

C0. Introduction

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C0.1

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

Northrop Grumman Corporation (herein referred to as “Northrop Grumman,” the “company,” “we,” “us,” or “our”) is a publicly traded company whose common stock is listed on the New York Stock Exchange (NYSE: NOC). Northrop Grumman is a leading global technology company focused on global security and human discovery. We deliver a broad range of products, services and solutions to United States (U.S.) and international customers, and principally to the U.S. Department of Defense (DoD) and intelligence community. Our broad portfolio is aligned to support national security priorities and our solutions equip our customers with capabilities they need to connect, protect and advance humanity. The company is a leading provider of space systems, advanced aircraft, missile defense, advanced weapons and long-range fires capabilities, mission systems, networking and communications, strategic deterrence systems, and breakthrough technologies, such as artificial intelligence, advanced computing and cyber. We are focused on competing and winning programs that enable continued growth, performing on our commitments and affordably delivering capability our customers need. With the investments we’ve made in advanced technologies, combined with our talented workforce and digital transformation capabilities, Northrop Grumman is well positioned to meet our customers’ needs today and in the future. Northrop Grumman established an environmental sustainability program in 2008 to reduce the company’s environmental footprint by improving operational efficiency and integrating environmental sustainability practices across our operations. Our Environmental Sustainability Program supports a vision for a more sustainable future by expanding environmental sustainability awareness throughout our organization, supporting our corporate values and meeting the expectations of our diverse set of stakeholders. Northrop Grumman announced our next generation sustainability goals in April 2022, which expand the company’s focus on sustainability beyond our operational footprint. Our next generation sustainability initiatives focus on activity around three mission areas: (1) Footprint: Minimizing the footprint of our operations; (2) Handprint: Enhance sustainability within the aerospace and defense industry by supporting customer needs and supply chain objectives; and (3) Blueprint: Affirm Sustainability leadership by collaborating to protect ecosystems and define environmental opportunities in our communities.

C0.2

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**(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
Reporting year	January 1 2021	December 31 2021	Yes	2 years

C0.3

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**(C0.3) Select the countries/areas in which you operate.**

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

C0.4

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

USD

C0.5

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**(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 chosen approach for consolidating your GHG inventory.**

Operational control

C0.8

**(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?**

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, a Ticker symbol	NOC

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	Our Board provides leadership and oversight with respect to ESG practices and our enterprise risk management activities, among other duties. Each of our independent Board committees assists in this role, providing its expertise. The full Board has ultimate responsibility for the oversight of risk and receives at least annual updates from each of the committees as well as periodic reports from senior management addressing specific risks, including those related to climate. The Policy Committee oversees the company's environmental program, including net zero, water and waste plans; oversees climate change-related risks (including, among other things, Scope 1 and 2 GHG emissions and targets for emissions reductions) and reviews our annual sustainability report. The Policy Committee also provides oversight of our ethics, standards of business conduct, corporate responsibility, human rights, and employee health and safety. The Policy Committee receives periodic updates from the Chief Sustainability Officer (CSO) and Vice President, Global Corporate Responsibility. One example of a climate-related decision that this board-level committee made within the last 2 years includes the Policy Committee's review of the 2021 sustainability report and 2022 TCFD report. This included review of the company's commitment to achieving net zero GHG emissions in our operations by 2035.
Board-level committee	Our Board provides leadership and oversight with respect to ESG practices and our enterprise risk management activities, among other duties. Each of our independent Board committees assists in this role, providing its expertise. The full Board has ultimate responsibility for the oversight of risk and receives at least annual updates from each of the committees as well as periodic reports from senior management addressing specific risks, including those related to climate. The Audit and Risk Committee assists the Board generally in overseeing the company's management of enterprise risks. This includes oversight of the company's financial risks, as well as risks pertaining to natural and environmental matters, cybersecurity, insurance, nuclear and the company's compliance program. One example of a climate-related decision that this board-level committee made within the last 2 years includes its review and approval of the management's enterprise risk assessment, which included the risk factors in the 2021 Annual Report. The Audit and Risk Committee reviewed the company's risk factors, which includes: "Risks associated with climate change and other environmental impacts, and increased focus and evolving views of our customers, shareholders and other stakeholders on climate change issues, could negatively affect our business and operations."
Board-level committee	Our Board provides leadership and oversight with respect to ESG practices and our enterprise risk management activities, among other duties. Each of our independent Board committees assists in this role, providing its expertise. The full Board has ultimate responsibility for the oversight of risk and receives at least annual updates from each of the committees as well as periodic reports from senior management addressing specific risks, including those related to climate. The Compensation Committee approves the financial and non-financial metrics for our compensation program, among other responsibilities. The non-financial metrics include certain environmental and diversity, equity and inclusion goals. One example of a climate-related decision that this board-level committee made within the last 2 years includes review of the non-financial metric targets in the company's annual incentive plan, which included a target for environmental sustainability. That target was Reductions in absolute greenhouse gas emissions and potable water consumption, and improvement in solid waste diversion (i.e., waste diverted from landfill disposal). The committee also reviewed the results of the non-financial metrics, which included the environmental sustainability target results and approved a non-financial score of 100%.
Board-level committee	Our Board provides leadership and oversight with respect to ESG practices and our enterprise risk management activities, among other duties. Each of our independent Board committees assists in this role, providing its expertise. The full Board has ultimate responsibility for the oversight of risk and receives at least annual updates from each of the committees as well as periodic reports from senior management addressing specific risks, including those related to climate. The Governance Committee looks broadly at governance-related risks, including the role of each committee with respect to oversight of ESG and corporate culture, among other responsibilities. One example of a climate-related decision that this board-level committee made within the last 2 years includes the Governance Committee assessment of the skills of the board as document in the 2022 Proxy. The committee concluded that 7 committee members have Environmental Sustainability/ Corporate Responsibility skills.

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	Scope of board-level oversight	Please explain
Scheduled – some meetings	<ul style="list-style-type: none"> <li>Reviewing and guiding strategy</li> <li>Reviewing and guiding major plans of action</li> <li>Reviewing and guiding risk management policies</li> <li>Setting performance objectives</li> <li>Monitoring implementation and performance of objectives</li> <li>Overseeing major capital expenditures, acquisitions and divestitures</li> <li>Monitoring and overseeing progress against goals and targets for addressing climate-related issues</li> </ul>	<Not Applicable>	The Policy Committee oversees the company's environmental program, including net zero, water and waste plans; oversees climate change-related risks (including, among other things, Scope 1 and 2 GHG emissions and targets for emissions reductions) and reviews our annual sustainability report. The Policy Committee also provides oversight of our ethics, standards of business conduct, corporate responsibility, human rights, and employee health and safety. The Policy Committee receives periodic updates from the Chief Sustainability Officer (CSO) and Vice President, Global Corporate Responsibility, policy, and government relations on an annual basis. The Audit and Risk Committee assists the Board generally in overseeing the company's management of enterprise risks. This includes oversight of the company's financial risks, as well as risks pertaining to natural and environmental matters, cybersecurity, insurance, nuclear and the company's compliance program. The Compensation Committee approves the financial and non-financial metrics for our compensation program, among other responsibilities. The non-financial metrics include certain environmental and diversity, equity and inclusion goals. The 2021 environmental non-financial metric was measured by reductions in absolute greenhouse gas (GHG) emissions and potable water consumption, and improvement in solid waste diversion (i.e., waste diverted from landfill disposal) and emphasized the importance of implementing projects to improve environmental sustainability across the company. The Governance Committee looks broadly at governance-related risks, including the role of each committee with respect to oversight of ESG and corporate culture, among other responsibilities.

**C1.1d**

**(C1.1d) Does your organization have at least one board member with competence on climate-related issues?**

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	Yes	In considering Board nominees, the Governance Committee considers each individual's background and personal and professional experiences in addition to general qualifications. Nominees are evaluated in the context of the Board as a whole, with a focus on achieving an appropriate mix of skills needed to provide effective governance and oversight, advancing the long-term interests of our shareholders. The Governance Committee regularly assesses and communicates with the Board about current and future skills and backgrounds to ensure the Board maintains an appropriate mix. Certain of the skills and qualifications nominees are assessed against are listed in the 2022 Proxy statement on p.15 and includes the topic of Environmental Sustainability/Corporate Responsibility, which is inclusive of the topic of climate-related issues. Currently, there are seven board members that have been assessed and evaluated as possessing skills in this area.	<Not Applicable>	<Not Applicable>

**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)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	Annually
Risk committee	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	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).**

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) and the Risk committee (referred to in question C1.2) is chaired by the Chair and CEO and is comprised of all members of the Executive Leadership Team (includes the CFO, CHRO, CGBO, General Counsel, Chief Strategy & Development Officer, VP Communications, and the four sector presidents), the Chief Accounting Officer, Chief Compliance Officer, Corporate Secretary, Chief Sustainability Officer (CSO), Vice President of Internal Audit and Treasurer and meets at least twice per year. The Chief Technology Officer and Vice President, Supply Chain also attend each ERMC meeting. Climate-related issues are included within the ERMC responsibilities because the ERMC oversees 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. The CSO is responsible for the monitoring of climate-related issues and risks and, as a member of the ERMC, brings forward those issues and risks for discussion as part of its overall risk management function.

These risks are described in the company's Annual Report on Form 10-K. Included within these risks are natural disasters, environmental, health and safety, compliance with laws, hazardous and high-risk operations, and climate-related risks, such as increased wildfire risks, rising mean temperature and sea levels, and long-term changes in precipitation patterns, like increased drought, desertification and/or poor water quality. At the ERMC meetings, members review each of the significant risks to the business, current trends related to those risks and the status and effectiveness of mitigation measures. For example, the CSO presented to the ERMC how climate change may continue to impact facilities, operations, employees and communities in certain regions potentially exposed to climate change-related natural disasters. Similarly, the CSO presented to the ERMC for evaluation how climate change-related disruptions could impact the availability and cost of materials needed for manufacturing, and how new or more stringent regulations adopted in response to climate change could require substantial capital investment and enhanced reporting. Importantly, the ERMC also identifies, discusses and considers new potential or emerging risks that could become significant to the company, including emerging climate-related risks as presented by the CSO, and integrates climate-related risks into the overall risk management process at Northrop Grumman. Members of the ERMC discuss the status of each risk, whether the risk is increasing or decreasing and areas of concern. The company has developed risk mitigation efforts for each of our significant risks, which members of the ERMC oversee. Other groups within the company, such as business continuity and supply chain management, have specialized practices in place for additional risk identification, assessment and management. The ERMC members work with management on risk mitigation and provide periodic updates to the Board.

**C1.3**

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

	Provide incentives for the management of climate-related issues	Comment
Row 1	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).**

Entitled to incentive	Type of incentive	Activity incentivized	Comment
Corporate executive team	Monetary reward	Emissions reduction project	As noted in the 2022 Proxy Statement, under our 2021 Annual Incentive Plan, we used 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, and others) annually. Environmental Sustainability is one of six non-financial metrics and performance against this non-financial metric is measured against our annual absolute greenhouse gas emissions and potable water consumption reduction targets as improvement in solid waste diversion (i.e., waste diverted from landfill disposal). In 2021, performance against non-financial metrics can result only in a downward adjustment to the financial metric score. In 2022, the compensation committee approved changes to the non-financial metrics in the AIP design from a negative-only modifier. Non-financial metrics have been embedded in our core metrics to reflect our continued focus on ESG and to bring greater alignment for employees, shareholders and other stakeholders and account for 10% of the overall 2022 AIP goals.
All employees	Monetary reward	Emissions reduction project	Non-financial metrics also 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 consumption, and improvement in solid waste diversion.

**C2. Risks and opportunities**

**C2.1**

**(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?**

Yes

**C2.1a**

**(C2.1a) How does your organization define short-, medium- and long-term time horizons?**

	From (years)	To (years)	Comment
Short-term	0	5	Time horizons defined within this response are for the purpose of our climate-related risk and opportunity assessments.
Medium-term	5	15	Time horizons defined within this response are for the purpose of our climate-related risk and opportunity assessments.
Long-term	15		Time horizons defined within this response are for the purpose of our climate-related risk and opportunity assessments.

**C2.1b**

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**(C2.1b) How does your organization define substantive financial or strategic impact on your business?**

In our Annual Report, Item 1A: Risk Factors (pg 10), 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. The analysis assesses the effect on the company by determining the financial, reputational and known legal impact if recovery is not achieved. Using a tiered ranking system, we evaluate risks to help determine prioritization based on probability, business impact (including a focus on top-tier suppliers), recovery time and if the exposure will be addressed at the site, sector or company level. Medium and high impacts represent a substantive financial impact. We use the word "substantive" throughout this questionnaire, as is consistent with CDP, and substantive impacts represent notable business impacts. We do not consider "substantive" to be analogous with materiality as defined by, or in the context of, the U.S. Securities and Exchange Commission (SEC) laws, including those related to SEC reporting and disclosure obligations (or any other securities laws) or as the term is used in the context of financial statements and financial reporting.

**C2.2**

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**(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.**

**Value chain stage(s) covered**

Direct operations  
Upstream

**Risk management process**

Integrated into multi-disciplinary company-wide risk management process

**Frequency of assessment**

Annually

**Time horizon(s) covered**

Short-term  
Medium-term  
Long-term

**Description of process**

The Board of Directors (BoD) is responsible for overseeing our enterprise risk management activities, among other duties, and has board-level committees that assist them in this role. The BoD and its Committees provide oversight of the Enterprise Risk Management Council (ERMC), oversee the company's environmental program, including net-zero, water and waste plans, receive updates from the CSO, and oversee climate change risks, Task Force on Climate-related Financial Disclosure (TCFD) evaluations and the annual sustainability report. The ERMC is comprised of all members of the Executive Leadership Team, the Chief Accounting Officer, Chief Compliance Officer, Corporate Secretary, Corporate Sustainability Officer, Vice President 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, including the CSO's responsibility for climate-related 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. The Business Continuity Program (BCP) conducts annual physical security surveys to evaluate risks and opportunities and their potential impacts to the company, personnel and/or operations. Business impact analyses are performed annually, originating at the site level and rolling up to the sector level, and the impact is determined on a scale of low, medium or high. Our Business Continuity team operates through centralized control and has oversight over all business units and service lines. The BCP performs business impact analyses in coordination with the sectors to assess the potential risk and identify the recovery prioritization of sites and business processes, as well as gaps in recoverability, at least annually. The analysis assesses the effect on the company by determining the financial, reputational and known legal impact if recovery is not achieved. Using a tiered ranking system, we evaluate risks to help determine prioritization based on probability, business impact (including a focus on top-tier suppliers), recovery time and if the exposure will be addressed at the site, sector or company level. When possible, we establish contingency plans in case our personnel or buildings are unavailable due to risks, such as natural disasters exacerbated by the effects of climate change. Certain risks and issues are elevated to sector and company leadership where mitigation options are developed and funded. 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. Efforts to manage climate-related risks also create opportunities for the company. To capitalize on these opportunities, our environmental sustainability program collaborates internally to analyze, address, and pursue potential opportunities from resource efficiency to stakeholder engagement. By working towards our next-generation environmental sustainability goals, including our Net Zero by 2035 in our operations emissions goal, we are actively reviewing and implementing initiatives that not only reduce our environmental footprint, but are also may positively influence the company through cost savings, resiliency, and/or company reputation. One case study 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. Our business continuity response in Louisiana is one such example. Northrop Grumman's Aircraft Maintenance and Fabrication Center in Lake Charles was directly impacted by Hurricane Laura in late August 2020. The region was hit by the hurricane which, with high winds, delivered devastating loss of life and property damage to the community. Residents were just recovering from this first hurricane when Hurricane Delta hit in early October 2020, bringing another round of torrential rains across the region. Both hurricanes caused widespread power outages and flooding, which created extensive debris fields. Crisis management teams engaged early, with Northrop Grumman's recovery and response preparation efforts guided by well-documented crisis management and business continuity plans and established protocols. Once all personnel had been accounted for, teams were deployed to assist with employee needs including supplies, insurance coordination, repairs, temporary housing and more, with a focus on timely and targeted outreach and communications. Partial business resumption after Hurricane Delta occurred after only nine days, and full resumption occurred after 20 days, demonstrating improved resiliency. In 2021, Northrop Grumman received Disaster Recovery Institute International's "Award for Excellence" in the category of Response and Recovery of the Year based on our crisis management response to these hurricanes. One case study of applying our risk management process to a transition risk includes increased operating costs due to compliance requirements such as California's Executive Order (EO) B-29-15 Drought Response that was signed by Governor Brown on April 1, 2015. When this EO was released, we worked with our California site teams to perform an analysis to understand the financial impacts of the EO on drought restrictions and drought utility charges on our operations. To mitigate the risk, we accelerated site water use assessments and 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.

**C2.2a**

**(C2.2a) Which 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 evaluation and mitigation strategies. 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 or enforced differently 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, and Sunnyvale sites, among others, that may be subject to existing climate-related regulations within the state, specifically programs like Assembly Bill 32, the California Global Warming Solutions Act (Chaptered 2006) that was updated with passage of Senate Bill 32 in 2016. Internationally, where we have major operations such as in the United Kingdom, we must comply with greenhouse gas and energy reporting requirements, like the Energy Savings Opportunity Scheme (ESOS) to ensure our in-country locations are meeting climate-related reporting requirements, as applicable.
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, over time. Compliance with these environmental laws and regulations requires, and is expected to continue to require, significant operating and capital costs. Companies across the board may face new climate change-related policy and legal requirements, such as carbon taxes or cap-and-trade programs in the states and/or countries in which they primarily operate. The financial impact of a carbon tax could be significant, based on Northrop Grumman's historical Scope 1 and 2 emission levels and estimates of future carbon taxes. We have major operations in California including our El Segundo, Manhattan Beach, Redondo Beach, Palmdale, Sunnyvale, among others that may be impacted by increased cost of emissions mitigation or reporting obligations resulting from the evolving climate-related regulatory environment within the state.
Technology	Relevant, always included	Northrop Grumman's ERMC includes technology as part of its risk assessment for climate change. Considering the pace of sustainability-focused technological advancements across the globe and the emissions and/or climate impacts associated with the defense industrial base, both for Northrop Grumman and our suppliers, it is reasonably likely that the industry will experience changes in technology over the next 20 to 30 years. If, for example, our customers develop requirements and adopt procurement policies that encourage social and environmental objectives, including products and technology with lower emissions, climate resiliency or technological advances that assist with the transition to a low-carbon economy and we are unable to meet those evolving demands our competitiveness may be impacted. As we expect many of these costs will be considered allowable and allocable costs to our U.S. government contracts, there is potential for the costs to impact overall affordability in the short term and that some of these costs could be managed through efficiencies gained in the future.
Legal	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council (ERMC) includes legal risks as part of its risk assessment. New or more stringent laws and regulations related to greenhouse gas emissions and other climate change related concerns may adversely affect us, our suppliers and our customers. Some of our facilities are, for example, engaged in manufacturing processes that produce greenhouse gas emissions, including carbon dioxide, or rely on products from others that do so. However, new and evolving laws and regulations could mandate different or more restrictive standards, could require capital investments to transition to low carbon technologies, could adversely impact our ongoing operations, and could require changes on a more accelerated time frame. Our suppliers may face similar challenges and incur additional compliance costs that are passed on to us. These direct and indirect costs may adversely impact our results of operations and financial condition. And non-compliance with legislative and regulatory requirements could also negatively impact our reputation and ability to do business.
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. Many of the markets in which we operate are characterized by rapidly-changing technologies and are highly competitive. If customer acquisition strategies, including those of the U.S. government, are modified to include climate change-related requirements, and we meet those evolving demands, we may see competitive advantages and enhanced future successes. If, conversely, current or future competitors outperform us in response to such demands or on our current and planned transition efforts to innovative climate-related products or services, we could lose future business to our competitors, which could affect our ability to generate favorable financial results and maintain market share and affect our financial position, results of operations and/or cash flows. Changing conditions impacting the frequency of extreme weather, the movement of glaciers and soil moisture conditions require increased monitoring and measurement. 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 as sustainment services for the Air Force Weather program or the ICESat-2 satellite that measures the changing height of Earth's glaciers, ice sheets and sea ice. 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.
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. This reputational risk specifically impacts our ability to acquire and retain talent within the company. As stated in our 2021 Sustainability 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. Having an environmental sustainability program and time-bound enterprise-wide goals to address climate-related issues demonstrates a commitment to environmental, social, and governance topics that are important to potential new hires, and thus reinforces Northrop Grumman's reputation as a preferred employer.
Acute physical	Relevant, always included	Northrop Grumman's Enterprise Risk Management Council includes acute physical risk such as natural disasters as part of its risk assessment and management programs. The increase in frequency and/or severity of extreme weather events may have a significant impact on many parts of our business, including: manufacturing, corporate locations (including facilities that have been and may in the future be exposed to extreme weather events), distribution facilities, logistics and transportation, supply chain and even demand for product. We have significant operations, including centers of excellence, located in regions that have been and may in the future be exposed to hurricanes and other damaging storms, changing water levels, wildfires and other natural disasters. Our subcontractors and suppliers similarly are subject to natural disasters that could affect their ability to deliver or perform under a contract, including possible disruptions to their workforce or the critical industrial infrastructure needed for normal business operation. 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.
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. We also review the infrastructure supporting critical sites and assess and rank priority risk level based on function and facility two times a year to determine the best way to support the highest priority facilities. 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.

**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 & Primary climate-related risk driver**

Acute physical	Cyclone, hurricane, typhoon
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**Primary potential financial impact**

Decreased revenues due to reduced production capacity

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**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. 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. As a result of the increased risk and expected recovery cost after catastrophic climate events, there is a risk of insurance coverage becoming less available or a larger financial burden.

**Time horizon**

Short-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. The \$750,000 equals the sum of lost production hours, employee time off and overtime, post-event cleanup, travel costs and diesel fuel for generators.

**Cost of response to risk**

0

**Description of response and explanation of cost calculation**

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. Case Study: 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. The cost of response to risk is \$0 because there is no additional cost in managing risks of extreme weather events as our Business Continuity Program is part of our regular course of business.

**Comment**

**Identifier**

Risk 2

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

Direct operations

**Risk type & Primary climate-related risk driver**

Chronic physical	Precipitation and/or hydrological variability
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**Primary potential financial impact**

Increased indirect (operating) costs

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**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. Our California sites in El Segundo, Manhattan Beach, Redondo Beach, Palmdale, and Sunnyvale, among others, account for approximately 30% of both our natural gas and electricity usage and could see higher operating costs as a result of increased utility fees associated with new regulations that have recently been passed to combat these environmental changes. Furthermore, 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, AB 1054 was passed in California in July of 2019. The program established by this law 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. Utilities are now allowed to impose additional fees and rate increases on rate payers like our sites mentioned above and we are continuing to assess how these additional rates have impacted the operating costs at our sites.

**Time horizon**

Short-term

**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)**

3500000

**Potential financial impact figure – minimum (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – maximum (currency)**

&lt;Not Applicable&gt;

**Explanation of financial impact figure**

Estimated financial impact is based on the company's 2019 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). Financial Impact= [(\$6.00/kgal\*.041)\*( 1,422,103,584/1000gals)\*10years]

**Cost of response to risk**

487000

**Description of response and explanation of cost calculation**

Northrop Grumman's next-generation 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. Case Study: In California, we are reducing the future impacts of rising utility costs as a result of chronic drought risk. Each year we implement potable water conservation projects to drive performance to our potable water use reduction goal. Across our business, through our environmental and efficiency allocated capital (E&E) we allocated \$1 million in 2021 to drive environmental sustainability projects, including water conservation projects. We use this figure as our cost of management response to risk. At sites in Southern California, we enhanced water monitoring systems totaling approximately \$487,000 in capital costs, reducing over 4 million gallons of water and saving \$50,000 annually in operational costs.

**Comment****Identifier**

Risk 3

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

Direct operations

**Risk type & Primary climate-related risk driver**

Emerging regulation	Carbon pricing mechanisms
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**Primary potential financial impact**

Increased direct costs

**Climate risk type mapped to traditional financial services industry risk classification**

&lt;Not Applicable&gt;

**Company-specific description**

Companies across the board may face new climate change-related policy and legal requirements, such as carbon taxes or cap-and-trade programs in the states and/or countries in which they primarily operate. The financial impact of a carbon tax could be significant, based on Northrop Grumman's historical Scope 1 and 2 emission levels and the International Energy Agency's (IEA's) estimated carbon price of \$140/tCO2 by 2040. The primary source of potential cost from the implementation of carbon pricing is from purchased electricity costs, as utility companies pass the carbon price on their emissions through the cost of electricity.

**Time horizon**

Long-term

**Likelihood**

Likely

**Magnitude of impact**

Low

**Are you able to provide a potential financial impact figure?**

Yes, an estimated range

**Potential financial impact figure (currency)**

&lt;Not Applicable&gt;

**Potential financial impact figure – minimum (currency)**

10161690

**Potential financial impact figure – maximum (currency)**

101616900

**Explanation of financial impact figure**

The estimated calculation represents an estimated annual carbon tax Northrop Grumman would have to pay annually in 2040 if the company maintains emissions at 2021 levels. Our analysis, as described in our TCFD report, is based on an estimated carbon price of \$140/tCO2 that IEA estimates will occur by 2040. Financial impact: By multiplying our 2021 annual emissions (725,835 tCO2) by the estimated 2040 carbon price (\$140/tCO2), we identify one scenario of how our business could be impacted by a carbon price. At the low end of the range, we assume that we achieve our Net Zero by 2035 emissions goal, with a remaining 10% emissions at the end of the goal period to offset. The lower estimate is based on 10% of our 2021 emissions (which is 72,583 tCO2) multiplied by the same carbon price (\$140/tCO2). Based on this scenario analysis, we do not anticipate the impact of carbon pricing to be significant relative to overall costs, and we believe we are currently resilient to this risk.

**Cost of response to risk**

3000000

**Description of response and explanation of cost calculation**

By proactively and voluntarily reducing our emissions, we are reducing exposure to future carbon taxes from the federal government, states and/or countries where we do business, while also making a contributing to the fight against climate change. We have set a Net Zero emissions by 2035 goal for our operations and achieving this goal can decrease the risk of carbon pricing to our business. Case Study: In order to achieve our Net Zero emissions goal and minimize our exposure to future carbon taxes, each year we invest in our infrastructure through energy efficiency and GHG emissions reductions projects. The \$3 million cost figure represents our annual investment in greenhouse gas emissions-reduction projects in 2021. In 2021, our execution of 48 greenhouse gas emissions-reductions projects across the company will reduce annual emissions by approximately 3,137 MTCO2e; these projects have an average payback of 6 years. Project examples include HVAC replacements, lighting upgrades, building controls systems, and installations of variable frequency drives (VFDs). This year, one LED lighting upgrade project at our Rolling Meadows facility reduced 186 MTCO2e, had a simple payback of 1.6 years and reduces operational costs by \$26,000 annually.

**Comment**

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C2.4

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**(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

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**(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

**Primary potential financial impact**

Reduced indirect (operating) costs

**Company-specific description**

Resource efficiency, driven by Northrop Grumman's environmental sustainability program and next-generation 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 16 certified green buildings in our portfolio totaling more than 2.2 million square feet of floor space certified to Energy Star and LEED standards. Investments in projects such as these drove performance towards our 2020 greenhouse gas reduction goal of 30% from a 2010 base year and reduce operation costs. These investments will continue to drive our strategy to achieve our Net Zero by 2035 goal.

**Time horizon**

Short-term

**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)**

5000000

**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 annual positive financial implications of our 2021 investments in resource efficiency projects. Lifetime cost savings of the 2021 investment in greenhouse gas emissions-reductions projects which is calculated over an estimated 10-year minimum lifespan of the projects. The average payback period for these projects is 6 years. Financial impact 5,000,000 = (500,000 annual cost savings \*10 years).

**Cost to realize opportunity**

3000000

**Strategy to realize opportunity and explanation of cost calculation**

Northrop Grumman manages this opportunity through the company's Environmental, Health & Safety (EHS) and 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 environmental sustainability program was established in 2008. Our second greenhouse gas emissions-reduction goal was to reduce emissions by 30% from 2010 to 2020. Our next-generation goal is to achieve Net Zero emissions in our operations by 2035. The cost to realize the opportunity represents the sum of the 2021 capital cost investments in emissions reductions activities that enable the company to minimize its greenhouse gas emissions and net zero goal. Case Study: By proactively and voluntarily reducing our emissions, we are reducing exposure to future environmental regulations from the federal government and states where we do business and capitalizing on efficiency opportunities. In 2021, our execution of 48 greenhouse gas emissions-reductions projects across the company will reduce annual emissions by approximately 3,137 MTCO2e; these projects have an average payback of 6 years. Project examples include HVAC replacements, lighting upgrades, building controls

systems, and installations of VFDs. This year, for example, one LED lighting upgrade project at our Rolling Meadows facility in Illinois reduced 186 MTCO<sub>2</sub>e, had a simple payback of 1.6 years and reduces operational costs by \$26,000 annually.

#### Comment

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##### 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

##### Primary potential financial impact

Reduced indirect (operating) costs

##### Company-specific description

Resource efficiency, driven by Northrop Grumman's environmental sustainability program and next-generation goals, creates an opportunity for reduced operating costs at our sites. Each year we invest in our infrastructure through reduced water usage and consumption projects, reducing the cost of our operations and minimizing our environmental footprint across all of our global operations. For example, the 28 water conservation projects completed in 2021 are estimated to conserve 41 million gallons annually across the business. Investments in these projects drive performance toward our next-generation water goal.

##### Time horizon

Short-term

##### 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)

101000

##### 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 our 2021 annual water reductions over a 10 year period. Estimated reduction of 41 million gallons annually and an average cost of water of \$6/kgal. Financial impacts: 101,000 = (41MG/1000gal\*\$6price/kgal)\*10 years

##### Cost to realize opportunity

4900000

##### Strategy to realize opportunity and explanation of cost calculation

Northrop Grumman's next-generation environmental sustainability goals for water use reduction assist in managing the climate-related risks associated with increasing costs of utilities. Through these goals, we drive operational efficiency and cost savings throughout our company, reducing energy consumption and conserving water. Through these reductions, we are also reducing the future impacts of rising utility costs as a result of issues such as the California drought. Each year we implemented potable water conservation projects to drive performance to our next-generation water goal. In 2021, we implemented targeted conservation projects estimated to save 41 million gallons of water by investing approximately \$4.9 million across the business. This cost to realize the opportunities represents the sum of the capital costs of these projects. We use this figure as our cost of management. Case Study: We invest in water reduction projects across our business; however, in areas like Southern California, our facilities face potential future impacts of rising utility costs related to drought. In response to this risk, we focus investments on driving water conservation in water-stressed regions. At sites in Southern California, for example, we enhanced water monitoring systems, reducing over 4 million gallons of water and saving \$50,000 annually in operational costs in a region where rising utility costs could impact our business in the future

#### Comment

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##### Identifier

Opp3

##### Where in the value chain does the opportunity occur?

Downstream

##### Opportunity type

Products and services

##### Primary climate-related opportunity driver

Shift in consumer preferences

##### Primary potential financial impact

Increased revenues resulting from increased demand for products and services

##### 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® 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 of \$9,000,000 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 N'AA'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.

**Cost to realize opportunity**

**Strategy to realize opportunity and explanation of cost calculation**

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. Case Study: 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.

**Comment**

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**C3. Business Strategy**

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**C3.1**

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**(C3.1) Does your organization's strategy include a transition plan that aligns with a 1.5°C world?**

**Row 1**

**Transition plan**

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a transition plan within two years

**Publicly available transition plan**

<Not Applicable>

**Mechanism by which feedback is collected from shareholders on your transition plan**

<Not Applicable>

**Description of feedback mechanism**

<Not Applicable>

**Frequency of feedback collection**

<Not Applicable>

**Attach any relevant documents which detail your transition plan (optional)**

<Not Applicable>

**Explain why your organization does not have a transition plan that aligns with a 1.5°C world and any plans to develop one in the future**

Northrop Grumman recognizes that climate-related risks and opportunities have the potential to impact our business in the short, medium and long term. In 2022, Northrop Grumman conducted a climate scenario analysis on certain physical and transition risks to gain a deeper understanding of our resilience in different climate scenarios. The results of this analysis were published in our first TCFD report. Within the next two years, we plan to develop a comprehensive transition plan and roadmap to achieving our Net Zero target.

**Explain why climate-related risks and opportunities have not influenced your strategy**

<Not Applicable>

**C3.2**

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**(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?**

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, qualitative and quantitative	<Not Applicable>	<Not Applicable>

**C3.2a**

**(C3.2a) Provide details of your organization's use of climate-related scenario analysis.**

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Transition scenarios IEA SDS	Company-wide	<Not Applicable>	To understand the potential impacts of carbon pricing, we chose two scenarios for our analysis based upon the IEA Stated Policies Scenario (STEPS, 2.6°C) and Sustainable Development Scenario (SDS, 1.5-to-2°C), across a time horizon spanning from a base year of 2021 to 2050. For the purpose of modelling the impact of carbon pricing, SDS represents IEA's view on the policy necessary for an orderly transition to a low-carbon economy in support of global temperature increases well below 2°C. SDS assumes a near-term surge in clean energy policies and investments to achieve sustainable energy objectives in line with the Paris Agreement, including universal access to modern energy and air quality goals. Although some assumptions made by the IEA may seem aggressive relative to current trends, they are modelled as presented for standardization purposes and best practices to allow us to understand the impact to our business under a 1.5-to-2°C warming scenario. We believe these two scenarios provide a useful comparison between existing policy (STEPS) and what would be necessary to avoid the worst physical impacts of climate change (SDS)
Transition scenarios IEA STEPS (previously IEA NPS)	Company-wide	<Not Applicable>	To understand the potential impacts of carbon pricing, we chose two scenarios for our analysis based upon the IEA Stated Policies Scenario (STEPS, 2.6°C) and Sustainable Development Scenario (SDS, 1.5-to-2°C), across a time horizon spanning from a base year of 2021 to 2050. For the purpose of modelling the impact of carbon pricing, STEPS considers only currently enacted carbon policy (which aligns with a 2.6°C increase in temperature by 2100 relative to pre-industrial levels. STEPS is based on policies in place as of mid-2021. It includes long-term energy and climate targets only to the extent that they are backed up by specific governmental or regulatory policies. Under STEPS, the share of renewable energy is gradually increasing, and accounts for over 40% of electricity generation by 2040. Renewables are even more prevalent than in STEPS, with all advanced economies reaching net zero emissions by 2050.1 Although some assumptions made by the IEA may seem aggressive relative to current trends, they are modelled as presented for standardization purposes and best practices to allow us to understand the impact to our business under a 1.5-to-2°C warming scenario. We believe these two scenarios provide a useful comparison between existing policy (STEPS) and what would be necessary to avoid the worst physical impacts of climate change (SDS).
Physical climate scenarios RCP 2.6	Company-wide	<Not Applicable>	Representative Concentration Pathways (RCP) 2.6 and RCP 8.5 are two generally-accepted scenarios used for the purposes of discussing physical risk scenario testing, and we believe that they provide a useful contrast of best- and worst-case physical risk exposure. RCP 2.6 is characterized by substantial net negative GHG emissions by the year 2100. It assumes carbon transition policies are put in place and is largely aligned with the well-below 2°C warming scenario described in the Paris Agreement.
Physical climate scenarios RCP 8.5	Company-wide	<Not Applicable>	Representative Concentration Pathways (RCP) 2.6 and RCP 8.5 are two generally-accepted scenarios used for the purposes of discussing physical risk scenario testing, and we believe that they provide a useful contrast of best- and worst-case physical risk exposure. RCP 8.5 is characterized by very high emissions throughout the 21st century. Though considered relatively unlikely, this scenario would result in approximately 4.3°C of warming2 as minimal additional effort is made to constrain GHG emissions. This is generally considered a "worst-case" climate change scenario.

**C3.2b**

**(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.**

**Row 1**

**Focal questions**

Focal Question 1: What is the impact of increased pricing of GHG emissions due to the implementation of a carbon price? Focal Question 2: What are the potential changes to the risk of flood, tornados, tropical cyclone and wildfires at all of our site locations, including manufacturing, facilities, offices and warehouses?

**Results of the climate-related scenario analysis with respect to the focal questions**

Focal Question 1: The potential carbon price impact to Northrop Grumman varies considerably across climate change scenarios, as the lower warming scenario (SDS) requires a more stringent policy implementation. In either scenario, the estimated direct impact of carbon pricing on our Scope 1 emissions, as produced by our model, is negligible due to our low Scope 1 emission levels. The primary source of potential cost from the implementation of carbon pricing is from purchased electricity costs (Scope 2 emissions) as utility companies pass the carbon price on their emissions through the cost of electricity. our risk of carbon pricing can be decreased by achieving our commitment to net zero GHG emissions in our operations. We also separately project carbon prices for the operating regions in which Northrop Grumman observes significant GHG emissions (e.g., US, UK, EU, and Australia) for the purposes of scenario planning. By creating distinct projections for specific geographies, we are able to better assess the impact a carbon price would have on sites in a particular operational region. Currently, we believe we are resilient in a carbon policy environment that is aligned to 1.5-to-2°C. We will continue to revisit this analysis in the future as carbon policy in our significant operating areas evolves. Focal Question 2: Overall, Northrop Grumman's business is diversified geographically in both high and low warming scenarios, and no single peril presents a heavily-concentrated risk across all locations. As expected, physical risk is estimated to be more impactful under RCP 8.5 conditions because of higher global GHG emissions. However, we still observe changes to physical risk levels under RCP 2.6 conditions. We split our analysis by peril, highlighting the regions that face the biggest risk or experience the biggest increase in projected risk in each area. For example, we closely monitor wildfire activity in California due to our large operational presence in the state.

**C3.3**

**(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.**

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	Climate-related issues may increase demand by our customers for technologies and capabilities provided by Northrop Grumman that support environmental and weather research. From observations to decision support, Northrop Grumman has made the strategic business decision to develop and operate systems and services to deliver environmental intelligence through science, sensors and enterprise services. The time horizon for these activities is ongoing (short-, medium-, and long-term as specified in C2.1a). Northrop Grumman provides an array of products that support climate and earth monitoring activities being completed by our customers. The data acquired from the systems we develop 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 in question 2.4a). 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.
Supply chain and/or value chain	Yes	Climate/natural disaster issues are one of many characteristics integrated into our Global Supply Chain Risk Management strategy. We have a committee that meets monthly to identify, assess and monitor medium-term (5 to 10 years) supply chain risks across the enterprise in order to manage issues on an ongoing basis. Our strategy is influenced by the fact that our suppliers and subcontractors are subject to natural and environmental disasters that could affect their performance to our contracts and ultimately impact our operations. As an example, when a Climate/natural disaster supply chain risk has been identified (i.e. hurricanes, wildfires), our committee assesses for probability of supply chain disruption as well as severity of impact to our business operations and programs. Detailed mitigation plans are established at the local or enterprise level, in collaboration with our internal stakeholders and suppliers as appropriate. Case study: During Hurricane Irma, our facilities in Melbourne and St. Augustine experienced availability and delivery issues for diesel fuel required to power emergency generators as a result of limited supply, high-demand and damaged infrastructure caused by the storm. A decision based on our risk mitigation strategy included leveraging our geographically diverse supply base in order to coordinate alternative sources of supply from outside of the impacted area in order to continue operational continuity of our facilities.
Investment in R&D	Yes	Climate-related risks and opportunities can have a direct impact on 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. One example of a low-carbon future technology is the development of a space-based solar power system. Northrop Grumman has provided a significant investment in a partnership with the California Institute of Technology (Caltech) for the development of the Space Solar Power Initiative. This program brings together our top engineers with researchers from Caltech to develop scientific and technological innovations to enable a space-based solar power system capable of generating electric power at cost parity with grid-connected fossil fuel power plants. In 2015, Northrop Grumman provided \$17.5 million to support this project and continues to collaborate with the Caltech team to develop solutions, build prototypes and obtain experimental and numerical validation concepts that could allow for the development and eventual implementation of new deep space solar technology.
Operations	Yes	Our strategy is influenced by the fact that 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. During annual planning for these events, our robust Business Continuity Program deploys an array of preventative and active measures that help to mitigate and adapt to impacts from natural and/or environmental disasters on our employees, operations, and physical infrastructure. Furthermore, we consider these risks in our new building design and construction. 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. We are also aware that policy and legal risks such as climate-related regulations could have a material adverse effect on our reputation and our financial position, results of operations, and/or cash flows. We have implemented a net zero by 2035 greenhouse gas goal to anticipate these risks, and we are also implementing additional strategies in parallel. For example, a substantial business decision made as a result of integration of climate-related issues, specifically related to greenhouse gas emissions reductions, was the decision to look beyond just our goals and minimize our impact to the environment as our operations expand. This is being accomplished through investing in clean energy, building our portfolio of both onsite and offsite solar projects to support decarbonization. In 2021, we completed installation of a 1.1 MW onsite solar array at our facility in Rolling Meadows, Illinois and explored onsite solar opportunities with 15 other Northrop Grumman campuses.

**C3.4**

**(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.**

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Indirect costs Capital expenditures Assets	Our business is subject to disruption caused by natural and/or environmental disasters that could adversely affect our revenues, indirect costs, profitability, assets 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 such as 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. On an annual basis, 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. As described in C2.3a Risk #1, proactive assessments and planning for Hurricane Irma resulted in a low impact on our Melbourne, Florida operations. As outlined in C2.4a Opportunities #1 and #2, Northrop Grumman drives resource efficiency through capital expenditures required to achieve environmental sustainability program goals and objectives as well as to reduce operating costs. This includes expenditures for energy efficiency, LEED certified buildings, onsite renewable energy systems, water conservation, and solid waste diversion. In 2021, our execution of 48 greenhouse gas emissions-reductions projects across the company will reduce annual emissions by approximately 3,137 MTCO2e; these projects have an average payback of 6 years. Project examples include HVAC replacements, lighting upgrades, building controls systems, and installations of variable frequency drives (VFDs). In addition, sixteen of our buildings, representing 2.2 million sq. ft. of the company's footprint, is has achieved a LEED or Energy Star rating.

**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

**Year target was set**

2021

**Target coverage**

Company-wide

**Scope(s)**

Scope 1

Scope 2

**Scope 2 accounting method**

Market-based

**Scope 3 category(ies)**

<Not Applicable>

**Base year**

2019

**Base year Scope 1 emissions covered by target (metric tons CO2e)**

272950

**Base year Scope 2 emissions covered by target (metric tons CO2e)**

489232

**Base year Scope 3 emissions covered by target (metric tons CO2e)**

<Not Applicable>

**Total base year emissions covered by target in all selected Scopes (metric tons CO2e)**

762182

**Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1**

100

**Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2**

100

**Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)**

<Not Applicable>

**Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes**

100

**Target year**

2030

**Targeted reduction from base year (%)**

50

**Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]**

381091

**Scope 1 emissions in reporting year covered by target (metric tons CO2e)**

259321

**Scope 2 emissions in reporting year covered by target (metric tons CO2e)**

466514

**Scope 3 emissions in reporting year covered by target (metric tons CO2e)**

<Not Applicable>

**Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)**

725835

**% of target achieved relative to base year [auto-calculated]**

9.53761699961426

**Target status in reporting year**

New

**Is this a science-based target?**

No, and we do not anticipate setting one in the next 2 years

**Target ambition**

<Not Applicable>

**Please explain target coverage and identify any exclusions**

Our target is company-wide and covers 100% of our Scope 1 and 2 emissions.

**Plan for achieving target, and progress made to the end of the reporting year**

We have set a target to reduce 50% of Scope 1 and Scope 2 emissions by 2030. This interim target will support progress towards our Net Zero Operations by 2035 goal. To achieve this target, we will continue to emphasize efficiency of our operations and equipment, invest in low and zero carbon energy solutions, including renewable energy, and incentivize operations-related emissions reductions through the company's non-financial metrics. For example, in 2021, we implemented 75 GHG and energy reduction projects expected to reduce 7,110 MT of CO2e annually. These projects included investments in energy efficiency projects, like HVAC equipment upgrades and LED lighting upgrades. We also are continuing to invest in renewable energy projects. The development process has begun on the 62.5 megawatt solar facility in Orange County, Virginia that Dominion Energy is constructing as a part of our 15-year virtual power purchase agreement (VPPA), signed in 2020. In 2021, a 1.1 megawatt onsite

solar array was also installed at our facility in Rolling Meadows, Illinois, and explored onsite solar opportunities with 15 other Northrop Grumman campuses. As a result, we are moving forward with four additional renewable energy projects in 2022.

**List the emissions reduction initiatives which contributed most to achieving this target**

<Not Applicable>

---

## C4.2

---

**(C4.2) Did you have any other climate-related targets that were active in the reporting year?**

Target(s) to increase low-carbon energy consumption or production

Net-zero target(s)

### C4.2a

---

**(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.**

**Target reference number**

Low 1

**Year target was set**

2021

**Target coverage**

Company-wide

**Target type: energy carrier**

Electricity

**Target type: activity**

Consumption

**Target type: energy source**

Renewable energy source(s) only

**Base year**

2019

**Consumption or production of selected energy carrier in base year (MWh)**

1485704

**% share of low-carbon or renewable energy in base year**

1.5

**Target year**

2030

**% share of low-carbon or renewable energy in target year**

50

**% share of low-carbon or renewable energy in reporting year**

1.6

**% of target achieved relative to base year [auto-calculated]**

0.206185567010309

**Target status in reporting year**

New

**Is this target part of an emissions target?**

Yes, this target is associated with our Absolute ghg emissions reduction target (Abs1) and both are aligned with our Net Zero 2035 target (NZ1)

**Is this target part of an overarching initiative?**

Other, please specify (NGC Next Generation Sustainability Goals)

**Please explain target coverage and identify any exclusions**

This target includes all electricity usage (MWh) across the company.

**Plan for achieving target, and progress made to the end of the reporting year**

We continue to look for and execute on renewable energy projects that will contribute to achieving 50% renewable electricity by 2030, including virtual power purchase agreements and onsite solar generation.

**List the actions which contributed most to achieving this target**

<Not Applicable>

---

### C4.2c

---



**(C4.2c) Provide details of your net-zero target(s).**

**Target reference number**

NZ1

**Target coverage**

Company-wide

**Absolute/intensity emission target(s) linked to this net-zero target**

Abs1

**Target year for achieving net zero**

2035

**Is this a science-based target?**

No, and we do not anticipate setting one in the next 2 years

**Please explain target coverage and identify any exclusions**

This goal covers Scope 1 and Scope 2 emissions for all buildings and facilities within which we have operational control.

**Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?**

Yes

**Planned milestones and/or near-term investments for neutralization at target year**

We currently anticipate that approximately 10% of emissions that have not been otherwise eliminated will require additional neutralization action in the target year.

**Planned actions to mitigate emissions beyond your value chain (optional)**

**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*	48	3137
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 category & Initiative type**

Energy efficiency in buildings	Other, please specify (Energy Efficiency in Building services)
--------------------------------	--

**Estimated annual CO2e savings (metric tonnes CO2e)**

2250

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 1

Scope 2 (location-based)

Scope 2 (market-based)

**Voluntary/Mandatory**

Voluntary

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

569686

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

3566461

**Payback period**

4-10 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 3,518 MT CO<sub>2</sub>e are achieved through maintenance and other 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 6,367 MWh, and the approximate avoided natural gas usage is 9,465 therms. As outlined in our 2021 Sustainability Report, we realized total emissions reductions of 7,110 MT CO<sub>2</sub>e from energy efficiency (building services and production processes), maintenance and other activities in 2021.

**Initiative category & Initiative type**

Energy efficiency in production processes	Other, please specify (Includes process optimization, equipment upgrades, etc.)
---	---

**Estimated annual CO<sub>2</sub>e savings (metric tonnes CO<sub>2</sub>e)**

15

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 1

**Voluntary/Mandatory**

Voluntary

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

15000

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

0

**Payback period**

&lt;1 year

**Estimated lifetime of the initiative**

11-15 years

**Comment**

Process efficiency efforts include manufacturing changes. As outlined in our 2021 Sustainability Report, we realized total emissions reductions of 7,110 MT CO<sub>2</sub>e from energy efficiency (building services and production processes), maintenance and other activities in 2021.

**Initiative category & Initiative type**

Low-carbon energy generation	Solar PV
------------------------------	----------

**Estimated annual CO<sub>2</sub>e savings (metric tonnes CO<sub>2</sub>e)**

872

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 2 (market-based)

**Voluntary/Mandatory**

Voluntary

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

88087

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

0

**Payback period**

No payback

**Estimated lifetime of the initiative**

11-15 years

**Comment**

Low-carbon energy generation includes onsite solar installation. The approximate avoided electricity is 1,638 MWh.

**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 reducing greenhouse gas emissions, potable water use, and solid waste sent to landfill.
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 reducing greenhouse gas emissions, potable water use, and solid waste sent to landfill.
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 sent to landfill) is one of the Company's six non-financial metrics that influences the annual incentive compensation program and holds ourselves accountable.
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?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.

Level of aggregation

Product or service

Taxonomy used to classify product(s) or service(s) as low-carbon

No taxonomy used to classify product(s) or service(s) as low carbon

Type of product(s) or service(s)

Other	Other, please specify (Unmanned Aerial Vehicle)
-------	---

Description of product(s) or service(s)

Northrop Grumman's unmanned aerial vehicle, used for surveillance and reconnaissance, is designed to have a smaller fuselage on a bigger wingspan, creating better flying efficiency and lower emissions compared to traditional manned flights. Autonomous flight capabilities also help the system fly with greater efficiency than a human pilot and cruise at higher altitudes. Compared to the equivalent manned system, this UAS not only uses less fuel but also emits 34 times less carbon dioxide. One standard flight uses the equivalent of a 55,922-mile (nearly 90,000 km) car journey, while fuel consumption for its manned counterparts rockets to the equivalent of almost 2 million miles for a similar flight. This helps our customers reduce emissions significantly over the lifespan of the product.

Have you estimated the avoided emissions of this low-carbon product(s) or service(s)

Yes

Methodology used to calculate avoided emissions

Other, please specify (Comparative emissions between two products)

Life cycle stage(s) covered for the low-carbon product(s) or services(s)

Use stage

Functional unit used

One surveillance mission

Reference product/service or baseline scenario used

Equivalent manned system

Life cycle stage(s) covered for the reference product/service or baseline scenario

Use stage

Estimated avoided emissions (metric tons CO2e per functional unit) compared to reference product/service or baseline scenario

Explain your calculation of avoided emissions, including any assumptions

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year

C5. Emissions methodology

C5.1

(C5.1) Is this your first year of reporting emissions data to CDP?

No

C5.1a

(C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

Row 1

Has there been a structural change?

Yes, an acquisition

Yes, a divestment

Name of organization(s) acquired, divested from, or merged with

Orbital ATK Peraton, an affiliate of Veritas

Details of structural change(s), including completion dates

As of 2021, historical environmental data presented is now inclusive of the Orbital ATK acquisition in 2018 and reflects the IT Services divestiture that occurred in 2021 (Peraton).

C5.1b

(C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	No	<Not Applicable>

C5.1c

(C5.1c) Have your organization's base year emissions been recalculated as result of the changes or errors reported in C5.1a and C5.1b?

	Base year recalculation	Base year emissions recalculation policy, including significance threshold
Row 1	Yes	We have updated our base year from 2010 to 2019. This was to reflect our organizational changes, as well as to serve as the new baseline for our next-generation goals. As of 2021, historical environmental data presented is now inclusive of the Orbital ATK acquisition in 2018 as well as reflects the IT Services divestiture that occurred in 2021.

C5.2

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

Scope 1

**Base year start**  
January 1 2019

**Base year end**  
December 31 2019

**Base year emissions (metric tons CO2e)**  
272950

**Comment**

Scope 2 (location-based)

**Base year start**  
January 1 2019

**Base year end**  
December 31 2019

**Base year emissions (metric tons CO2e)**  
496661

**Comment**

Scope 2 (market-based)

**Base year start**  
January 1 2019

**Base year end**  
December 31 2019

**Base year emissions (metric tons CO2e)**  
489232

**Comment**

Scope 3 category 1: Purchased goods and services

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

Scope 3 category 2: Capital goods

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

25191

**Comment**

Does not include data from legacy Orbital ATK

**Scope 3 category 4: Upstream transportation and distribution**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

1108845

**Comment**

Does not include data from legacy Orbital ATK

**Scope 3 category 5: Waste generated in operations**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

2826

**Comment**

Does not include data from legacy Orbital ATK

**Scope 3 category 6: Business travel**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

165710

**Comment**

Does not include data from legacy Orbital ATK

**Scope 3 category 7: Employee commuting**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

172780

**Comment**

Does not include data from legacy Orbital ATK

**Scope 3 category 8: Upstream leased assets**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 9: Downstream transportation and distribution**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 10: Processing of sold products**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 11: Use of sold products**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 12: End of life treatment of sold products**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 13: Downstream leased assets**

**Base year start**

January 1 2019

**Base year end**

December 31 2019

**Base year emissions (metric tons CO2e)**

1318

**Comment**

Does not include data from legacy Orbital ATK

**Scope 3 category 14: Franchises**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 15: Investments**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3: Other (upstream)**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3: Other (downstream)**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**C5.3**

---

**(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.**

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

Other, please specify (IAEG Aerospace GHG Reporting Guidance)

## C6. Emissions data

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### 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)**  
259321

**Start date**  
January 1 2021

**End date**  
December 31 2021

**Comment**

**Past year 1**

**Gross global Scope 1 emissions (metric tons CO2e)**  
231719

**Start date**  
January 1 2020

**End date**  
December 31 2020

**Comment**

This figure is a minor restatement due to the historical data correction process capturing a more complete annual inventory for RY 2020.

**Past year 2**

**Gross global Scope 1 emissions (metric tons CO2e)**  
272950

**Start date**  
January 1 2019

**End date**  
December 31 2019

**Comment**

This figure is a minor restatement due to the historical data correction process capturing a more complete annual inventory for RY 2019.

### 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**

475706

**Scope 2, market-based (if applicable)**

466514

**Start date**

January 1 2021

**End date**

December 31 2021

**Comment**

**Past year 1**

**Scope 2, location-based**

478551

**Scope 2, market-based (if applicable)**

468931

**Start date**

January 1 2020

**End date**

December 31 2020

**Comment**

This figure is a minor restatement due to the historical data correction process capturing a more complete annual inventory for RY 2020.

**Past year 2**

**Scope 2, location-based**

496661

**Scope 2, market-based (if applicable)**

489232

**Start date**

January 1 2019

**End date**

December 31 2019

**Comment**

This figure is a minor restatement due to the historical data correction process capturing a more complete annual inventory for RY 2019.

**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 (mobile diesel, gasoline and propane) for all reporting sites comprises 1.2% 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.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Mobile diesel, gasoline, and propane usage accounted for 9,382 MT CO2e emissions in 2019 (current base year). Using an intensity metric of emissions per SF, we



estimate that our emissions from mobile emissions for small fleets would be 3,550 MT CO<sub>2</sub>e. Our total gross S1 + S2 emissions in 2019 was 762,182, therefore  $(3,550/762,182)*100 = 0.47\%$

---

**Source**

Non-utility fuel data for sites 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**

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.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Total stationary generator reporting (sites >100K or voluntary under the threshold) accounted for 8,813 MT CO<sub>2</sub>e emissions in 2019 (current base year). Using an intensity metric of emissions per total square feet, we estimate that our emissions from non-utility fuel data for sites <100k SF would be 3,335 MT CO<sub>2</sub>e. Our total gross S1 + S2 emissions in 2019 was 762,182, therefore  $(3,335/762,182)*100 = 0.44\%$

---

**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**

No emissions excluded

**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.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

1

**Explain how you estimated the percentage of emissions this excluded source represents**

Total process emissions (sites >100K or voluntary under the threshold) accounted for 7,006 MT CO<sub>2</sub>e emissions in 2019 (current base year). Using an intensity metric of emissions per total square feet, we estimate that our emissions from process emissions for sites <100k SF would be 6,672 MT CO<sub>2</sub>e. Our total gross S1 + S2 emissions in 2019 was 762,182, therefore  $(6,672/762,182)*100 = 0.88\%$ .

---

**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 2021. This category is continuously monitored and was reflected in the NGC GHG inventory that received limited assurance through third party verification.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

4

**Explain how you estimated the percentage of emissions this excluded source represents**

We averaged our 2019 and 2020 actual emissions from refrigerants to estimate our refrigerants as 3.6% for 2021.

---

**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.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Fire suppression system releases accounted for 1,075 MT CO<sub>2</sub>e emissions in 2019 (current base year). Our total gross S1 + S2 emissions in 2019 was 762,182, therefore  $(1,075/762,182)*100 = 0.1\%$ .

---

C6.5

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

**Purchased goods and services**

**Evaluation status**

Relevant, not yet calculated

**Emissions in reporting year (metric tons CO<sub>2</sub>e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

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

<Not Applicable>

**Please explain**

Northrop Grumman spent more than \$13 billion domestically on subcontractors during government fiscal year 2020. A total of \$4.8 billion was awarded to small business suppliers, representing 37.2% of our total domestic spend. We have a large supply chain that may be multiple levels deep and are exploring ways to calculate/estimate Scope 3 emissions for purchased goods and services.

**Capital goods**

**Evaluation status**

Relevant, not yet calculated

**Emissions in reporting year (metric tons CO<sub>2</sub>e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

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

<Not Applicable>

**Please explain**

Northrop Grumman spent more than \$13 billion domestically on subcontractors during government fiscal year 2020. A total of \$4.8 billion was awarded to small business suppliers, representing 37.2% of our total domestic spend. We have a large supply chain that may be multiple levels deep and are exploring ways to calculate/estimate Scope 3 emissions for capital goods.

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

**Evaluation status**

Relevant, calculated

**Emissions in reporting year (metric tons CO<sub>2</sub>e)**

32557

**Emissions calculation methodology**

Average data method

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

0

**Please explain**

Northrop Grumman calculated metric tonnes of CO<sub>2</sub>e 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 2019 nation-wide loss published by the EPA was approximately 4.7%. Based on Northrop Grumman's purchased electricity for 2021 (1,501,764,614 kWh), we calculated the amount of electricity that would have been needed to deliver those kWh taking into consideration a 4.7% loss. We then calculated the kWh that were lost during distribution and applied the eGRID 2019 U.S. average emission factor of 889.35 lb CO<sub>2</sub>e/kWh, which resulted in 32,557 metric tonnes of CO<sub>2</sub>e due to transmission and distribution loss.

## Upstream transportation and distribution

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

796022

### Emissions calculation methodology

Supplier-specific method

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

100

### Please explain

Northrop Grumman is an EPA SmartWay partner and utilizes ground shipment data collected, managed and provided by our partner logistics organization. The primary domestic shipment and mileage data is tracked through our partner's Freight Bill Audit & Payment (FBAP) system. The GWPs are consistent with our Scope 1 and Scope 2 emissions inventory and come from the IPCC Fourth Assessment Report (AR4). Our logistics partner applies the SmartWay program's emission factors based on classification of each carrier and mode type to the primary mileage data per shipment. Approximately 99.8% of the emissions reported in this category are covered by SmartWay carrier partners. This category of Scope 3 emissions includes only partial data coverage of legacy Orbital ATK sites.

## Waste generated in operations

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

5279

### Emissions calculation methodology

Waste-type-specific method

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

76

### Please explain

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 2021 as calculated by the EPA WARM model.

## Business travel

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

101307

### Emissions calculation methodology

Hybrid method

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

0

### Please explain

Data related to business travel is typically provided by Northrop Grumman's travel management system. This year, due to an expedited data collection timeline, actual data was not available and instead data was estimated based on three year averages of travel data. Activity data include number of hotel nights booked, rental car miles travelled and emissions, and the number of air and train miles travelled. The emissions from air and train travel are calculated using emission factors (EF) from the U.S. EPA Center for Corporate Climate Leadership GHG EF Hub. Emissions from hotel stays are calculated using the respective EF from Carbon Fund. Emissions from car rentals are provided by the car rental companies. The GWPs are consistent with our Scope 1 and 2 emissions inventory and come from the IPCC Fourth Assessment Report. The GHG inventory for business travel achieved Limited Assurance via Third Party Verification. This category remains low due to limitations on business travel during the COVID-19 pandemic.

## Employee commuting

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

288270

### Emissions calculation methodology

Average data method

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

3

### Please explain

Employee commuting accounts for the emissions associated with Northrop Grumman employee travel 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 provided by People Analytics and includes all active NG employees. 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. That value is then multiplied by the emission factor to determine the total commuting emissions. Although employee commuting patterns may have been impacted by COVID, we have maintained our methodologies and assumptions.

## Upstream leased assets

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

### Please explain

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

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

### Please explain

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

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

### Please explain

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

Relevant, not yet calculated

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

### Please explain

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 and, as such, detail around the use of those products by our military customers is not disclosed to manufacturers, such as Northrop Grumman. Currently, the lack of available information in this category for defense companies makes calculating emissions unworkable at this time.

## End of life treatment of sold products

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

### Please explain

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

### Emissions in reporting year (metric tons CO2e)

1605

### Emissions calculation methodology

Average data method

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

### Please explain

As of December 2021, Northrop Grumman had approximately 51 million square feet of floor space of which approximately 232,000 square feet were 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 eGRID2019, we calculated GHG emissions from downstream leased assets.

## Franchises

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

### Please explain

Northrop Grumman does not own or operate franchises.

## Investments

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

### Please explain

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

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

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

<Not Applicable>

### Please explain

**Other (downstream)**

**Evaluation status**

Please select

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

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

<Not Applicable>

**Please explain**

C6.5a

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**(C6.5a) Disclose or restate your Scope 3 emissions data for previous years.**

**Past year 1**

**Start date**

January 1 2020

**End date**

December 31 2020

**Scope 3: Purchased goods and services (metric tons CO2e)**

**Scope 3: Capital goods (metric tons CO2e)**

**Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)**

23185

**Scope 3: Upstream transportation and distribution (metric tons CO2e)**

768411

**Scope 3: Waste generated in operations (metric tons CO2e)**

2125

**Scope 3: Business travel (metric tons CO2e)**

62388

**Scope 3: Employee commuting (metric tons CO2e)**

253358

**Scope 3: Upstream leased assets (metric tons CO2e)**

**Scope 3: Downstream transportation and distribution (metric tons CO2e)**

1476

**Scope 3: Processing of sold products (metric tons CO2e)**

**Scope 3: Use of sold products (metric tons CO2e)**

**Scope 3: End of life treatment of sold products (metric tons CO2e)**

**Scope 3: Downstream leased assets (metric tons CO2e)**

**Scope 3: Franchises (metric tons CO2e)**

**Scope 3: Investments (metric tons CO2e)**

**Scope 3: Other (upstream) (metric tons CO2e)**

**Scope 3: Other (downstream) (metric tons CO2e)**

**Comment**

Past year 2

Start date

January 1 2019

End date

December 31 2019

Scope 3: Purchased goods and services (metric tons CO2e)

Scope 3: Capital goods (metric tons CO2e)

Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)  
25191

Scope 3: Upstream transportation and distribution (metric tons CO2e)  
1108845

Scope 3: Waste generated in operations (metric tons CO2e)  
2826

Scope 3: Business travel (metric tons CO2e)  
165710

Scope 3: Employee commuting (metric tons CO2e)  
172780

Scope 3: Upstream leased assets (metric tons CO2e)

Scope 3: Downstream transportation and distribution (metric tons CO2e)  
1318

Scope 3: Processing of sold products (metric tons CO2e)

Scope 3: Use of sold products (metric tons CO2e)

Scope 3: End of life treatment of sold products (metric tons CO2e)

Scope 3: Downstream leased assets (metric tons CO2e)

Scope 3: Franchises (metric tons CO2e)

Scope 3: Investments (metric tons CO2e)

Scope 3: Other (upstream) (metric tons CO2e)

Scope 3: Other (downstream) (metric tons CO2e)

Comment

C-CG6.6

(C-CG6.6) Does your organization assess the life cycle emissions of any of its products or services?

	Assessment of life cycle emissions	Comment
Row 1	No, but we plan to start doing so within the next two years	

C6.7

(C6.7) Are carbon dioxide emissions from biogenic 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**

0.00002033

**Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)**

725835

**Metric denominator**

unit total revenue

**Metric denominator: Unit total**

35667000000

**Scope 2 figure used**

Market-based

**% change from previous year**

8.48

**Direction of change**

Increased

**Reason for change**

Growth of our real estate and production operations as well as employees returning to onsite work after significant pandemic-driven reductions in 2020 contributed to the increase in emissions in 2021. The 2020 net combined Scope 1 and 2 emissions have been adjusted since RY 2020 for increased accuracy and completeness, and that figure is 689,651 MTCO2e. Company sales also decreased by approximately 3% from the previous year due to a \$2.2 billion reduction in sales related to the IT services divestiture, which was offset by higher sales at Space and Mission Systems, partially offset by lower sales at Aeronautics Systems and Defense Systems.

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**Intensity figure**

0.014203096

**Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)**

725835

**Metric denominator**

square foot

**Metric denominator: Unit total**

51104000

**Scope 2 figure used**

Market-based

**% change from previous year**

4.78

**Direction of change**

Increased

**Reason for change**

Growth of our real estate and production operations as well as employees returning to onsite work after significant pandemic-driven reductions in 2020 contributed to the increase in emissions in 2021. The 2020 net combined Scope 1 and 2 emissions have been adjusted since RY 2020 for increased accuracy and completeness, and that figure is 689,651 MTCO2e. Square footage represents owned and leased square footage and excludes subleased space as reported in the Annual Report.

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## C7. Emissions breakdowns

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### C7.1

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

Yes

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### 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	252857	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	122	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	324	IPCC Fourth Assessment Report (AR4 - 100 year)
HFCs	4144	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify (CF4)	123	IPCC Fourth Assessment Report (AR4 - 100 year)
SF6	1238	IPCC Fourth Assessment Report (AR4 - 100 year)
NF3	53	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify (Methylene Chloride)	0.17	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify (C2F6)	416	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify (C4F8)	44	IPCC Fourth Assessment Report (AR4 - 100 year)
Other, please specify (Chloroform)	0	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	257832
United Arab Emirates	0
Japan	0
Republic of Korea	27
Saudi Arabia	0
Belgium	26
Germany	495
Denmark	0
France	476
United Kingdom of Great Britain and Northern Ireland	195
Italy	125
Netherlands	56
Australia	0
Norway	0.002
Canada	89
Poland	0

## 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)
Aeronautics Systems	47241
Mission Systems	69421
Enterprise Services	5185
Defense Systems	32921
Space Systems	104553

## 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)
Canada	8	8
United States of America	467851	458659
United Arab Emirates	55	55
Japan	79	79
Republic of Korea	129	129
Saudi Arabia	37	37
Belgium	12	12
Switzerland	1	1
Germany	4438	4438
Denmark	30	30
France	182	182
United Kingdom of Great Britain and Northern Ireland	766	766
Italy	1160	1160
Netherlands	38	38
Norway	0.2	0.2
Australia	759	759
Poland	161	161

**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 (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Aeronautics Systems	99897	99723
Defense Systems	82553	82196
Enterprise Services	8130	1235
Mission Systems	133943	132536
Space Systems	151182	150825

**C7.9**

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

Increased

**C7.9a**

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

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	1050	Decreased	0.25	Northrop Grumman completed the installation of a rooftop solar panel system at its Rolling Meadows facility early in 2021. The RECs generated by this system will be sold to the state of Illinois as a part of their Illinois Shines initiative; Northrop Grumman purchased 2,155 MWh of replacement RECs to match the system's electricity output. This REC purchase is in addition to our annual REC purchase of 20,857 MWh. We account for the associated emissions reductions using the eGRID2019 emission factors. We continue to operate four other small on-site solar power systems at our sites. Emissions reductions associated with minor fluctuations in annual solar output and eGRID emission factor variance are negligible. The total gross S1 + S2 market based emissions reported to CDP in RY 2020 was 414,903 MT CO2e, therefore $(1,050/414,903) * 100 = 0.25\%$ total reduction in emissions due to additional renewable energy consumption.
Other emissions reduction activities	7110	Decreased	1.71	We implemented 75 GHG and energy reduction projects expected to reduce 7,110 MT of CO2e. This includes 1,200 MT in HVAC equipment upgrades and 1,890 MT in LED lighting upgrades. The total gross S1 + S2 market based emissions reported to CDP in RY 2020 was 414,903 MT CO2e, therefore $(7,110/414,903) * 100 = 1.71\%$ total reduction in emissions due to emissions-reduction activities."
Divestment	4147	Decreased	1	As of 2021, historical Scope 1 and Scope 2 data presented now excludes an IT Services divestiture that occurred in 2021. Since 2021 data for the divestiture was not collected, the reduction amount has been estimated based off of the footprint of the divestiture in 2020. The total gross S1 + S2 market based emissions reported to CDP in RY 2020 was 414,903 MT CO2e, therefore $(4,147/414,903) * 100 = 1.00\%$ total reduction in emissions due to divestment.
Acquisitions	252485	Increased	60.85	As of 2021, historical Scope 1 and Scope 2 data presented is now inclusive of the Orbital ATK acquisition. Orbital ATK data was excluded through year-end 2020 to close out our previous goal period. The total gross S1 + S2 market based emissions reported to CDP in RY 2020 was 414,903 MT CO2e, therefore $(252,485/414,903) * 100 = 60.85\%$ total increase in emissions due to the acquisition.
Mergers		<Not Applicable >		Not applicable
Change in output	70754	Increased	17.05	Growth of our real estate and production operations as well as employees returning to onsite work after significant pandemic-driven reductions in 2020 contributed to the increase in emissions in 2021. The total gross S1 + S2 market based emissions reported to CDP in RY 2020 was 414,903 MT CO2e, therefore $(70,754/414,903) * 100 = 17.05\%$ total increase in emissions due to change in output.
Change in methodology		<Not Applicable >		Not applicable
Change in boundary		<Not Applicable >		Not applicable
Change in physical operating conditions		<Not Applicable >		Not applicable
Unidentified		<Not Applicable >		Not applicable
Other		<Not Applicable >		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?**  
Market-based

**C-CG7.10**

**(C-CG7.10) How do your total Scope 3 emissions for the reporting year compare to those of the previous reporting year?**  
Increased

**C-CG7.10a**

**(C-CG7.10a) For each Scope 3 category calculated in C6.5, specify how your emissions compare to the previous year and identify the reason for any change.**

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

### Direction of change

Increased

### Primary reason for change

Acquisitions

### Change in emissions in this category (metric tons CO<sub>2</sub>e)

9372

### % change in emissions in this category

40.42

### Please explain

Legacy Orbital ATK data was included in our Fuel and energy-related activities calculation in 2021, but was not included in 2020, therefore the amount of electricity derived from the grid in 2021 (1,501,765 MWh) is greater than that of 2020 (1,069,439 MWh). Emissions from this category are derived from Transmission & Distribution loss associated with electricity delivered from the grid, and more MWh purchased from the grid also increases the associated emissions corresponding from grid delivery. The nation-wide loss factor provided by the Energy Information Agency remained unchanged between RY2020 and RY2021, because eGRID2019 emission factors were applied to both reporting years.

## Upstream transportation and distribution

### Direction of change

Increased

### Primary reason for change

Change in output

### Change in emissions in this category (metric tons CO<sub>2</sub>e)

27611

### % change in emissions in this category

3.59

### Please explain

Data coverage for this category includes only partial data coverage of legacy Orbital ATK in both 2020 and 2021. The emissions increase is associated with fluctuations in modes of transportation based on business activity.

## Waste generated in operations

### Direction of change

Increased

### Primary reason for change

Acquisitions

### Change in emissions in this category (metric tons CO<sub>2</sub>e)

3154

### % change in emissions in this category

148.43

### Please explain

Legacy Orbital ATK data was included in our Waste generated in operations calculation in 2021, but was not included in 2020, therefore the tons of material sent to landfill in RY2021 compared to RY2020 is significantly larger, resulting in increased emissions from decomposition in landfill.

## Business travel

### Direction of change

Increased

### Primary reason for change

Other, please specify (Increase in activity)

### Change in emissions in this category (metric tons CO<sub>2</sub>e)

38919

### % change in emissions in this category

62.38

### Please explain

Business travel was significantly lower than historical levels in 2020 due to COVID-19 pandemic related travel restrictions imposed by Northrop Grumman. 2021 has seen a return of some business travel activity, but is still limited to lower than pre-pandemic levels. Due to an expedited data collection timeline for RY2021, actual data was not yet available and instead data was estimated based on three year averages of travel data. This data will be adjusted to reflect actual values before the 2022 reporting cycle. 2020 business travel data is inclusive of legacy Orbital ATK data because it was integrated into the Northrop Grumman business travel system in 2020, and we were unable to separate the heritage NG data from Orbital ATK for RY2020 reporting.

## Employee commuting

### Direction of change

Increased

### Primary reason for change

Other, please specify (Increase in headcount)

### Change in emissions in this category (metric tons CO2e)

34912

### % change in emissions in this category

13.78

### Please explain

Total emissions from employee commuting increased over last year as we calculate employee commuting emissions based on employee headcount, which increased in 2021. 2020 data is inclusive of Orbital ATK because a change to our reporting systems prevented its exclusion from RY2020 reporting. Reported emissions for this category may be higher than actuals because we did not discount for less employees commuting onsite due to a larger virtual workforce during the COVID-19 pandemic.

## Downstream leased assets

### Direction of change

Increased

### Primary reason for change

Other, please specify (Reduction in downstream leased square footage)

### Change in emissions in this category (metric tons CO2e)

129

### % change in emissions in this category

8.73

### Please explain

Emissions in this category are directly tied to square footage leased to a third party by the company. Legacy Orbital ATK data was included in our Downstream leased assets calculation in 2021, but was not included in 2020, therefore our reported subleased square footage increased from 189,000 square feet in 2020 to 232,000 square feet in 2021.

## 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 undertook this energy-related activity in the reporting year
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 (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	Unable to confirm heating value	0	1342853	1342853
Consumption of purchased or acquired electricity	<Not Applicable>	23611	1501765	1525375
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>	690	<Not Applicable>	690
Total energy consumption	<Not Applicable>	24301	2844618	2868918

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	No
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.**

**Sustainable biomass**

**Heating value**

Please select

**Total fuel MWh consumed by the organization**

**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**

**Other biomass**

**Heating value**

Please select

**Total fuel MWh consumed by the organization**

**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**

**Other renewable fuels (e.g. renewable hydrogen)**

**Heating value**

Please select

**Total fuel MWh consumed by the organization**

**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**

**Coal**

**Heating value**

Please select

**Total fuel MWh consumed by the organization**

**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**

**Oil**

**Heating value**

Please select

**Total fuel MWh consumed by the organization**

**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**

**Gas**

**Heating value**

Unable to confirm heating value

**Total fuel MWh consumed by the organization**

1226643

**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**

This is inclusive of our stationary natural gas usage.

**Other non-renewable fuels (e.g. non-renewable hydrogen)**

**Heating value**

Unable to confirm heating value

**Total fuel MWh consumed by the organization**

116209

**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**

This is inclusive of all other combustion of fuels, not including stationary natural gas.

**Total fuel**

**Heating value**

Please select

**Total fuel MWh consumed by the organization**

1342853

**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) 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	690	690	690	690
Heat	0	0	0	0
Steam	0	0	0	0
Cooling	0	0	0	0



## C8.2e

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

**Sourcing method**

Unbundled energy attribute certificates (EACs) purchase

**Energy carrier**

Electricity

**Low-carbon technology type**

Solar

**Country/area of low-carbon energy consumption**

United States of America

**Tracking instrument used**

US-REC

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

20857

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

United States of America

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)**

2019

**Comment**

**Sourcing method**

Unbundled energy attribute certificates (EACs) purchase

**Energy carrier**

Electricity

**Low-carbon technology type**

Wind

**Country/area of low-carbon energy consumption**

United States of America

**Tracking instrument used**

US-REC

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

2155

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

United States of America

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)**

2010

**Comment**

## C8.2g

(C8.2g) Provide a breakdown of your non-fuel energy consumption by country.

**Country/area**

Canada

**Consumption of electricity (MWh)**

407

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

407

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

**Country/area**

United States of America

**Consumption of electricity (MWh)**

1482018

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

1482018

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

United Arab Emirates

**Consumption of electricity (MWh)**

92

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

92

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Japan

**Consumption of electricity (MWh)**

159

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

159

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Republic of Korea

**Consumption of electricity (MWh)**

225

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

225

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Saudi Arabia

**Consumption of electricity (MWh)**

49

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

49

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Belgium

**Consumption of electricity (MWh)**

63

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

63

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Switzerland

**Consumption of electricity (MWh)**

32

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

32

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Germany

**Consumption of electricity (MWh)**

9305

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

9305

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Denmark

**Consumption of electricity (MWh)**

0

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

0

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

France

**Consumption of electricity (MWh)**

2976

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

2976

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

United Kingdom of Great Britain and Northern Ireland

**Consumption of electricity (MWh)**

3605

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

3605

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Italy

**Consumption of electricity (MWh)**

2886

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

2886

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

---

Netherlands

**Consumption of electricity (MWh)**

93

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

93

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Norway

**Consumption of electricity (MWh)**

14

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

14

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Australia

**Consumption of electricity (MWh)**

922

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

922

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Poland

**Consumption of electricity (MWh)**

207

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

207

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

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**C-CG8.5**

**(C-CG8.5) Does your organization measure the efficiency of any of its products or services?**

	Measurement of product/service efficiency	Comment
Row 1	Yes	

---

**C-CG8.5a**

**(C-CG8.5a) Provide details of the metrics used to measure the efficiency of your organization's products or services.**

**Category of product or service**

Other, please specify (Unmanned Aerial Vehicle)

**Product or service (optional)**

**% of revenue from this product or service in the reporting year**

**Efficiency figure in the reporting year**

**Metric numerator**

Please select

**Metric denominator**

Please select

**Comment**

Northrop Grumman's unmanned aerial vehicle, used for surveillance and reconnaissance, is designed to have a smaller fuselage on a bigger wingspan, creating better flying efficiency and lower emissions compared to traditional manned flights. Autonomous flight capabilities also help the system fly with greater efficiency than a human pilot and cruise at higher altitudes. Compared to the equivalent manned system, this UAS not only uses less fuel but also emits 34 times less carbon dioxide. One standard flight uses the equivalent of a 55,922-mile (nearly 90,000 km) car journey, while fuel consumption for its manned counterparts rockets to the equivalent of almost 2 million miles for a similar flight. This helps our customers reduce emissions significantly over the lifespan of the product.

**C9. Additional metrics**

**C9.1**

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

**Description**

Waste

**Metric value**

49.1

**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**

5.2

**Direction of change**

Decreased

**Please explain**

We track percentage of solid (non-hazardous) waste within our operational boundary that is diverted from landfill via alternative disposal methods. Orbital ATK data was excluded from our reported data through year-end 2020 to close out our previous goal period. As of 2021, historical data presented is now inclusive of the Orbital ATK acquisition. Our diversion rate in RY2020, with Orbital ATK data and data corrections, was 51.8%. Our diversion rate in RY2021 was 49.1%, a 5.2% decrease from the previous year  $(49.1-51.8)/51.8*100 = 5.2\%$ . In 2022, we set a goal to strengthen our leadership in operational footprint reduction through setting and achieving pioneering targets in environmental stewardship by 2025 including potable water use and solid waste to landfill

**Description**

Other, please specify (Water)

**Metric value**

1422103584

**Metric numerator**

Total Potable Water Withdrawals (in gallons)

**Metric denominator (intensity metric only)**

**% change from previous year**

7.7

**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. Orbital ATK data was excluded from our reported data through year-end 2020 to close out our previous goal period. As of 2021, historical data presented is now inclusive of the Orbital ATK acquisition. Our water footprint in RY2020, with Orbital ATK data and data corrections, was 1.32B gallons, whereas our RY2021 usage was 1.42B gallons, a 7.7% increase from the previous year  $(1.42B-1.32B)/1.32B*100 = 7.7\%$ . In 2022, we set a goal to strengthen our leadership in operational footprint reduction through setting and achieving pioneering targets in environmental stewardship by 2025 including potable water use and solid waste to landfill

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	Northrop Grumman provided a significant investment in a partnership with the California Institute of Technology (Caltech) for the development of the Space Solar Power Initiative. This program brings together our top engineers with researchers from Caltech to develop scientific and technological innovations to enable a space-based solar power system capable of generating electric power at cost parity with grid-connected fossil fuel power plants. In 2015, Northrop Grumman provided \$17.5 million to support this project and continues to collaborate with the Caltech team to develop solutions, build prototypes and obtain experimental and numerical validation concepts that could allow for development and eventual implementation of new deep space solar technology.

### C-CG9.6a

(C-CG9.6a) Provide details of your organization's investments in low-carbon R&D for capital goods products and services over the last three years.

**Technology area**

Renewable energy

**Stage of development in the reporting year**

Basic academic/theoretical research

**Average % of total R&D investment over the last 3 years**

≤20%

**R&D investment figure in the reporting year (optional)**

**Comment**

### 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 emissions, and attach the relevant statements.

**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**

2021-NG-Verification-Statement.pdf

**Page/ section reference**

2

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

#### C10.1b

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

**Scope 2 approach**

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**

2021-NG-Verification-Statement.pdf

**Page/ section reference**

2

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

---

**Scope 2 approach**

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**

2021-NG-Verification-Statement.pdf

**Page/ section reference**

2

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

---

## C10.1c

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

**Scope 3 category**

Scope 3: Business travel

**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**

2021-NG-Verification-Statement.pdf

**Page/section reference**

2

**Relevant standard**

ISO14064-3

**Proportion of reported emissions verified (%)**

100

---

## C10.2

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(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?

No, we do not verify any other climate-related information reported in our CDP disclosure

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## C11. Carbon pricing

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### C11.1

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**(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

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

No

### C11.3

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**(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

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### C12.1

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

Yes, our suppliers

Yes, our customers/clients

Yes, other partners in the value chain

### C12.1a

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**(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 operational emissions (Scopes 1 & 2)

**% of suppliers by number**

3.5

**% total procurement spend (direct and indirect)**

0.5

**% of supplier-related Scope 3 emissions as reported in C6.5**

100

**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 99.8% 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. The impact of the engagement with SmartWay shipping carriers can be quantified by the average CO<sub>2</sub>/mile versus that of non-SmartWay carriers, based on supplier emission factors provided by the EPA. In 2021, the SmartWay carriers averaged approximately 0.00159 metric tons CO<sub>2</sub>/mile, whereas the non-SmartWay carriers averaged 0.00245 metric tons CO<sub>2</sub>/mile; this results in a 35% avoidance in greenhouse gas emissions per mile by proactively selecting SmartWay carrier partners. We consider this engagement successful because more than 95% of our ground shipments are completed using SmartWay carriers. This metric provides us a solid foundation off which we are able to expand engagement with our transportation suppliers to identify other efficiencies including consolidating efficiencies and integrating sustainability requirements into our contracts.

**Comment**

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## C12.1b

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

#### Type of engagement & Details of engagement

Education/information sharing	Run an engagement campaign to education customers about your climate change performance and strategy
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#### % of customers by number

85

#### % of customer - related 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, 85% 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, Boeing, and Airbus request to disclose climate-related activity via the CDP Supply Chain Program and communicating our climate priorities directly to our Government customers to better understand how our climate priorities align and to identify opportunities to support our mutual ambitions around climate. We also engage directly with climate-focused offices within federal agencies.

#### Impact of engagement, including measures of success

Engaging in these climate-related requests and discussions has been impactful because it has enabled us to engage with 85% (based on sales) of our customer base, particularly those directly focused on sustainability-related policies. 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.

## C12.1d

### (C12.1d) 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.

## C12.2

### (C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?

No, but we plan to introduce climate-related requirements within the next two years

## C12.3

### (C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?

#### Row 1

#### Direct or indirect engagement that could influence policy, law, or regulation that may impact the climate

Yes, we engage directly with policy makers

Yes, we engage indirectly through trade associations

Yes, we engage indirectly by funding other organizations whose activities may influence policy, law, or regulation that may significantly impact the climate

#### Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?

No, and we do not plan to have one in the next two years

#### Attach commitment or position statement(s)

<Not Applicable>

#### Describe the process(es) your organization has in place to ensure that your engagement activities are consistent with your overall climate change strategy

Northrop Grumman ensures that our engagements are consistent with the company's overall climate strategy through collaboration and regular updates with leadership and stakeholder engagement groups within our organization, with our external stakeholders, and through our larger public and private partnerships. Internally, we engage with the board committees described in question 2 of this questionnaire, the Corporate Sustainability Officer, the Vice Presidents of Operations/Quality (Environmental Sustainability Executive Sponsors), Environmental, Health and Safety Leadership Committee (ELC), the Facilities Working Group (FWG), Government Relations, and Communications, among others. These organizations collaboratively monitor state and local regulations and proposals related to environmental policy, including providing guidance through facility operations management team meetings on these policies. Close coordination across the company provides the environmental sustainability program with further insights into local and state policy activities and also provide the Government Relations team a go-to resource for environmental sustainability topics. Environmental technical experts also maintain regular communication with Northrop Grumman representatives serving within industry groups to ensure the activities are consistent with the company's climate strategy.

#### Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

#### Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

<Not Applicable>

## C12.3a

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**(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?**

**Focus of policy, law, or regulation that may impact the climate**

Mandatory climate-related reporting

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

Executive Order 14030 – Climate-Related Financial Risk

**Policy, law, or regulation geographic coverage**

National

**Country/region the policy, law, or regulation applies to**

United States of America

**Your organization's position on the policy, law, or regulation**

Neutral

**Description of engagement with policy makers**

Following the issuance of EO 14030, a number of government agencies, including Department of Defense issued requests for information to the public to better understand the ESG related activities of its stakeholders as part of its planning process to comply with the requirements of this Executive Order. Northrop Grumman provided comment on the public docket to the Department of Defense as a way to share information and support the DoD in their planning process related to the development or updating of any associated acquisition requirements.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

No, we have not evaluated

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## C12.3b

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**(C12.3b) Provide details of the trade associations your organization engages with which are likely to take a position on any policy, law or regulation that may impact the climate.**

**Trade association**

Business Roundtable

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

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. Northrop Grumman actively participates in the Business Roundtable. In particular, we engage in conversations around the subject of climate change and other environmental priorities and the development of comments and position statements. For example, in 2021, the Business Roundtable released a Call to Action from global businesses in support of climate action that enhances competitiveness. This statement outlined seven actions that BRT recommends governments take to support delivery on their commitments under the Paris Agreement on climate change. These actions included prioritizing international cooperation on GHG reductions; promoting effective carbon pricing across regions; investing in innovation; and aligning frameworks for climate risk disclosures, among other things.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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## C12.3c

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**(C12.3c) Provide details of the funding you provided to other organizations in the reporting year whose activities could influence policy, law, or regulation that may impact the climate.**

**Type of organization**

Non-Governmental Organization (NGO) or charitable organization

**State the organization to which you provided funding**

Aerospace Industries Association

**Funding figure your organization provided to this organization in the reporting year (currency as selected in C0.4)**

443286.08

**Describe the aim of this funding and how it could influence policy, law or regulation that may impact the climate**

Northrop Grumman is a member of Aerospace Industries Association (AIA) and retains a position on the Executive Committee of this organization. AIA engages on a variety of issues. As a member of AIA, Northrop Grumman participates in a number of different topic areas including those related to climate and environment. Within the Environmental Committee of AIA, Northrop Grumman provides input on global environmental and climate policy as well as related policy areas and proposed rules.

**Have you evaluated whether this funding is aligned with the goals of the Paris Agreement?**

No, we have not evaluated

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**C12.4**

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(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**

Other, please specify (2022 TCFD Report )

**Status**

Complete

**Attach the document**

20220330-Northrop-Grumman-TCFD-Report\_Final.pdf

**Page/Section reference**

pp3-32

**Content elements**

Governance

Strategy

Risks & opportunities

Emissions figures

Emission targets

Other metrics

**Comment**

---

**Publication**

In mainstream reports

**Status**

Complete

**Attach the document**

2021-Annual-Report-Northrop-Grumman-1.pdf

**Page/Section reference**

9, 19-20

**Content elements**

Risks & opportunities

Emission targets

Other metrics

**Comment**

---

**Publication**

In other regulatory filings

**Status**

Complete

**Attach the document**

2022-Proxy-Statement-Northrop-Grumman.pdf

**Page/Section reference**

14, 26-27, 48-50, 58

**Content elements**

Governance

Emission targets

Other metrics

**Comment**

---

**Publication**

In voluntary sustainability report

**Status**

Complete

**Attach the document**

2021-NG-Sustainability-Report\_Final.pdf

**Page/Section reference**

7-14, 68-70

**Content elements**

Governance

Strategy

Risks & opportunities

Emissions figures

Emission targets

Other metrics

**Comment**

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C15. Biodiversity

C15.1

**(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?**

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	No, and we do not plan to have both within the next two years	<Not Applicable>	<Not Applicable>

C15.2

**(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?**

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments only	Other, please specify (Expand Technology for Conservation (T4C) initiatives in proximity to Northrop Grumman's U.S. locations by 2030, in collaboration with external partners.)	<Not Applicable>

C15.3

**(C15.3) Does your organization assess the impact of its value chain on biodiversity?**

	Does your organization assess the impact of its value chain on biodiversity?	Portfolio
Row 1	No, and we do not plan to assess biodiversity-related impacts within the next two years	<Not Applicable>

C15.4

**(C15.4) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?**

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity-related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water protection Land/water management Species management Education & awareness

C15.5

**(C15.5) Does your organization use biodiversity indicators to monitor performance across its activities?**

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	Yes, we use indicators	Other, please specify (Number of Northrop Grumman sites with Technology for Conservation projects)

C15.6

**(C15.6) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
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C16. 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.**

C16.1

**(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.**

	Job title	Corresponding job category
Row 1	VP and Chief Sustainability Officer	Chief Sustainability Officer (CSO)

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 aerospace and defense company. We use our broad portfolio of capabilities and technologies to create and deliver innovative platforms, systems and solutions in space; manned and autonomous airborne systems; including strike; strategic deterrence systems; hypersonic; missile defense; weapons systems; cyber; command, control, communications and computers, intelligence, surveillance and reconnaissance (C4ISR); and logistics and modernization. We participate in many high-priority defense and government programs in the United States and globally. 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 in 2008 to reduce the company's environmental footprint by improving operational efficiency and integrating environmental sustainability practices into all our operations. Our Environmental Sustainability Program strives to expand environmental sustainability awareness throughout our organization, supporting our corporate values and meeting the expectations of our diverse set of stakeholders. This program 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. All quantitative data in this response represents Northrop Grumman prior to the acquisition of Orbital ATK.

SC0.1

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

	Annual Revenue
Row 1	35667000000

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).**

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

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**(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 broad portfolio of capabilities and technologies deliver innovative platforms, systems and solutions in space; manned and autonomous airborne systems; including strike; strategic deterrence systems; hypersonic; missile defense; weapons systems; cyber; command, control, communications and computers, intelligence, surveillance and reconnaissance (C4ISR); 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

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

SC2.2

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

No

SC4.1

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

No, I am not providing data

Submit your response

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**In which language are you submitting your response?**

English

**Please confirm how your response should be handled by CDP**

	I understand that my response will be shared with all requesting stakeholders	Response permission
Please select your submission options	Yes	Public

**Please confirm below**

I have read and accept the applicable Terms