infrastructure through energy efficiency and greenhouse gas emissions reductions projects, reducing the cost of our operations and minimizing our environmental footprint across all of our global operations. For example, we have 15 certified green buildings in our portfolio totaling more than 2.5 million square feet of floor space certified to Energy Star and LEED standards. Investments in projects such as these drive performance towards our 2020 greenhouse gas reduction goal of 30% from a 2010 base year and reduce operation costs.

Time horizon
Current

Likelihood
Virtually certain

Magnitude of impact
Low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
9800000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
The estimated financial impact represents the lifetime cost savings of the 2018 investment in greenhouse gas emissions-reductions projects which is calculated over an estimated 10-year minimum lifespan of the projects. The simple payback for these projects is averaged to be 1.9 years.

Strategy to realize opportunity
Each year we implement energy efficiency and greenhouse gas reduction projects to drive performance to our 2020 greenhouse gas reduction goal. In 2018 alone, our execution of 78 greenhouse gas emissions-reductions projects for energy efficiency related to building services will reduce annual emissions by approximately 6,716 MTCO2e; these projects have a payback period of 1.9 years. Examples of these projects include HVAC replacements, LED lighting upgrades, building controls systems, and installations of variable frequency drives on motors and pumps. For example, a LED lighting upgrade project at our Warner Robins facility reduced 192 MTCO2e, had a simple payback of 3.4 years and reduces operational costs by $38,000 annually.

Cost to realize opportunity
3900000

Comment

Identifier

Opp2

Where in the value chain does the opportunity occur?
Direct operations

Opportunity type
Resource efficiency

Primary climate-related opportunity driver
Reduced water usage and consumption

Type of financial impact
Reduced operating costs (e.g., through efficiency gains and cost reductions)

Company-specific description
The estimated financial impact represents the cost savings resulting from reducing water consumption by 20%, from the 2014 baseline, for 10 years (estimated average lifetime of conservation projects). Estimated reduction of 186 million gallons annually (20% reduction from baseline) to meet the goal extrapolated over the 10 year life of the projects and an average cost of water of $6/kgal.

Time horizon
Current

Likelihood
Virtually certain

Magnitude of impact
Low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
11208000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
The estimated financial impact represents the cost savings resulting from reducing 20% water consumption b over the goal period, for 10 years (estimated average lifetime of conservation project). Estimated reduction of 186 million gallons annually to meet the goal and an average cost of water of $6/kgal.

Strategy to realize opportunity
Each year we implement potable water conservation projects to drive performance to our 2020 potable water use reduction goal and reduce operational costs. From 2015-2018, we have implemented targeted conservation projects estimated to save 157 million gallons at a cost of approximately $5 million. For example, in 2018, we were able to conserve 2 million gallons of water at our Huntsviille, AL site by simply evaluating and adjusting the irrigation schedule to better fit the needs of the site.

Cost to realize opportunity
5000000

Comment

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

Better competitive position to reflect shifting consumer preferences, resulting in increased revenues

Company-specific description
Climate-related issues may increase demand for technologies and capabilities provided by Northrop Grumman that support environmental and weather research. From observations to decision support, Northrop Grumman develops and operates systems and services to deliver environmental intelligence through science, sensors and enterprise services. Examples include the Global Hawk air vehicle that is being used by NASA earth science missions, sustainment services for the Air Force Weather program, and the AstroMesh-Lite(R) reflector being developed for NASA JPL's Soil Moisture Active Passive spacecraft.

Time horizon
Medium-term

Likelihood
About as likely as not

Magnitude of impact
Medium-low

Are you able to provide a potential financial impact figure?
Yes, a single figure estimate

Potential financial impact figure (currency)
9000000

Potential financial impact figure – minimum (currency)
<Not Applicable>

Potential financial impact figure – maximum (currency)
<Not Applicable>

Explanation of financial impact figure
The financial impact represents the lowest contract value from the examples provided below. Financial impacts vary based on individual contract value. Example programs include the $300 million Air Force contract for the Systems Engineering, Management and Sustainment III, the $121 million Advanced Technology Microwave Sounder for NOAA's Joint Polar Satellite System, and the $9 million Scalable Space Inertial Reference Units for the Korea Aerospace Research Institute GEO-KOMPSAT-2 space satellite program.

Strategy to realize opportunity
The methods used to manage these opportunities include Northrop Grumman's business development/customer relationship management practices. Northrop Grumman has supported NASA environmental data missions since the 1980s and our support has matured and evolved. We showcase our expanded suite of technical capabilities and supporting IT platforms, including those designed for environmental and climate monitoring via press releases and our public website. Our environmental and weather information solutions have a dedicated page on our capabilities website which describes our initiatives that support weather and environmental science. Northrop Grumman extended the NASA Space Act Agreement into 2018 to continue joint use and shared cost of the Northrop Grumman-produced Global Hawk unmanned aircraft for science missions, hurricane surveillance, atmospheric research and exploration of new mission capabilities. There is no additional cost to realize the opportunity as engaging with customers to demonstrate our capabilities is part of our regular course of business.

Cost to realize opportunity
0

Comment

C2.5

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

	Impact	Description
Products and services	Impacted for some suppliers, facilities, or product lines	Northrop Grumman provides an array of products that support climate and earth monitoring activities. The data acquired from these systems provide important information that is required to better understand the Earth's changing climate. The continued need for these systems provides further opportunity to leverage Northrop Grumman capabilities (Opportunity #3). For example, the JPSS-1 satellite was launched carrying two Northrop Grumman-developed sensors that monitor atmospheric data. The NASA Global Hawk developed by Northrop Grumman is used for various climate monitoring missions and has recently been used to closely monitor hurricanes and aid in disaster relief efforts. Consistent with 2.4a, Opportunity #3, the magnitude of direct impact to our business overall is low.
Supply chain and/or value chain	Impacted for some suppliers, facilities, or product lines	Our subcontractors and suppliers are also subject to natural and environmental disasters that could affect their ability to deliver or perform under a contract. During Hurricane Irma, our Melbourne, Florida site experienced supply chain availability and delivery issues for diesel fuel as a result of high-demand, road closures, and damage from the hurricane. The magnitude of this impact may vary depending on the event and range from low (in the example described) to significant.
Adaptation and mitigation activities	Impacted	We have significant operations located in regions that may be exposed to hurricanes and other damaging storms and natural disasters. Although preventative measures may help to mitigate damage, the magnitude of the impact, damage and disruption resulting from natural and environmental disasters may be significant. Our robust Business Continuity Program deploys an array of preventative and active measures that help to mitigate impacts from natural and/or environmental disasters on our employees, operations, and physical infrastructure. In addition, mitigation efforts during the construction of the new Building 100 at our St. Augustine, Florida site required additional investment to incorporate the capability to withstand an ultimate wind speed of 130 mph into the building structure design and the roof-mounted, integrated solar panels. The magnitude of impact of the risks (Risk #1) and opportunities (Opportunity #1 and #2) directly to our business is low to medium overall per C2.3a and C2.4a.
Investment in R&D	Not impacted	Climate-related risks and opportunities have not directly impacted our investment in R&D due to the nature of our business. Our products and services are designed to meet contractual requirements of our customers, primarily the U.S. Government and principally the Department of Defense and intelligence community. Company-sponsored R&D investment strategy includes significant investment to support future technologies and mission solutions primarily related to government programs.
Operations	Impacted for some suppliers, facilities, or product lines	Our business is subject to disruption caused by natural and/or environmental disasters that could adversely affect our profitability and our overall financial position. We have significant operations located in regions that may be exposed to hurricanes and other damaging storms and natural disasters. For example, Hurricanes Irma and Maria impacted our St. Augustine, Florida and Melbourne, Florida operations and resulted in employee evacuations, lost work-hours, and limited infrastructure damage. The magnitude of impact of the risks (Risk #1) and opportunities (Opportunity #1 and #2) directly to our business is low to medium overall per C2.3a and C2.4a.
Other, please specify	Please select	

C2.6

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

	Relevance	Description
Revenues	Impacted for some suppliers, facilities, or product lines	Our business is subject to disruption caused by natural and/or environmental disasters that could adversely affect our revenues, profitability and our overall financial position. We have significant operations located in regions that may be exposed to hurricanes and other damaging storms and natural disasters; for example our St. Augustine, Florida and Melbourne, Florida sites. Our subcontractors and suppliers are also subject to natural and environmental disasters that could affect their ability to deliver or perform under a contract. Although preventative measures may help to mitigate damage, the damage and disruption resulting from natural and environmental disasters may be significant. If insurance or other risk-transfer mechanisms are unavailable or insufficient to recover all costs or if we experience a significant disruption to our business due to a natural or environmental disaster, the magnitude of the impact could be a material adverse effect on our financial position, results of operations and/or cash flows. As described in Risk #1, proactive assessments and planning for Hurricane Irma resulted in a low impact on our Melbourne, Florida operations.
Operating costs	Impacted for some suppliers, facilities, or product lines	Part of operating costs include the insurance and other risk-transfer mechanisms for operations located in regions that may be exposed to hurricanes and other damaging storms and natural disasters; for example our St. Augustine, Florida and Melbourne, Florida sites. Our earnings and profitability depend, in part, on subcontractor and supplier performance and financial viability as well as raw material and component availability and pricing. Our subcontractors and suppliers are also subject to natural and environmental disasters that could affect their ability to deliver or perform under a contract. The inability of our suppliers to perform, or their inability to perform adequately, could also result in the need for us to transition to alternate suppliers, which could result in significant incremental cost and delay or the need for us to provide other resources to support our existing suppliers. If we are unable to procure or experience significant delays in subcontractor or supplier deliveries of needed materials, components, services, intellectual property or parts the magnitude of the impact could have a material adverse effect on our financial position, results of operations and/or cash flows. As described in Risk #1, proactive assessments and planning for Hurricane Irma resulted in a low impact on our Melbourne, Florida operations.
Capital expenditures / capital allocation	Impacted	Capital expenditures are required to achieve environmental sustainability program goals and objectives. This includes expenditures for energy efficiency, LEED certified buildings, onsite renewable energy systems, water conservation, and solid waste diversion. In 2018, $4 million was invested specifically in greenhouse gas emissions-reductions projects that reduce our annual emissions by 6,837MTCO2e and contribute to our 2020 greenhouse gas reduction goal. We also completed LEED certification on a new building at a location in Grand Forks, ND. The magnitude of the impact of this area to the business is low overall.
Acquisitions and divestments	Not impacted	Climate-related risks and opportunities do not currently impact our process for considering acquisitions and divestitures. Due to the nature of our business, factors for acquisitions and divestments focus on broadening our capabilities and offerings, creating value for shareholders, and enhancing our ability to provide innovative solutions to meet our customers' emerging requirements. Our products and services are designed to meet the needs and contractual requirements of our customers, primarily the U.S. Government and principally the Department of Defense and intelligence community.
Access to capital	Not impacted	Climate-related risks and opportunities do not currently have an impact on this area of the Company's financial planning process and do not add significant risk to Northrop Grumman and are not applicable to factors considered when pursuing access to external capital.
Assets	Impacted for some suppliers, facilities, or product lines	Our business is subject to disruption caused by natural and/or environmental disasters that could adversely affect our assets, profitability and our overall financial position. We have significant operations and assets located in regions that may be exposed to hurricanes and other damaging storms and natural disasters; for example our St. Augustine, Florida and Melbourne, Florida sites. Although preventative measures may help to mitigate damage, the damage and disruption resulting from natural and environmental disasters may be significant. If insurance or other risk transfer mechanisms are unavailable or insufficient to recover all costs or if we experience a significant disruption to our business due to a natural or environmental disaster, it could have a material adverse effect on our financial position, results of operations and/or cash flows.
Liabilities	Not impacted	Liabilities assumed with the company have future anticipated financial benefit and have been evaluated for associated risk. Climate-related risks and opportunities do not significantly impact liabilities and the Company's financial planning process as it relates.
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 and quantitative

C3.1c

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

- Northrop Grumman's environmental sustainability program, greeNG, was established in 2008 in response to the growing stakeholder expectations surrounding environmental sustainability including climate and greenhouse gas emissions, water conservation, solid waste management. To ensure integration into the business and business strategy, environmental sustainability and specifically greenhouse gas emissions reductions projects, was established as one of the Company's six non-financial performance metrics that influence compensation for executives and eligible employees. The Board of Directors Policy Committee has oversight of the environmental sustainability program and is updated annually on the environmental sustainability program, 2020 goal performance, and stakeholder-engagement activities. The company's current 2020 environmental sustainability goals for 30% greenhouse gas emissions reductions from 2010, 20% potable water use reduction from 2014, and 70% solid waste diversion from landfill continue our commitment to addressing climate-related issues.
- We have operations located in regions that may be exposed may be exposed to hurricanes and other damaging storms and natural disasters (e.g. coastal Florida). Our Business Continuity program analyzes acute physical climate-related issues and uses weather trends to perform quantitative analyses that include financial implications of business disruption from natural disasters. This analysis drives various risk management programs to be implemented across the company. Climate-related issues also have an impact on global stability, both near and long-term. It is one of many macro-trends that are considered in business strategies as an influencer on the future needs of our customers and may increase demand for some Northrop Grumman capabilities and products such as the Global Hawk that can be used for disaster relief efforts and climate monitoring.
- The company's strategy includes our 2020 environmental sustainability goals for greenhouse gas emissions reductions of 30% from a 2010 base year.
- A substantial business decision made as a result of integration of climate-related issues, specifically related to the aspect of greenhouse gas emissions reductions, was the decision to look beyond just our 2020 goals and minimize our impact to the environment as our operations expand. This is being accomplished through investing in LEED certification for new construction to ensure our business operations minimize greenhouse gas emissions, water use, and solid waste generation. In 2018, a new building in Grand Forks, ND has achieved LEED certification.

C3.1d

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

Climate-related scenarios	Details
Other, please specify (WWF 3% solution)	Northrop Grumman recognizes the impacts of climate change on global stability, both near (<5 years) and long-term (>5 years); it is one many macro-trends that is considered in business and product strategies, influences the future needs of our customers, and may increase demand for disaster relief and climate-monitoring systems such as the Global Hawk. Business Continuity analyzes acute physical climate change impacts within a short (<1 year) and medium-term (1-5 years) time horizon. Consistent with Question 2.3a, we have operations located in regions that may be exposed to increased severity of natural disasters (e.g. coastal Florida). We use weather trends to perform quantitative analyses that includes the period of time within which operations must be recovered and the financial implications through loss of work-hours, revenue, asset values and insurance claims. We perform additional qualitative analyses to understand any reputational implications due to potential product delivery delays as a result of business disruption from natural disasters. An example of where we integrated climate related issues into business decisions was during development of our 2020 greenhouse gas goal. The WWF 3% Solution scenario analysis was used to inform development of the goal as it was one of the only tools available for science-based projections in 2013 when this goal was developed. The 2020 greenhouse gas reduction of goal 30% from a 2010 base year reflects consideration of science- based climate change projections, inclusive of sources such as The 3% Solution, to ensure our reduction goal is impactful. The WWF 3% Solution calculator identified 19-24% as a the range for total percentage emissions reduction based on Northrop Grumman's base year emissions, industry classification, business unit emissions distribution/attribution and expected market share change over the goal period time horizon (2010-2020). This GHG goal is inclusive of all scope 1 and 2 emissions from our full portfolio of facilities where we have operational control and represents 98% of our global floor space. By setting an ambitious GHG target beyond what was projected by the 3% Solution, we prioritized large scale efficiency projects at our operations and invested in renewable energy installations that have enabled us to surpass our GHG emissions reduction goal well before the end of the goal period.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?
Absolute target

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)

% emissions in Scope
100

Targeted % reduction from base year
30

Base year
2010

Start year
2014

Base year emissions covered by target (metric tons CO2e)
732736

Target year
2020

Is this a science-based target?
Yes, we consider this a science-based target, but this target has not been approved as science-based by the Science-Based Targets initiative

% of target achieved
100

Target status
Underway

Please explain
This is Northrop Grumman's second greenhouse gas and first absolute reduction goal. This goal reflects consideration of science-based climate change projections, inclusive of sources such as The 3% Solution, to ensure our goal is impactful. The analysis was conducted prior to the development of CDP's standards that define a science-based goal as including a Scope 3 target and WRI's publication of the updated Scope 2 Accounting Guidance. The WWF 3% Solution calculator identified 19-24% as a the range for total percentage emissions reduction based on Northrop Grumman's base year emissions, industry classification, business unit emissions distribution/attribution and expected market share change over the goal period time horizon (2010-2020).

C4.2

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

Target
Waste

KPI – Metric numerator
% waste diverted from landfill

KPI – Metric denominator (intensity targets only)
N/A

Base year
2014

Start year
2014

Target year
2020

KPI in baseline year
58.3

KPI in target year
70

% achieved in reporting year
33.3

Target Status
Underway

Please explain
This goal is to increase solid waste diversion from landfill in our global operations by diverting via various alternative strategies such as recycling, composting, etc. In 2018, our solid waste diversion rate was 62.2% diversion from landfill.

Part of emissions target
N/A

Is this target part of an overarching initiative?
Other, please specify (Environmental Sustainability 2020 Goals)

Target
Other, please specify (Potable Water Use)

KPI – Metric numerator
Potable water usage

KPI – Metric denominator (intensity targets only)
N/A

Base year
2014

Start year
2015

Target year
2020

KPI in baseline year
0

KPI in target year
20

% achieved in reporting year
33

Target Status
Underway

Please explain
The goal is a 20% reduction in potable water use within our global operations.

Part of emissions target
N/A

Is this target part of an overarching initiative?
Other, please specify (Environmental Sustainability 2020 Goals)

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 initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	0	0
To be implemented*	0	0
Implementation commenced*	0	0
Implemented*	78	6837
Not to be implemented	0	0

C4.3b

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

Initiative type

Other, please specify (Energy efficiency: building services)

Description of initiative

<Not Applicable>

Estimated annual CO2e savings (metric tonnes CO2e)

6717

Scope

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

1800000

Investment required (unit currency – as specified in C0.4)

3900000

Payback period

1-3 years

Estimated lifetime of the initiative

11-15 years

Comment

Building efficiency projects include HVAC, lighting, motors, compressed air systems, and boilers. Additional GHG savings of 4,504 MT CO2e, are achieved through maintenance activities that have higher investments and extended ROIs. The additional cost for energy efficiency gains beyond standard replacement is difficult to isolate and is not included in this line item. The approximate avoided electricity by implementing these building services projects is estimated to be 14,700 MWh, based on the average U.S. grid emission factor (lb GHG/MWh) calculated from EPA eGrid's 2018 release.

Initiative type

Energy efficiency: Processes (Energy efficiency: Processes)

Description of initiative
Other, please specify (Includes process optimization, equipment upgrades, etc.)

Estimated annual CO2e savings (metric tonnes CO2e)
112

Scope
Scope 1

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
340000

Investment required (unit currency – as specified in C0.4)
110000

Payback period
<1 year

Estimated lifetime of the initiative
21-30 years

Comment
Process efficiency efforts include establishing an annual review of server deployment and removal, and equipment efficiency upgrades. The approximate avoided electricity by implementing these building services projects is estimated to be 246 MWh, based on the average U.S. grid emission factor (lb GHG/MWh) calculated from EPA eGrid's 2018 release.

Initiative type
Low-carbon energy installation

Description of initiative
Solar PV

Estimated annual CO2e savings (metric tonnes CO2e)
8

Scope
Scope 2 (location-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
1600

Investment required (unit currency – as specified in C0.4)
28000

Payback period
16-20 years

Estimated lifetime of the initiative
21-30 years

Comment
Construction and installation of a small Solar PV rooftop system onsite at a Northrop Grumman facility. The approximate avoided electricity by implementing these building services projects is estimated to be 18 MWh, based on the average U.S. grid emission factor (lb GHG/MWh) calculated from EPA eGrid's 2018 release.

C4.3c

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

Method	Comment
Dedicated budget for energy efficiency	We make annual financial investments in energy efficiency projects in our buildings and operations to support progress towards our 2020 greenhouse gas emissions reductions, potable water use reductions, and solid waste diversion goals.
Dedicated budget for other emissions reduction activities	We make annual financial investments in projects that increase efficiency and directly or indirectly result in GHG emissions reductions to support progress towards our 2020 greenhouse gas emissions reductions, potable water use reductions, and solid waste diversion goals.
Internal incentives/recognition programs	Environmental sustainability (measured in terms of reductions in absolute greenhouse gas emissions, potable water use consumption and improvement in solid waste diversion) is one of the Company's six non-financial metrics that influence compensation for executives and eligible employees and can result only in a downward adjustment to the financial metric score.
Employee engagement	Employee awareness and behavior is an important element of efficiency and emissions-reductions activities. We engage with employees through our environmentally focused Employee Resource Group, signage in our facilities, webinars, and voluntary training.

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?

No

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 2010

Base year end
December 31 2010

Base year emissions (metric tons CO2e)
171412

Comment

Scope 2 (location-based)

Base year start
January 1 2010

Base year end
December 31 2010

Base year emissions (metric tons CO2e)
561324

Comment

Scope 2 (market-based)

Base year start
January 1 2010

Base year end
December 31 2010

Base year emissions (metric tons CO2e)
561324

Comment

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.

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)
Other, please specify (IAEG Aerospace GHG Reporting Guidance)

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.

IAEG GHG Reproting Guidance for the Aerospace Industry a supplement to the GHG Protocol Corporate (Scope1&2) and Value Chain (Scope 3) Accounting and Reporting Standards

C6. Emissions data

C6.1

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

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)
134068

Start date
January 1 2018

End date
December 31 2018

Comment

Past year 1

Gross global Scope 1 emissions (metric tons CO2e)
140951

Start date
January 1 2017

End date
December 31 2017

Comment
This figure is a restatement due to the histoircal data correction process capturing a more complete annual inventory for 2017

Past year 2

Gross global Scope 1 emissions (metric tons CO2e)
130431

Start date
January 1 2016

End date
December 31 2016

Comment
This figure is a restatement due to the histoircal data correction process capturing a more complete annual inventory for 2017

Past year 3

Gross global Scope 1 emissions (metric tons CO2e)
141716

Start date
January 1 2015

End date
December 31 2015

Comment
This figure is a restatement due to the histoircal data correction process capturing a more complete annual inventory for 2017

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?

Reporting year

Scope 2, location-based
365559

Scope 2, market-based (if applicable)
355537

Start date
January 1 2018

End date
December 31 2018

Comment

Past year 1

Scope 2, location-based
370140

Scope 2, market-based (if applicable)
361188

Start date
January 1 2017

End date
December 31 2017

Comment
This figure is a restatement due to the historical data correction process capturing a more complete annual inventory for RY2017

Past year 2

Scope 2, location-based
402842

Scope 2, market-based (if applicable)
393935

Start date
January 1 2016

End date
December 31 2016

Comment
This figure is a restatement due to the historical data correction process capturing a more complete annual inventory for RY2017

Past year 3

Scope 2, location-based
434286

Scope 2, market-based (if applicable)
425836

Start date
January 1 2015

End date
December 31 2015

Comment
This figure is a restatement due to the historical data correction process capturing a more complete annual inventory for RY2017

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

Mobile emissions for small fleets (<10 vehicles)

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

No emissions excluded

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions excluded

Explain why this source is excluded

Fuel consumption (diesel, gasoline and propane) for all reporting sites comprises 0.64% of the baseline total inventory. Therefore, it was concluded that emissions associated with sites that have fewer than 10 vehicles are immaterial to the GHG inventory. This category is continuously monitored and was reflected in the NGC GHG inventory that received limited assurance through third party verification.

Source

Non-utility fuel data for sites less than100,000 square feet

Relevance of Scope 1 emissions from this source

Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source

No emissions excluded

Relevance of market-based Scope 2 emissions from this source (if applicable)

No emissions excluded

Explain why this source is excluded

For sites less than 100,000 square feet, fuel deliveries that are not utility based (e.g., natural gas and propane) are excluded because they are not common at Northrop Grumman and are immaterial to the baseline inventory. This category is continuously monitored and was reflected in the NGC GHG inventory that received limited assurance through third party verification.

Source

Process Emissions excluded for buildings less than 100,000 square feet

Relevance of Scope 1 emissions from this source

Emissions are not relevant

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)

No emissions excluded

Explain why this source is excluded

A majority of manufacturing and testing is performed at the Northrop Grumman sites and campuses that are greater than 100,000 sq.ft. The majority of buildings in the Northrop Grumman real estate portfolio that are less than 100,000 sq. ft are used primarily as office space and not for manufacturing operations. Thus, any process emissions related to operations in these sites are considered immaterial. This category is continuously monitored and was reflected in the NGC GHG inventory that received limited assurance through third party verification.

Source
Refrigerant emissions of HFCs

Relevance of Scope 1 emissions from this source
Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source
No emissions excluded

Relevance of market-based Scope 2 emissions from this source (if applicable)
No emissions excluded

Explain why this source is excluded
Baseline assessments of refrigerant (HFC) emissions were made for both processes (e.g. thermal chambers) and fugitive (e.g. facility HVAC equipment) and were considered immaterial to the inventory. This was reassessed in 2012 and immateriality threshold is still met. This category is continuously monitored and was reflected in the NGC GHG inventory that received limited assurance through third party verification.

Source
Emissions of PFCs from fire suppression systems

Relevance of Scope 1 emissions from this source
Emissions are not relevant

Relevance of location-based Scope 2 emissions from this source
No emissions excluded

Relevance of market-based Scope 2 emissions from this source (if applicable)
No emissions excluded

Explain why this source is excluded
Northrop Grumman tracks fire suppression system leaks and releases. In our baseline year, releases accounted for less than 0.05 percent of the GHG inventory and were deemed immaterial to the inventory. This category is continuously monitored and was reflected in the NGC GHG inventory that received limited assurance through third party verification.

C6.5

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

Purchased goods and services

Evaluation status
Relevant, not yet calculated

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation

Capital goods

Evaluation status
Relevant, not yet calculated

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation

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

Evaluation status
Relevant, calculated

Metric tonnes CO2e
26758

Emissions calculation methodology
Northrop Grumman calculated metric tonnes of CO2e due to distribution loss using the average U.S. nation-wide loss provided by the EIA (https://www.eia.gov/tools/faqs/faq.php?id=105&t=3). The nation-wide loss was approximately 4.9%. Based on Northrop Grumman's purchased electricity for 2017 (1,102,695,400 kWh), we calculated the amount of electricity that would have been needed to deliver those kWh taking into consideration a 4.9% loss. We then calculated the kWh that were lost during distribution and applied the eGRID 2016 U.S. average emission factor of 1,004.27 lb/kWh CO2e, which resulted in 26,758 metric tonnes of CO2e due to transmission and distribution loss.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
The primary kWh data used by Northrop Grumman comes from bill pay IT system. However, 5.12% assumed distribution loss comes from EIA. Therefore, stating 0% of data comes from suppliers or value chain partner.

Upstream transportation and distribution

Evaluation status
Relevant, calculated

Metric tonnes CO2e
1014643

Emissions calculation methodology
Northrop Grumman is an EPA SmartWay partner and utilizes ground shipment data collected, managed and provided by our partner shipping organization. It is broken down into two categories: i) tracked mileage data through our partner’s Freight Bill Audit Program (FBAP) and ii) number of shipments based on receipts not input into FBAP. The GWPs are consistent with our Scope 1 and Scope 2 emissions inventory and come from the IPCC Fourth Assessment Report. Emission factors are provided by our shipping partner. The information is tracked by our shipping partner and 70% of the emissions reported for upstream distribution is calculated using primary data from the SmartWay program. The remaining emissions data is calculated using receipts and average emissions derived from the SmartWay program. Receipt data uses an average miles per shipment (based on tracked shipments) to get total miles travelled. The estimated mileage data is converted to MTCO2e using an average CO2/mile emission factor, which is derived from the SmartWay program.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
70

Explanation
Assumption that SmartWay data is 70% of total emissions data (30% assumed from other sources not available in easily usable format). This assumption is based on 2015 and 2014 proportions calculated from these two sources where the other source data was ~30% of the total reported emissions.

Waste generated in operations

Evaluation status
Relevant, calculated

Metric tonnes CO2e
2850

Emissions calculation methodology
Northrop Grumman auditable sites track their annual waste by category (commodity, product, unit, etc.) and by management method. Northrop Grumman waste categories were mapped to corresponding categories using the EPA WARM model, which generates emissions in MTCO2e for each material category and management method. The reported emissions represent the actual waste data collected that was sent to landfill in 2018 as calculated by the EPA WARM model.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
63

Explanation
The primary data collected comes from waste hauler-provided receipts demonstrating actual tonnage and the remainder is estimated based on applying a standard factor to facility headcount.

Business travel

Evaluation status
Relevant, calculated

Metric tonnes CO2e
140280

Emissions calculation methodology
All activity data related to business travel is provided by Northrop Grumman's central travel management system. Activity data include number of hotel nights booked, rental car miles travelled and emissions, train miles travelled, and number of air miles travelled. The emissions from air travel and train travel are calculated using emission factors from the U.S. EPA Center for Corporate Climate Leadership GHG Emission Factors Hub. Emissions from hotel stays are calculated using the respective emission factor from Carbon Fund. Emissions from car rentals are provided by the central travel management system. The GWPs are consistent with our Scope 1 and Scope 2 emissions inventory and come from the IPCC Fourth Assessment Report. The GHG inventory for business travel achieved Limited Assurance via Third Party Verification from LRQA America’s Sustainability, Inc.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
99.4

Explanation
A portion of emissions from car rentals are extrapolated based on spend data.

Employee commuting

Evaluation status
Relevant, calculated

Metric tonnes CO2e
180951

Emissions calculation methodology
Employee commuting accounts for the emissions associated with Northrop Grumman employee commutes to/from work. The GWPs are consistent with our Scope 1 and Scope 2 emissions inventory and come from the IPCC Fourth Assessment Report. The emissions are calculated using emission factors from the U.S. EPA Center for Corporate Climate Leadership GHG Emission Factors Hub. Employee headcount is primary data from the Annual Report (10K) filing. Estimating factors and averages are used from reputable public sources (e.g., EPA). Each business sector provides an average vehicle ridership (AVR) value for the sector. If not available, an average is used. The AVR value is multiplied by the number of employees per sector and an average fuel economy; it is then multiplied by the emission factor for the total commuting emissions.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
10.1

Explanation
National averages for commute miles to work, MPG, and AVR are used to calculate employee commuting emissions. Approximately 11% of our data is considered actual data from value chain because it is reported through compliance mechanisms.

Upstream leased assets

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation
Northrop Grumman reports emissions from leased spaces as part of Scope 1 and Scope 2 inventories since we consider leased space within our operational control. Therefore, we do not have additional emissions to report as part of this Scope 3 category.

Downstream transportation and distribution

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation
According to the Voluntary GHG Reporting Guidance for the Aerospace Industry (IAEG, 2016), downstream transportation and distribution emissions are most often captured in a customer's Scope 1 emissions or are more appropriately quantified in Scope 3 Category 4. Therefore, Category 9 is irrelevant to the aerospace industry. The International Aerospace Environmental Group (IAEG) is a non-profit organization of global aerospace companies created to collaborate on and share environmental solutions for the industry.

Processing of sold products

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation
Products and services provided by Northrop Grumman do not require further processing, transformation or inclusion in another product before use by the end consumer. This status is a function of Northrop Grumman's role as a prime contractor to the U.S. and allied governments. Where Northrop Grumman is a supplier to another prime contractor, post-processing is minimal and considered immaterial.

Use of sold products

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation
Northrop Grumman's customer base is primarily the U.S. Government, principally the Department of Defense and intelligence community. We also conduct business with foreign, state and local governments, as well as commercial customers. Our products and services are designed to meet contractual requirements of our customers. Northrop Grumman does nto produce a materially impactful volume of commercial products. Detailed insight into the use patterns of our products or services once they are in our customer's possession is not publically available. Due to the nature of our business and customer requirements, performance and use specifications are not publicly available. Northrop Grumman believes that "not relevant, explanation provided" is the most appropriate available response.

End of life treatment of sold products

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation
Northrop Grumman's customer base is primarily the U.S. Government, principally the Department of Defense and intelligence community. We also conduct business with foreign, state and local governments, as well as commercial customers. Our products and services are designed to meet contractual requirements of our customers. Products are sold to government customers who take formal possession of the product. Customers have their own property disposition process for owned-property, especially products used for military and defense operations. Due to the nature of our business and customer requirements, Northrop Grumman believes that "not relevant, explanation provided" is the most appropriate available response.

Downstream leased assets

Evaluation status
Not relevant, calculated

Metric tonnes CO2e
1930

Emissions calculation methodology
As of December 2018, Northrop Grumman had approximately 53 million square feet of floor space of which approximately 247,000 square feet were leased to third parties (excluding NGIS-owned floor space leased to third parties). By multiplying the average MWh/sq ft, we derived electricity usage for the facilities Northrop Grumman leases to third parties. Using the U.S. national average CO2e emission factor from eGRID2016, we calculated GHG emissions from downstream leased assets.

Percentage of emissions calculated using data obtained from suppliers or value chain partners
0

Explanation
Emissions for this category are immaterial. As of December 2017, Northrop Grumman had approximately 53 million square feet of floor space, of which approximately 247,000 square feet was leased to third parties (excluding NGIS-owned floor space leased to third parties). Source: http://www.northropgrumman.com/AboutUs/AnnualReports/Documents/pdfs/2017_noc_ar.pdf p. 19

Franchises

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation
Northrop Grumman does not own or operate franchises.

Investments

Evaluation status
Not relevant, explanation provided

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation
Northrop Grumman is not a financial institution or financial services organization. Therefore, in accordance with the WRI Scope 3 Protocol, this category of emissions is not relevant to Northrop Grumman.

Other (upstream)

Evaluation status
Please select

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

Explanation

Other (downstream)

Evaluation status
Please select

Metric tonnes CO2e
<Not Applicable>

Emissions calculation methodology
<Not Applicable>

Percentage of emissions calculated using data obtained from suppliers or value chain partners
<Not Applicable>

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
0.00001863

Metric numerator (Gross global combined Scope 1 and 2 emissions)
499627

Metric denominator
unit total revenue

Metric denominator: Unit total
26819000000

Scope 2 figure used
Location-based

% change from previous year
5.95

Direction of change
Decreased

Reason for change
Implemented in 2018 a wide range of emissions-reduction activities including building and process efficiency projects and green IT initiatives, such as multiple lighting upgrades resulting in approximately 6400 MTCO2e savings and boiler replacements resulting in approximately 400 MTCO2e. The 2017 gross combined Scope 1 and 2 emissions have been adjusted since RY 2017 for increased accuracy and completeness, and that figure is 511,091 MTCO2e.

Intensity figure
0.014

Metric numerator (Gross global combined Scope 1 and 2 emissions)
499627

Metric denominator
square foot

Metric denominator: Unit total
35563726

Scope 2 figure used
Location-based

% change from previous year
2.75

Direction of change
Decreased

Reason for change
Implemented in 2018 a wide range of emissions-reduction activities including building and process efficiency projects and green IT initiatives. Square footage represents owned and leased square footage and excludes subleased space as reported in the Annual Report, as well as square footage owned or leased by the Innovation Systems sector, which is outside the current goal period boundary.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

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	121935	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	55	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	257	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	3650	IPCC Fourth Assessment Report (AR4 - 100 year)
PFCs	597	IPCC Fourth Assessment Report (AR4 - 100 year)
SF6	7520	IPCC Fourth Assessment Report (AR4 - 100 year)
NF3	53	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify (methylene Chloride)	1	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)
United States of America	132138
United Arab Emirates	0
Japan	0
Republic of Korea	28
Saudi Arabia	0
Belgium	32
Germany	589
Denmark	108
France	436
United Kingdom of Great Britain and Northern Ireland	510
Italy	21
Netherlands	188
Australia	0
Norway	0
Canada	18

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)
Aerospace Systems	58731
Mission Systems	63728
Enterprise Services	9114
Technology Services	2495

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)
Canada	1	1	31	0
United States of America	355423	345401	1067736	22017
United Arab Emirates	55	55	92	0
Japan	88	88	159	0
Republic of Korea	144	144	251	0
Saudi Arabia	77	77	105	0
Belgium	24	24	102	0
Switzerland	1	1	32	0
Germany	5562	5562	10358	0
Denmark	13	13	27	0
France	197	197	2367	0
United Kingdom of Great Britain and Northern Ireland	1625	1625	3943	0
Italy	1020	1020	2383	0
Netherlands	46	46	89	0
Norway	2	2	87	0
Australia	1281	1281	1604	0

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)
Aerospace Systems	151435	151435
Mission Systems	181642	177313
Enterprise Services	11495	6420
Technology Services	20987	20369

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?

Decreased

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	0	No change	0	No Change
Other emissions reduction activities	12066	Decreased	2.36	The emissions-reduction activities undertaken in RY 2018 resulted in a decreased of 12,066 MT CO2e. The total gross S1 + S2 emissions in RY 2018 was 511,091, therefore (12,066/ 511,091)= 2.36% total reduction in emissions due to emissions-reduction activities.
Divestment		<Not Applicable>		
Acquisitions		<Not Applicable>		
Mergers		<Not Applicable>		
Change in output		<Not Applicable>		
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 0% but less than or equal to 5%

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	No
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

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)	Unable to confirm heating value	0	631094	631094
Consumption of purchased or acquired electricity	<Not Applicable>	21359	1089398	1110757
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	658	<Not Applicable>	658
Total energy consumption	<Not Applicable>	22017	1720492	1742509

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	No
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
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)
Aviation Gasoline

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
382

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
<Not Applicable>

MWh fuel consumed for self-generation of steam
<Not Applicable>

MWh fuel consumed for self-generation of cooling
<Not Applicable>

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

Comment

Fuels (excluding feedstocks)
Diesel

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
15219

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
<Not Applicable>

MWh fuel consumed for self-generation of steam
<Not Applicable>

MWh fuel consumed for self-generation of cooling
<Not Applicable>

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

Comment

Fuels (excluding feedstocks)
Motor Gasoline

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
8693

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
<Not Applicable>

MWh fuel consumed for self-generation of steam
<Not Applicable>

MWh fuel consumed for self-generation of cooling
<Not Applicable>

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

Comment

Fuels (excluding feedstocks)
Jet Kerosene

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
71457

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
<Not Applicable>

MWh fuel consumed for self-generation of steam
<Not Applicable>

MWh fuel consumed for self-generation of cooling
<Not Applicable>

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

Comment

Fuels (excluding feedstocks)
Liquefied Petroleum Gas (LPG)

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
326

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
<Not Applicable>

MWh fuel consumed for self-generation of steam
<Not Applicable>

MWh fuel consumed for self-generation of cooling
<Not Applicable>

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

Comment

Fuels (excluding feedstocks)
Propane Liquid

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
742

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
<Not Applicable>

MWh fuel consumed for self-generation of steam
<Not Applicable>

MWh fuel consumed for self-generation of cooling
<Not Applicable>

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

Comment

Fuels (excluding feedstocks)
Natural Gas

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
534274

MWh fuel consumed for self-generation of electricity
<Not Applicable>

MWh fuel consumed for self-generation of heat
<Not Applicable>

MWh fuel consumed for self-generation of steam
<Not Applicable>

MWh fuel consumed for self-generation of cooling
<Not Applicable>

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

Comment

Fuels (excluding feedstocks)
Kerosene

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
1

MWh fuel consumed for self-generation of electricity

<Not Applicable>

MWh fuel consumed for self-generation of heat
<Not Applicable>

MWh fuel consumed for self-generation of steam
<Not Applicable>

MWh fuel consumed for self-generation of cooling
<Not Applicable>

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

Comment

C8.2d

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

Aviation Gasoline

Emission factor
8.52

Unit
kg CO2e per gallon

Emission factor source
US EPA eHUB Center for Corporate Climate Leadership

Comment

Diesel

Emission factor
10.23

Unit
kg CO2e per gallon

Emission factor source
US EPA eHUB Center for Corporate Climate Leadership

Comment

Jet Kerosene

Emission factor

Unit
Please select

Emission factor source

Comment

Kerosene

Emission factor
10.18

Unit
kg CO2e per gallon

Emission factor source
US EPA eHUB Center for Corporate Climate Leadership

Comment

Liquefied Petroleum Gas (LPG)

Emission factor
5.7

Unit
kg CO2e per gallon

Emission factor source
US EPA eHUB Center for Corporate Climate Leadership

Comment

Motor Gasoline

Emission factor
8.91

Unit
kg CO2e per gallon

Emission factor source
US EPA eHUB Center for Corporate Climate Leadership

Comment

Natural Gas

Emission factor
0.58

Unit
kg CO2e per gallon

Emission factor source
US EPA eHUB Center for Corporate Climate Leadership

Comment

Propane Liquid

Emission factor
5.74

Unit
kg CO2e per gallon

Emission factor source
US EPA eHUB Center for Corporate Climate Leadership

Comment

C8.2e

(C8.2e) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	658	658	658	658
Heat	0	0	0	0
Steam	0	0	0	0
Cooling	0	0	0	0

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
Solar PV

Region of consumption of low-carbon electricity, heat, steam or cooling
North America

MWh consumed associated with low-carbon electricity, heat, steam or cooling
502

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

Comment
This low-carbon electricity represents solar power purchased from the landlord of a leased facility through an onsite power purchase agreement (PPA)

Basis for applying a low-carbon emission factor
Energy attribute certificates, Renewable Energy Certificates (RECs)

Low-carbon technology type
Solar PV

Region of consumption of low-carbon electricity, heat, steam or cooling
North America

MWh consumed associated with low-carbon electricity, heat, steam or cooling
12000

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

Comment
Zero-emissions Renewable Energy Certificates certified by green-e standard

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Basis for applying a low-carbon emission factor
Energy attribute certificates, Renewable Energy Certificates (RECs)

Low-carbon technology type
Wind

Region of consumption of low-carbon electricity, heat, steam or cooling
North America

MWh consumed associated with low-carbon electricity, heat, steam or cooling
8857

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

Comment
Zero-emissions Renewable Energy Certificates certified by green-e standard

---

Basis for applying a low-carbon emission factor
Off-grid energy consumption from an on-site installation or through a direct line to an off-site generator owned by another company

Low-carbon technology type
Solar PV

Region of consumption of low-carbon electricity, heat, steam or cooling
North America

MWh consumed associated with low-carbon electricity, heat, steam or cooling
658

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

Comment
On-site solar systems

C9. Additional metrics

C9.1

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

Description
Waste

Metric value
62.2

Metric numerator
Tons of solid waste diverted from landfill.

Metric denominator (intensity metric only)
Total tons of solid waste generated (div + disp)

% change from previous year
1.1

Direction of change
Decreased

Please explain
We track percentage of solid (non-hazardous) waste from our operational boundary that is diverted from landfill via alternative disposal methods. We have a goal of 70% diversion by 2020, and have achieved 62.2% in RY2018, a 1.1% decrease from our RY2017 diversion rate, which was 62.9% [(62.91-62.19)/62.91 = -1.1%]

Description
Other, please specify (6.6)

Metric value
6.6

Metric numerator
Percent reduction of potable water use achieved.

Metric denominator (intensity metric only)

% change from previous year
1.5

Direction of change
Increased

Please explain
Our 2020 potable water use reduction goal of 20% is managed as an absolute reduction target, therefore the metric provided is reduction against our baseline year 2014 potable water use. In RY2018, we are reporting a 6.6% reduction of potable water use (gallons), whereas in RY2016 after data correction for accuracy we are reporting a 6.5% reduction against the baseline. Therefore, we have achieved a 1.5% improvement this year [(6.6-6.5)/6.5 = 1.5%].

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
CY18 NGC Verification AS April 2019-ASR V1 final April 15 2019.pdf

Page/ section reference
Page 3

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
CY18 NGC Verification AS April 2019-ASR V1 final April 15 2019.pdf

Page/ section reference
Page 3

Relevant standard
ISO14064-3

Proportion of reported emissions verified (%)
100

Scope
Scope 2 market-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
CY18 NGC Verification AS April 2019-ASR V1 final April 15 2019.pdf

Page/ section reference

Page 3

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
CY18 NGC Verification AS April 2019-ASR V1 final April 15 2019.pdf

Page/section reference
Page 3

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
C9. Additional metrics	Other, please specify (Potable Water Use)	ISO 14064-3	Northrop Grumman's annual potable water use is verified to limited assurance level. Our 2020 potable water use reduction goal of 20% and its performance is included in C9.1. CY18 NGC Verification AS April 2019-ASR V1 final April 15 2019.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)?

No, and we do not anticipate being regulated in the next three years

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

Mississippi Valley Project

Verified to which standard

ACR (American Carbon Registry)

Number of credits (metric tonnes CO2e)

11000

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

11000

Credits cancelled

Yes

Purpose, e.g. compliance

Voluntary Offsetting

C11.3

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

No, and we do not currently anticipate doing so in the next two years

C12. Engagement

C12.1

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

Yes, our suppliers

Yes, our customers

Yes, other partners in the value chain

C12.1a

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

Type of engagement
Engagement & incentivization (changing supplier behavior)

Details of engagement
Offer financial incentives for suppliers who reduce your upstream emissions (Scopes 3)

% of suppliers by number
0.93

% total procurement spend (direct and indirect)
1.14

% Scope 3 emissions as reported in C6.5
74

Rationale for the coverage of your engagement
This engagement focuses on our domestic shipping and logistics suppliers. Northrop Grumman is an EPA SmartWay Transport Partner and strives to leverage SmartWay certified carriers for US domestic ground shipments as these partners have committed to demonstrating improvements in efficiency and reporting emissions metrics. The SmartWay program also provides supplier emissions data that supports internal benchmarking and informs our supplier selection process.

Impact of engagement, including measures of success
Northrop Grumman leverages the EPA SmartWay program to select shipping and logistics suppliers who have committed to the carrier partner program. SmartWay carrier partners commit to providing documented emissions metrics, demonstrating efficiency improvements and optimizing fuel economy. Northrop Grumman prioritizes selection of SmartWay carrier partners, and we have seen measured success with this engagement as about 98.5% of our U.S. domestic ground shipments are completed by SmartWay carrier companies. By incentivizing SmartWay partners, Northrop Grumman is prioritizing suppliers committed to lowering emissions as a best practice.

Comment

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement
Education/information sharing

Details of engagement
Run an engagement campaign to education customers about your climate change performance and strategy

% of customers by number
82

% Scope 3 emissions as reported in C6.5
0

Please explain the rationale for selecting this group of customers and scope of engagement
As stated in our annual report, 82% of our sales are to the U.S. government, and as such, we engage significantly with them on a variety of environment-related topics including climate. Recent climate-related engagement activities with the U.S. Government include responding to the General Services Administration request to disclose climate-related activity via the CDP Supply Chain Program and responding to the Council on Environmental Quality's Federal Supplier Greenhouse Gas Management Scorecard. These activities enable our customers to better understand our environmental sustainability performance and the climate-related programs we have developed.

Impact of engagement, including measures of success
Contributing in these climate-related requests has been impactful because it has enabled us to engage with 82% (based on sales) of our customer base. We can measure the success of these engagement by our achievement of a green rating on the 2016 scorecard in all three categories of emissions disclosure, targets, and climate risk.

C12.1c

(C12.1c) Give details of your climate-related engagement strategy with other partners in the value chain.

Our methods for engagement with partners include membership-based involvement with non-profit organizations. For example, Northrop Grumman is a founding member of the International Aerospace Environmental Group (IAEG), which was formed to develop collaborative approaches for global aerospace companies in the realm of environmental compliance and sustainability. Our strategy to engage with partners is to leverage groups or organizations that provide added value. Through the GHG Management and Reporting Workgroup #3, IAEG has developed GHG Reporting Guidance for the Aerospace Industry, a supplement to the GHG Protocol. The measure of success for this partner engagement is collaboration in development and adoption of the Guidance as well as the improvement in consistency in GHG emissions reporting within the aerospace industry.

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
Other

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
Adaptation or resilience	Support	Northrop Grumman employees serve as members of scientific organizations, including the National Academy of Sciences (NAS) Board on Atmospheric Sciences and Climate. The Board advises Congress and governmental organizations such as the U.S. Global Change Research Program (USGCRP) regarding strategic decision-making on topics related to and directly impacted by global climate change.	The NAS Board advises Congress and governmental organizations such as the National Science Foundation and the U.S. Global Change Research Program (USGCRP), agencies including the Department of Defense (DoD), NASA, NOAA, and other agencies that address national security, regarding strategic decision-making on topics related to and directly impacted by global climate change.

C12.3b

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

Yes

C12.3c

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

Trade association
Business Roundtable

Is your position on climate change consistent with theirs?
Consistent

Please explain the trade association's position
The Business Roundtable believes, as stated on its website, that steps to address the risks of global warming are prudent and supports collective actions that will lead to the reduction of greenhouse gas emissions on a global basis. It also believes that harnessing America's abundant renewable energy resources in a cost-effective manner diversifies U.S. energy supplies, enhances U.S. energy security and advances environmental stewardship. Business Roundtable CEOs are committed to sustainability and making life better in the communities in which their companies operate, while also creating greater prosperity by driving economic growth and job creation.

How have you influenced, or are you attempting to influence their position?
Northrop Grumman participates in the Business Roundtable's annual Sustainability Report to affirm Northrop Grumman's commitment to sustainability.

Trade association
International Aerospace Environmental Group

Is your position on climate change consistent with theirs?
Consistent

Please explain the trade association's position
IAEG™ is a non-profit corporation comprised of a global group of aerospace companies, established to facilitate harmonization of compliance amongst Aerospace Companies and their supply chains with the existing and emerging laws and regulations protecting human health and the environment. As a non-lobbying organization (as defined in the by-laws), IAEG™ seeks to achieve its objectives by promoting the development of voluntary consensus standards published by an independent standards organization harmonizing environmental requirements applicable to aerospace companies. For example, the IAEG GHG work group identified the need to develop a voluntary consensus standard for GHG Reporting, to drive common and consistent GHG reporting across aerospace companies and their suppliers, to promote improved accounting and accountability for GHG emissions reductions.

How have you influenced, or are you attempting to influence their position?
Engagement: Northrop Grumman is a founding Board member of IAEG and actively engaged in the organization's governance, strategy and objectives. Northrop Grumman representatives at the Board and Work Group levels provide strategic direction and practical solutions for achieving the goals of the organization and the work groups.

Trade association
Aerospace Industries Association

Is your position on climate change consistent with theirs?
Consistent

Please explain the trade association's position
The Aerospace Industries Association (AIA), founded in 1919 only a few years after the birth of flight, is a trade association representing major aerospace and defense manufacturers and suppliers in the United States. AIA was one of four industry groups to write a collective statement on fuel efficiency and carbon dioxide (CO2) emissions to clarify that the International Civil Aviation Organization goals involve participation by the whole aviation sector using a broad array of measures, not just aircraft technology.

How have you influenced, or are you attempting to influence their position?
Northrop Grumman participates in the AIA Committee on the Environment.

C12.3e

(C12.3e) Provide details of the other engagement activities that you undertake.

Northrop Grumman is a member of the Conservation International (CI) Business Sustainability Council (BSC). The BSC is a forum for corporate leaders taking positive environmental actions in their businesses and provides members a blend of CI thought leadership and science, practical experience from the field, and shared best practices across corporations and cultures. BSC offers members an annual meeting for collaboration amongst members, online learning and employee engagement tools, and technical and advisory support.Conservation International informs policy development by serving as a trusted advisor to local, regional and national governments around the world. CI data, methods and tools assist governments in understanding the value of oceans, forests, croplands, water supplies and wildlife populations, and help to inform actions necessary to protect these vital natural resources.

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?

Northrop Grumman ensures consistency of strategy through collaboration and regular updates with leadership and stakeholder engagement groups within our organization including the Vice Presidents of Operations/Quality (greeNG Environmental Sustainability Executive Sponsors), Environmental, Health and Safety Leadership Council (ELC), the Facilities Working Council (FWC), Government Relations, and Communications. Government Relations monitors and tracks state legislation, regulations, and local government ordinances related to environmental policy development and provides regular updates and guidance through facility operations management team meetings to ensure that the Northrop Grumman can adhere to regulations and policies. The facility team meetings serve as a forum for Government Relations to engage internal environmental stakeholders and share knowledge and ideas on how best to manage environmental regulation and policy development as part of our larger public and private partnerships. Environmental sustainability (greeNG) program representatives participate in monthly state and local update meetings organized by our Government Relations organization. These meetings provide our team further insights into local activities and they provide the Government Relations team a go-to resource for environmental sustainability topics. Environmental technical experts also participate in or maintain regular communication with Northrop Grumman representatives serving within our industry groups to ensure the activities are consistent with the company’s strategy.

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 mainstream reports

Status
Complete

Attach the document
2018_noc_ar.pdf

Page/Section reference
30-35

Content elements
Risks & opportunities
Emission targets
Other metrics

Comment

Publication
In other regulatory filings

Status
Complete

Attach the document

Page/Section reference

Content elements
Governance
Emission targets
Other metrics

Comment

Publication
In voluntary sustainability report

Status
Complete

Attach the document
2018-noc-cr-report.pdf

Page/Section reference
30-35

Content elements
Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics

Comment

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	Vice President, Enterprise Services, Operations, and International	Other, please specify (VP, Enterprise Services Ops & Intl)

SC. Supply chain module

SC0.0

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

Northrop Grumman Corporation is a publicly owned company whose common stock is listed on the New York Stock Exchange (NYSE: NOC). Northrop Grumman is a leading global security company providing innovative systems, products and solutions in autonomous systems, cyber, C4ISR, space, strike, and logistics and modernization to customers worldwide. We offer a broad portfolio of capabilities and technologies that enable us to deliver innovative products, systems and solutions for applications that range from undersea to outer space and into cyberspace. We participate in many high-priority defense and government programs in the United States and abroad. We conduct most of our business with the U.S. Government, principally the Department of Defense (DoD) and intelligence community. We also conduct business with foreign, state and local governments and commercial customers. Northrop Grumman established its environmental sustainability program, greeNG, in 2008 to reduce the company's environmental footprint by improving operational efficiency and integrating environmental sustainability practices into all our operations. Our greeNG Program strives to expand environmental sustainability awareness throughout our organization, supporting our corporate values and meeting the expectations of our diverse set of stakeholders. greeNG is a catalyst for environmentally sustainable performance that drives long-term affordability into our operations, benefiting our customers as well as our shareholders. Northrop Grumman has committed to the following 2020 environmental sustainability goals: a 30% reduction in absolute GHG emissions from 2010 levels, a 20% reduction in potable water use from 2014, and a 70% solid waste diversion rate from landfill.

SC0.1

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

	Annual Revenue
Row 1	30095000000

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	6668071029

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.

SC1.2

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

2018 Northrop Grumman Coroprate Responsibility

Report 2018 Northrop Grumman Annual Report

Both references are available on our public website: www.northropgrumman.com

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
Diversity of product lines makes accurately accounting for each product/product line cost ineffective	Northrop Grumman's customer base is primarily the U.S. Government, principally the Department of Defense and intelligence community. We also conduct business with foreign, state and local governments, as well as commercial customers. Our portfolio of products and solutions include autonomous systems, cyber, C4ISR, strike, and logistics and modernization. Due to the nature of our business, broad product portfolio, and customer requirements the allocation of emissions to an individual product or customer is difficult. Consequently, we provide our full GHG inventory so that customers may allocate in accordance with their methodology.

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.

Northrop Grumman's customer base is primarily the U.S. Government, principally the Department of Defense and intelligence community. We also conduct business with foreign, state and local governments, as well as commercial customers. Our portfolio of products and solutions include autonomous systems, cyber, C4ISR, strike, and logistics and modernization. Due to the nature of our business, broad product portfolio, and customer requirements ,the allocation of emissions to an individual product is difficult.

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 2019-2020 CDP Action Exchange initiative?

No

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2018-2019 Action Exchange initiative?

No

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

No, I am not providing data

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