Alphabet

CDP Climate Change Response 2023

Published August 2023

C0. Introduction

C0.1

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

This is our 17th consecutive year responding to the CDP Climate Change questionnaire. We began calculating our annual carbon footprint in 2006. Every year since 2009, we've publicly reported the results to CDP.

Our mission to organize the world's information and make it universally accessible and useful is as relevant today as it was when we were founded in 1998. Since then, we've evolved from a company that helps people find answers to a company that also helps people get things done.

At Google, we have a unique opportunity to help lead the transition to a more sustainable future by making information accessible and by driving innovation forward.

Alphabet is a collection of businesses — the largest of which is Google. We report Google in two segments, Google Services and Google Cloud; we also report all non-Google businesses collectively as Other Bets.

Google Services

We have always been committed to building helpful products that can improve the lives of millions of people worldwide. Google Services' core products and platforms include ads, Android, Chrome, hardware, Gmail, Google Drive, Google Maps, Google Photos, Google Play, Search, and YouTube, with broad and growing adoption by users around the world.

Google Cloud

Google Cloud Platform provides leading technology in cybersecurity; data, analytics, AI, and machine learning; and infrastructure. Google Workspace's easy-to-use and secure communication and collaboration tools, which include apps like Gmail, Docs, Drive, Calendar, Meet, and more, enable secure hybrid work, boosting productivity and collaboration.

Our Class A stock has been listed on the Nasdaq Global Select Market under the symbol “GOOG” since August 19, 2004 and under the symbol "GOOGL" since April 3, 2014. Prior to August 19, 2004, there was no public market for our stock. Our Class B stock is neither listed nor traded. Our Class C stock has been listed on the Nasdaq Global Select Market under the symbol “GOOG” since April 3, 2014.

Our headquarters are located in Mountain View, California. We own and lease office facilities and data centers around the world, primarily in North America, Europe, and Asia. We own and operate data centers in the U.S., Europe, South America, and Asia.

As of December 31, 2022, Alphabet had 190,234 employees. Our revenues for the fiscal year ended on December 31, 2022 were $282.8 billion, approximately 99% of which came from the Google Services and the Google Cloud segments.

As used herein, "Alphabet," "the company," "we," "us," "our," and similar terms include Alphabet Inc. and its subsidiaries, unless the context indicates otherwise.

Throughout this report, we use the term “sustainability” to refer to environmental sustainability.

References to information in this report should not be construed as a characterization regarding the materiality of such information to our financial results or our operations. While certain matters discussed in this report may be significant, any significance should not be read as necessarily rising to the level of materiality used for the purposes of complying with applicable securities laws and regulations. The information in this report may contain projections, future estimates, plans, expectations, goals, and other forward-looking statements. Forward-looking statements are based on current expectations and assumptions that are subject to certain risks and uncertainties, which could cause our actual results to differ materially from those reflected in the forward-looking statements. Any changes in methodology may result in material changes to our calculations and may result in the current and previous periods, including our base year, to be adjusted. Except as required by law, we undertake no obligation to correct, revise, or update any information included in this report.

All reported values represent the best data available at time of publication. Where actual data is not available, we may use estimates. We base our estimates and methodologies on historical experience, available information, and on various other assumptions that we believe to be reasonable. All environmental data found in this report is subject to measurement uncertainties resulting from limitations inherent in the nature and the methods used for determining such data. The selection of different but acceptable measurement techniques can result in materially different measurements. The precision of different measurement techniques may also vary. As we improve our methodologies and as new information becomes available, we may continue to revise our estimates and assumptions. Methodology changes may include changes in a calculation, improvements in the quality of data, new activity types for greater data granularity, and updates to available supplier reported data. Such updates may result in material changes to our calculations and may also result in adjustments made to the current and previous periods, including our base year.

Carbon and energy metrics have been rounded.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data and indicate whether you will be providing emissions data for past reporting years.

Reporting year

Start date
January 1 2022

End date
December 31 2022

Indicate if you are providing emissions data for past reporting years
No

Select the number of past reporting years you will be providing Scope 1 emissions data for
<Not Applicable>

Select the number of past reporting years you will be providing Scope 2 emissions data for
<Not Applicable>

Select the number of past reporting years you will be providing Scope 3 emissions data for
<Not Applicable>

C0.3

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

Argentina
Australia
Austria
Belgium
Brazil
Canada
Chile
China
Colombia
Croatia
Czechia
Denmark
Finland
France
Germany
Ghana
Greece
Hong Kong SAR, China
Hungary
India
Indonesia
Ireland
Israel
Italy
Japan
Kenya
Lithuania
Malaysia
Mexico
Netherlands
New Zealand
Nigeria
Norway
Peru
Philippines
Poland
Portugal
Republic of Korea
Romania
Russian Federation
Singapore
Slovakia
South Africa
Spain
Sweden
Switzerland
Taiwan, China
Thailand
Turkey
Ukraine
United Arab Emirates
United Kingdom of Great Britain and Northern Ireland
United States of America

C0.4

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

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your 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	GOOGL
Yes, a Ticker symbol	GOOG

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 or committee	Responsibilities for climate-related issues
Board-level committee	Oversight of environmental sustainability primarily resides with the Audit and Compliance Committee of Alphabet's Board of Directors, which reviews and discusses with management our risk exposures, including those related to environmental sustainability, which can include climate-related issues. As an example of a climate-related decision made by Alphabet's Board of Directors: In 2020, at the recommendation of the Audit and Compliance Committee, Alphabet's Board of Directors approved the issuance of $5.75 billion in sustainability bonds—the largest sustainability or green bond issuance by any company in history at the time. The proceeds from these sustainability bonds funded ongoing and new projects that are environmentally or socially responsible. In January 2022, we adopted an ESG Bonus for members of Alphabet's senior executive team, including each of the following executive officers: Senior Vice President, Chief Financial Officer; SVP, Knowledge and Information, Google; Senior Vice President, Chief Business Officer, Google; and President, Global Affairs, Chief Legal Officer and Secretary, Alphabet and Google (ESG Participants). The Leadership Development, Inclusion and Compensation Committee of Alphabet's Board of Directors (the Compensation Committee) is responsible for determining payout of the ESG Bonus for each ESG Participant, in conjunction with the CEO's review of company-wide performance and individual contributions made by each ESG Participant. As an example of a decision made by the Compensation Committee: In 2022, to acknowledge the central role each ESG Participant played, both as individuals and as a group, in advancing progress toward Alphabet's Environmental and Social goals, the Compensation Committee decided to align the amounts of the 2022 ESG Bonus payouts for the ESG Participants.

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	Overseeing and guiding employee incentives Monitoring the implementation of a transition plan Monitoring progress towards corporate targets Reviewing and guiding the risk management process	<Not Applicable>	Board oversight: Oversight of environmental sustainability primarily resides with the Audit and Compliance Committee of Alphabet's Board of Directors, which reviews and discusses with management our risk exposures, including those related to environmental sustainability, which can include climate-related issues. The Leadership Development, Inclusion and Compensation Committee of Alphabet's Board of Directors (the Compensation Committee) is responsible for determining payout of the ESG Bonus for each ESG Participant, in conjunction with the CEO's review of company-wide performance and individual contributions made by each ESG Participant. The ESG Participants are members of Alphabet's senior executive team, including each of the following executive officers: Senior Vice President, Chief Financial Officer; SVP, Knowledge and Information, Google; Senior Vice President, Chief Business Officer, Google; and President, Global Affairs, Chief Legal Officer and Secretary, Alphabet and Google. Climate-related issues may also be added to the agenda for meetings of Alphabet's full Board of Directors on an as-needed basis. Our Chief Financial Officer (CFO) keeps the Audit and Compliance Committee of Alphabet's Board of Directors apprised of climate-related issues, and raises these issues on an as-needed basis. Management oversight: In 2022, Google evolved its approach to sustainability governance by creating a Sustainability Focus Area, an internal team led by our SVP of Learning and Sustainability that provides centralized management oversight of sustainability and climate-related issues. The Sustainability Focus Area includes the Chief Sustainability Officer and executives from across the company with diverse skills, from teams such as operations, products, finance, marketing, legal, communications, and policy, among others. Through the Sustainability Focus Area, sustainability and climate ambitions are built into our company-wide goals, plans of action, management policies, performance objectives, and how we monitor progress. Climate-related issues are a topic for the majority of the Sustainability Focus Area's meetings.

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	We include questions about climate expertise in our Board's annual self-assessment questionnaire. Our Board is composed of highly experienced and diverse directors with extensive backgrounds as entrepreneurs, technologists, operational and financial experts, academics, scientists, investors, advisors, nonprofit board members, and government leaders. Our directors have experience serving as board members and/or advisors of various companies, organizations, educational institutions, and foundations, including The Aspen Institute, Climate Imperative Foundation, and the President's Council of Advisors on Science and Technology. One of our directors has also authored a book in 2021 about an action plan for solving the climate crisis and has funded a school of sustainability at a major university. For additional biographical information of our directors and information regarding the director selection process and qualifications, see the sections titled "Directors and Executive Officers" on pages 22-26 and pages 34-35 of Alphabet's 2023 Proxy Statement (https://abc.xyz/investor/static/pdf/2023_alphabet_proxy_statement.pdf).	<Not Applicable>	<Not Applicable>

C1.2

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

Position or committee
Chief Sustainability Officer (CSO)

Climate-related responsibilities of this position
Implementing a climate transition plan
Monitoring progress against climate-related corporate targets
Assessing climate-related risks and opportunities
Managing climate-related risks and opportunities

Coverage of responsibilities
<Not Applicable>

Reporting line
CEO reporting line

Frequency of reporting to the board on climate-related issues via this reporting line
Quarterly

Please explain
In 2022, Google evolved its approach to sustainability governance by creating a Sustainability Focus Area, an internal team led by our SVP of Learning and Sustainability that provides centralized management oversight of sustainability and climate-related issues.

The Sustainability Focus Area includes the Chief Sustainability Officer and executives from across the company with diverse skills, from teams such as operations, products, finance, marketing, legal, communications, and policy, among others. Through the Sustainability Focus Area, sustainability and climate ambitions are built into our company-wide goals, plans of action, management policies, performance objectives, and how we monitor progress.

Climate-related issues are a topic for the majority of the Sustainability Focus Area's meetings.

Our CSO and other leaders meet quarterly and as needed with our CFO to discuss climate-related issues. Our CFO keeps the Audit and Compliance Committee of Alphabet's Board of Directors apprised of climate-related issues, and raises these issues on an as-needed basis.

Our CSO leads sustainability across Google's worldwide operations, products, and supply chain, coordinating with data center, real estate, and product teams to ensure the company capitalizes on opportunities to strategically advance sustainability. Our CSO reports up to our SVP of Learning and Sustainability and provides updates as needed. The CSO oversees the global sustainability team, which leads much of Google's work on assessing and managing climate-related risks and opportunities, including programs such as carbon and environmental accounting and reporting, climate-related disclosures, partnerships and engagement, water, circular economy, biodiversity, sustainability data infrastructure, and regional sustainability.

Our CSO leads cross-functional strategy and collaboration with sustainability teams across the company—including teams such as real estate sustainability, data center sustainability, and consumer hardware sustainability, among others.

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	In January 2022, we adopted an Environmental, Social, and Governance Bonus (ESG Bonus) for members of Alphabet's senior executive team. The ESG Bonus provides individual participants with an annual cash bonus opportunity, based on contributions to the company's performance against environmental and social goals.

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
Corporate executive team

Type of incentive
Monetary reward

Incentive(s)
Bonus – set figure

Performance indicator(s)
Achievement of climate transition plan KPI
Progress towards a climate-related target
Achievement of a climate-related target

Incentive plan(s) this incentive is linked to
Short-Term Incentive Plan

Further details of incentive(s)
In January 2022, we adopted an Environmental, Social, and Governance Bonus (ESG Bonus) for members of Alphabet's senior executive team, including each of the following executive officers: Senior Vice President, Chief Financial Officer; SVP, Knowledge and Information, Google; Senior Vice President, Chief Business Officer, Google; and President, Global Affairs, Chief Legal Officer and Secretary, Alphabet and Google (ESG Participants).

The ESG Bonus provides individual participants with a maximum $2.0 million annual cash bonus opportunity, based on contributions to the company's performance against environmental and social goals. The ESG Bonus consists of two components – Environmental and Social – each with a maximum potential payout of $1.0 million. The Leadership Development, Inclusion and Compensation Committee is responsible for determining payout of the ESG Bonus for each ESG Participant, in conjunction with the CEO's review of company-wide performance and individual contributions made by each ESG Participant. For the Environmental component, key accomplishments include progress toward advancing carbon-free energy across our global operations.

Explain how this incentive contributes to the implementation of your organization's climate commitments and/or climate transition plan
As part of our goal to achieve net-zero emissions across all of our operations and value chain by 2030, we aim to reduce 50% of our combined Scope 1, Scope 2 market-based, and Scope 3 absolute emissions (versus our 2019 baseline) before 2030, and plan to invest in nature-based and technology-based carbon removal solutions to neutralize our remaining emissions. There are three main focus areas that make up our approach to our net-zero goal: reducing emissions across our operations and value chain, advancing carbon-free energy, and addressing our residual emissions with carbon removal. Advancing toward carbon-free energy is a KPI in our transition toward net-zero emissions. This ESG Bonus supports progress toward advancing carbon-free energy across our global operations, which is a key focus area as we work toward a more sustainable and carbon-free future.

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	1	8	In 2017, we conducted a Phase 2 assessment of Google's exposure to climate risk, which incorporated near-term climate projections (2020/2025). This represented a 1 to 8 year short-term time horizon.
Medium-term	8	34	In 2016, we conducted a Phase 1 assessment of Google's exposure to climate risk in the mid-term (2050) and long-term (2100). This represented a medium-term time horizon up to 34 years.
Long-term	34	84	In 2016, we conducted a Phase 1 assessment of Google's exposure to climate risk in the mid-term (2050) and long-term (2100). This represented a long-term time horizon up to 84 years.

C2.1b

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

We define “substantive financial or strategic impact” for the purpose of CDP reporting as climate-related risks and/or opportunities that have a strong possibility of occurring and would be important to our business, reputation, financial condition, and operating results. Examples of factors that can have a substantive impact include macro-economic, political, and event risks and opportunities, as well as business-specific risks and opportunities related to strategy and competition, all of which can be influenced by climate change. In determining whether a climate-related risk and/or opportunity is substantive for the purpose of CDP reporting, one metric we may consider is its quantitative impact relative to 5% of our net income.

Factors that could harm our business and operating results in material ways include: Changes in international and local social, political, economic, tax, and regulatory conditions or laws and policies governing a wide range of topics that may increase our cost of doing business, limit our ability to pursue certain business models, offer products or services in certain jurisdictions, or cause us to change our business practices. These same factors apply when identifying or assessing climate-related risks.

As an example, changes to energy policies and the availability of contractual structures that allow end-users to purchase renewable energy for their operations could have a substantive impact on our business. For example, the elimination of policies that enable corporate end users to purchase clean energy would make it more difficult for Google to meet its carbon-free energy goals by decreasing access to clean energy in states where we operate. This would mean we would have to find other alternatives to procure carbon-free energy, which could be more expensive or located outside of the grids where we operate.

Regarding energy costs specifically, we evaluate the net present value of entering into a renewable energy supply contract by comparing the business-as-usual scenario to energy costs under the long-term clean energy scenario. If we find that clean energy will significantly reduce the carbon intensity of our electricity supply and be more economical, these are very important inputs to identify a project as an opportunity as well as to decide whether or not to enter into a long-term contract. One of our risk mitigation activities is our work to procure renewable energy for our operations via long-term contracts with stable prices. From 2010 to 2022, we signed more than 80 agreements totaling approximately 10 gigawatts of clean energy generation capacity. Through these agreements, we estimate we’ll spend approximately $10 billion to purchase clean energy through 2040. This estimated spend is based on contracts signed to purchase clean energy for our operations. Actual spend may vary from these estimates based on changes in renewable electricity output from operational projects, the number of contracts signed, and energy market prices. Although we are unable to make precise estimates for this risk, changes to policies regarding corporate procurement of clean energy could have a substantive strategic impact on our business as well as on our goal of operating on 24/7 carbon-free energy by 2030.

C2.2

(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
Downstream

Risk management process
Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment
More than once a year

Time horizon(s) covered
Short-term
Medium-term
Long-term

Description of process
We consider activities that are short-, medium-, and long-term, spanning our direct operations, as well as activities upstream and downstream in our value chain. Several of these activities, such as renewable energy procurement and our urban ecology program, are assessed on an ongoing basis (i.e. more than once a year).

Description of process: On behalf of Google's SVP of Learning and Sustainability, our CSO collaborates with risk management and operations teams on a multi-disciplinary company-wide risk management process to ensure risks and opportunities are identified and evaluated across the company for mitigation of and adaptation to climate change.

Our Enterprise Risk Management (ERM) team is responsible for identifying, assessing, and reporting risks related to the company's operations, financial performance, and reputation. As with financial, operational, and strategic risks, the team assesses environmental risks as part of the company's overall risk management framework. The risks and opportunities identified through this process support public disclosures and inform Google's sustainability strategy. Our Chief Sustainability Officer and sustainability teams work to address risks by identifying opportunities to reduce the company's environmental impacts from its operations and value chain, and through improving climate resilience.

Geographical areas that could be considered in risk and opportunities management include Google's Bay Area headquarters, its major global office operations, and 24 global data center locations. The scope of the process considers regulatory risks due to climate change that could increase energy costs, across all of Alphabet's operations globally. Results of risk and opportunity assessments are reported to a cross-functional group of key internal stakeholders, including the Sustainability Focus Area that provides centralized management oversight of sustainability and climate-related issues.

Results are also reported to the CFO, who raises climate-related issues to the Board on an as needed basis.

Risks and opportunities are also assessed at an asset level by using the same models applied to both transition risks and physical risks. As an example, risks and opportunities are also assessed at a company-level by modeling likely future energy cost scenarios under climate change regulation, and applying these scenarios to estimate the cost impact to our overall operations.

For our global office locations, Google assesses risk and opportunity based on specific climate risk factors. To prioritize each risk and opportunity identified, we consider several factors including: its potential impact on our financial bottom line, its potential impact to our company's reputation, and progress towards our 24/7 carbon-free energy and greenhouse gas emissions reduction targets. We weigh these and other factors based on the risk/opportunity being prioritized.

As an example of a process used to identify climate-related risks, in 2020, Google conducted an updated climate risk assessment, building on the previous risk assessment that was conducted in 2017. This included climate scenario analysis, referencing RCP 4.5 and 8.5, and an assessment of the impact of flooding, water stress, extreme heat, and wildfires on 26 priority office sites and 23 data center locations. The key result of this scenario analysis was that increased exposure to extreme heat and flooding is likely to impact many of our global offices and data centers as early as 2030 (if not sooner). Since flooding and extreme heat emerged as critical climate risks that could have a significant impact on physical assets and occupants, they have been considered as part of the overall development strategy for Google's expanding footprint. As an example, we launched Google's Ecology Program in 2014 with the goal of enhancing ecological resilience, focusing on the following objectives: expanding wildlife habitat, creating diverse landscapes that can withstand the stresses of climate change, and restoring many of the ecological functions lost with the development of office parks across Silicon Valley. We leveraged cutting-edge science and data to create the Landscape Resilience Framework for ecological planning in the region, in partnership with the San Francisco Estuary Institute. We engaged with ecologists, landscape architects, planners, and local nongovernmental organizations to ensure that our outdoor environments would enhance the region's ecology over time. As a result, Google has planted 1.4 acres of native vegetation in our "Green Loop," added roughly 5.9 acres of riparian habitat and 1,800 native trees to the Charleston Retention Basin, and designed our Bay View site like a bay's edge, with large meadows, emergent and freshwater marsh, and one of the largest willow groves ever planted in the region. For more information on Google's Urban Ecology program, see: https://sustainability.google/operating-sustainably/stories/urban-ecology/

In 2022, we updated our climate risk assessment (including physical and transition risks) to align efforts with the company's overall enterprise risk management process as we continue to align our disclosures and adopt the recommendations of the TCFD. Evaluation is in progress and updates will be shared in our future reporting.

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	We closely monitor state and federal renewable energy and clean energy incentives and standards in the United States. We see these policies as critical to help drive low-carbon power sources where we have offices and data centers. An elimination of policies that support corporate clean energy purchasing would make it more difficult for Google to meet its carbon-free energy goal, by slowing deployment of clean energy and decreasing access to purchase it in states where we operate. As an example, we have closely monitored the establishment, extension, and implementation of federal clean energy incentives in the United States through the Inflation Reduction Act. Federal incentives and programs in the Inflation Reduction Act for deployment of clean energy technologies like solar, wind, geothermal, nuclear, energy storage, clean hydrogen, and carbon capture utilization and storage, among other technologies, provide essential support for accelerating decarbonization of grids where we operate. A rollback of these incentives could create challenges for corporate clean energy purchasing and impact our ability to meet our carbon-free energy goal.

	Relevance & inclusion	Please explain
Emerging regulation	Relevant, always included	We are subject to laws, regulations, and other measures that govern a wide range of topics, including those related to matters beyond our core products and services. For instance, new laws, regulations, policies, and international accords relating to ESG matters, including sustainability, climate change, human capital, and diversity, are being developed and formalized in Europe, the U.S., and elsewhere, which may entail specific, target-driven frameworks and/or disclosure requirements. We have implemented robust ESG programs, adopted reporting frameworks and principles, and announced a number of goals and initiatives. The implementation of these goals and initiatives may require considerable investments, and our goals, with all of their contingencies, dependencies, and in certain cases, reliance on third-party verification and/or performance, are complex and ambitious, may change, and we cannot guarantee that we will achieve them. Any failure, or perceived failure, by us to adhere to our public statements, comply fully with developing interpretations of ESG laws and regulations, or meet evolving and varied stakeholder expectations and standards could harm our business, reputation, financial condition, and operating results. As an example, we have few direct emissions of greenhouse gases relative to our indirect emissions, therefore we do not expect our operations to be directly impacted by regulatory and policy measures that limit GHG emissions, nor do we expect to participate in any current or future compliance markets for carbon trading, in the United States. Google could face the risk of increased costs of energy if a price on carbon is applied through legislation such as cap and trade (or other mechanisms such as taxation). Running our business requires us to use a lot of energy to power our data centers, offices, and other infrastructure. In 2022, our total energy consumption was more than 22 million MWh. To the extent that a price on carbon is applied through legislation and passed on to us from a regulated entity, the cost of running our operations would likely increase.
Technology	Relevant, always included	People access the Internet through a variety of platforms and devices that continue to evolve with the advancement of technology and user preferences. Google's data centers are the engine of our company powering products like Gmail, Google Cloud, Search, and YouTube for billions of people around the world. An example of a potential technology-related risk could be maintaining the environmental performance of our data centers as demand for digital products, and the amount of compute needed to power these applications, increases dramatically. We've worked for more than a decade to make Google data centers some of the most efficient in the world. We outfit each data center with high-performance servers that we've custom-designed to use as little energy as possible. We improve facility energy use by installing smart temperature and lighting controls and redesigning how power is distributed to reduce energy loss. We're also applying machine learning to drive energy efficiency even further and automatically optimize cooling. As a result, a Google-owned and -operated data center is, on average, more than 1.5 times as energy efficient as a typical enterprise data center. With AI at an inflection point, predicting the future growth of energy use and emissions from AI compute in our data centers is challenging. Historically, research has shown that as AI/ML compute demand has gone up, the energy needed to power this technology has increased at a much slower rate than many forecasts predicted. We have used tested practices to reduce the carbon footprint of workloads by large margins; together these principles have reduced the energy of training a model by up to 100x and emissions by up to 1000x. We plan to continue applying these tested practices and to keep developing new ways to make AI computing more efficient.
Legal	Relevant, sometimes included	Potential legal risks relate to climate-related litigation and/or penalties associated with non-compliance with new and emerging climate-related regulations. To mitigate this risk, we monitor current and emerging regulations to assess risks and ensure compliance. We also pursue many voluntary sustainability certifications that demonstrate that we're going beyond compliance. For example, we pursue and align with voluntary certifications for our operations and products, including the ISO 50001 certified energy management system for select data centers and the Leadership in Energy and Environmental Design (LEED) certifications for select offices. As an example, in 2022, we maintained our ISO 50001 certification for all Google-owned and -operated data centers in Europe that met our operational threshold for power usage. We also support greener electronics standards and certifications. In February 2017, the Nest Learning Thermostat became the first smart thermostat to achieve ENERGY STAR certification by the EPA.
Market	Relevant, sometimes included	In 2019, the National Bureau of Economic Research published a study on the long-term macroeconomic effects of climate change, which found that increases in average global temperatures could result in GDP per capita declines of up to 10.5% for the United States and 4.6% for the European Union by 2100 due to changes in labor productivity, among other factors. Throughout 2020, climate-related events including devastating floods, extreme droughts, and wildfires, impacted communities and caused economic disruptions around the world. Fluctuating socio-economic conditions due to climate change could have a negative impact on Google's revenue if they cause users to reduce the rate of economic transactions and thus cause advertisers to demand less online advertising. Alphabet generated more than 80% (more than $224 billion) of total revenues from online advertising in 2022. If, for example, all online economic activity decreased by 1%, it is hypothetically possible that we could experience a similar reduction in our share of this activity. However, it is very difficult to predict the magnitude or potential occurrence of this risk.
Reputation	Relevant, sometimes included	Our business depends on strong brands, and failing to maintain and enhance our brands would hurt our ability to expand our base of users, advertisers, customers, content providers, and other partners. Any failure, or perceived failure, by us to adhere to our public statements, comply fully with developing interpretations of ESG laws and regulations, or meet evolving and varied stakeholder expectations and standards could harm our business, reputation, financial condition, and operating results. Insufficiently addressing climate change risks and impacts could result in reduced demand for our goods and services because of negative reputation impact. The 2022 Best Global Brands report, produced independently by Interbrand, ranks Google as the fourth most valuable global brand. Negative reputation could result in a decrease in brand value and in a loss of future brand equity. This risk driver could have a negative impact on our brands. For example, Interbrand's 2022 Best Global Brands report estimates Google's brand value at approximately $252 billion. Using Interbrand's estimated brand value, a hypothetical reputational risk resulting in a 0.1% decrease in brand value could result in a loss of future brand equity of approximately $252 million. It is very difficult to predict the magnitude or potential occurrence of this risk, given the indirect nature of the relationship between climate change and online consumer economic activity.
Acute physical	Relevant, sometimes included	We have experienced and/or may in the future experience supply shortages, price increases, and/or longer lead times that could negatively affect our operations, driven by raw material, component availability, manufacturing capacity, labor shortages, industry allocations, logistics capacity, inflation, foreign currency exchange rates, tariffs, sanctions and export controls, trade disputes and barriers, geopolitical tensions, armed conflicts, natural disasters or pandemics, the effects of climate change (such as sea level rise, drought, flooding, heat waves, wildfires and resultant air quality effects and power shutoffs associated with wildfire prevention, and increased storm severity), power loss, and significant changes in the financial or business condition of our suppliers. The availability of our products and services and fulfillment of our customer contracts depend on the continuing operation of our information technology and communications systems. Our systems are vulnerable to damage, interference, or interruption from modifications or upgrades, terrorist attacks, natural disasters or pandemics, geopolitical tensions or armed conflicts, the effects of climate change (such as sea level rise, drought, flooding, heat waves, wildfires and resultant air quality effects and power shutoffs associated with wildfire prevention, and increased storm severity), power loss, telecommunications failures, computer viruses, ransomware attacks, computer denial of service attacks, phishing schemes, or other attempts to harm or access our systems. In 2020, we conducted an updated global assessment from our 2017 assessment, of near-term (2030) and mid-term (2050) climate risks, including the impacts of flooding, extreme heat and water stress, as well as a special focus on wildfires in applicable locations. Based on this updated assessment, we found exposure to flooding and extreme heat across the portfolio to be our biggest risks. Our 2020 assessment suggested that these trends are likely to increase and continue through the end of the century.
Chronic physical	Relevant, sometimes included	We must cool our data centers to keep them in operation, and the amount of energy needed to cool them is related to the outside air temperature. If global temperatures increase, this will increase the amount of energy required to cool our data centers and increase the cost of running our operations. Given that climate change is expected to increase average temperatures globally and we have facilities and operations around the world, this is a risk that we face at all of our facilities globally. In particular, this may impact our data centers located in warm climates, such as our data center in Singapore. As of December 31, 2022, Google had 24 data center locations across North America, South America, Europe, and Asia. To learn more about our data centers and their locations, see: https://www.google.com/about/datacenters/locations/ In general, we expect that our data center cooling costs will go up if there were an increase in cooling-degree-days due to increasing average temperatures. We are not able to predict the exact temperature increase, but if, for example, the number of cooling-degree-days increased by 10%, we would expect a noticeable rise in our cooling costs, assuming we were not further able to improve our energy efficiency. This would have a low-to-medium negative financial impact.

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

Emerging regulation	Other, please specify (Policy and legal: Increased pricing of GHG emissions)

Primary potential financial impact
Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
Description of risk: We have few direct emissions of greenhouse gases relative to our indirect emissions, therefore we do not expect our operations to be directly impacted by climate policy in the US, nor do we expect to participate in any current or future compliance markets for carbon trading in the US. Running our business requires us to use a lot of electricity to power our data centers, offices, and other infrastructure. We have offices and data centers in roughly 200 cities around the world, 24 data center locations, as well as more than 30 Google Cloud regions. We have data center locations in the US, Chile, Ireland, Netherlands, Denmark, Finland, Belgium, Taiwan, Japan, and Singapore. In 2022, our total energy consumption was more than 22 million MWh. Therefore, Google does face the risk of increased costs of energy if a price on carbon is applied through legislation such as cap and trade (or other mechanisms such as taxation).

Time horizon
Short-term

Likelihood
Unlikely

Magnitude of impact
Low

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

Potential financial impact figure (currency)
131000000

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

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

Explanation of financial impact figure
Potential financial impact figure & breakdown: As a hypothetical example, if a carbon price of e.g. $51/metric tonne were established through regulation (social cost of carbon recommended by the U.S. Federal Government), this could increase our costs by approximately $131 million, assuming these costs were passed through to electricity consumers and we were not further able to reduce our carbon footprint. This was calculated by adding our 2022 Scope 1 and 2022 Scope 2 market-based emissions, and then multiplying by the aforementioned carbon price example [= (2022 Scope 1 + market-based Scope 2) x $51]. The financial impact would likely be less as we already voluntarily purchase carbon credits. Note that this is a hypothetical example and not our actual internal carbon price.

Cost of response to risk
14000000

Description of response and explanation of cost calculation
Case study: As an example of a case study, we're minimizing our exposure to this risk by working to run the most efficient computing infrastructure in the world. Through efficiency innovations, we've managed to cut energy usage in our data centers so that we're using significantly less energy than the industry average. As a result, in 2022, the average annual PUE (power usage effectiveness) for our global fleet of data centers was 1.10, compared with the industry average of 1.55—meaning that Google data centers use about 5.5 times less overhead energy. We achieved this through the use of increasingly efficient power supplies, evaporative cooling technology, machine learning, and other innovations.

Timescale of implementation: Ongoing. We're constantly working on our data center efficiency efforts.

An additional risk mitigation activity is our work to procure renewable energy for our operations via long-term contracts with stable prices. From 2010 to 2022, we signed more than 80 agreements totaling approximately 10 GW of clean energy generation capacity.

Cost figure & breakdown: Though there is an up-front capital cost associated with our data center efficiency improvements, these projects have financial paybacks because they improve our energy efficiency and thus reduce our operational costs. Google has various longstanding and ongoing sustainability initiatives, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives, which can include data center energy efficiency. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives.

Comment

Identifier
Risk 2

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

Risk type & Primary climate-related risk driver

Reputation	Increased stakeholder concern or negative stakeholder feedback

Primary potential financial impact
Decreased revenues due to reduced demand for products and services

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
Our business depends on strong brands, and failing to maintain and enhance our brands would hurt our ability to expand our base of users, advertisers, customers, content providers, and other partners.

Any failure, or perceived failure, by us to adhere to our public statements, comply fully with developing interpretations of ESG laws and regulations, or meet evolving and varied stakeholder expectations and standards could harm our business, reputation, financial condition, and operating results.

Description of risk: We have always been a company committed to building helpful products that can improve the lives of millions of people. Our product innovations have made our services widely used, and our brand one of the most recognized in the world. Google Services' core products and platforms include ads, Android, Chrome, hardware, Gmail, Google Drive, Google Maps, Google Photos, Google Play, Search, and YouTube, each with broad and growing adoption by users around the world. Through our products and platforms that billions of users engage with every day, we're helping people make decisions that can drive positive action for our planet. Additionally, by organizing information about our planet and making it actionable through technology and platforms, we can help partners and customers create even more positive impact. Insufficiently addressing potential climate change risks and impacts could result in reduced demand for our goods and services due to negative reputation impact associated with limited transparency, among other factors. We discuss these risks and impacts and share how we're addressing them through our sustainability initiatives in our public disclosures, such as Alphabet's CDP Climate Change response and Google's Environmental Report, and via our website, sustainability.google. Through white papers, case studies, and blog posts, we work to establish transparency and share best practices to help others do the same.

The 2022 Best Global Brands report, produced independently by Interbrand, ranks Google as the fourth most valuable global brand, valued at approximately $252 billion. Negative reputation could result in a decrease in brand value and in a loss of future brand equity.

Time horizon
Medium-term

Likelihood
About as likely as not

Magnitude of impact
Medium

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

Potential financial impact figure (currency)
252000000

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

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

Explanation of financial impact figure
Potential financial impact figure & breakdown: This risk driver could have a negative impact on our brands. For example, the 2022 Best Global Brands report, produced independently by Interbrand, estimates Google's brand value at approximately $252 billion. Using Interbrand's estimated brand value, a hypothetical reputational risk resulting in a 0.1% decrease in brand value could result in a loss of future brand equity of approximately $252 million. It is very difficult to predict the magnitude or potential occurrence of this risk, given the indirect nature of the relationship between climate change and online consumer economic activity.

Cost of response to risk
14000000

Description of response and explanation of cost calculation
Case study: To mitigate potential negative reputational risks from insufficiently addressing climate risks and limited transparency, we continually strive to increase efficiency and reduce our impact on the environment, thereby helping our customers reduce their footprint as well by choosing our products and services. For over 10 years, we've been building and running some of the most efficient data centers in the world. All these efforts can have positive impacts on our reputation and potentially increase demand for Google's products and services. As an example of a case study, to increase transparency, build awareness of our sustainability initiatives, and help others looking to implement similar initiatives, we share our best practices through Google's Environmental Report, as well as through white papers and blog posts. In 2022, we published a white paper outlining details of the CFE Manager model, a new approach to clean energy procurement that can help a wide range of energy buyers streamline their clean energy purchasing. We share three case studies where Google recently signed CFE Manager agreements—in Virginia, Germany, and California—and discussed some contractual terms and issues that buyers pursuing these agreements should consider. As a result, these resources can help other companies and consumers envision how they too can set goals to move closer to 24/7 carbon-free energy and maximize their impact on grid decarbonization.

Timescale of implementation: Ongoing, We regularly publish case studies to help others adopt some of the approaches that have worked for us.

Cost figure & breakdown: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives, which can include efforts related to clean energy. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives.

Comment

Identifier
Risk 3

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

Risk type & Primary climate-related risk driver

Market	Changing customer behavior

Primary potential financial impact
Decreased revenues due to reduced demand for products and services

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
Alphabet generated nearly 80% of total revenues from online advertising in 2022. Advertisers pay Google for the ability to advertise via Google Search and other properties, YouTube, and Google Network partners' properties.

Description of risk: In 2019, the National Bureau of Economic Research published a study on the long-term macroeconomic effects of climate change, which found that increases in average global temperatures could result in GDP per capita declines of up to 10.5% for the United States and 4.6% for the European Union by 2100 due to changes in labor productivity, among other factors. As an example, throughout 2020, climate-related events including devastating floods, extreme droughts, and wildfires, impacted communities and caused economic disruptions around the world. Fluctuating socio-economic conditions due to climate change could have a negative impact on Google's revenue if it causes users to reduce the rate of economic transactions and thus causes advertisers to demand less online advertising.

Time horizon
Medium-term

Likelihood
Unlikely

Magnitude of impact
Medium

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

Potential financial impact figure (currency)
2240000000

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

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

Explanation of financial impact figure
Fluctuating socio-economic conditions could have a negative impact on Google's revenue if they cause users to reduce the rate of economic transactions and thus cause advertisers to demand less online advertising.

Potential financial impact figure & breakdown: It is difficult to predict the magnitude of this risk, given the indirect nature of the relationship between climate change and online consumer economic activity. That said, Alphabet generated over 80% (more than $224,000,000,000) of total revenues from online advertising in 2022. If, for example, all online economic activity decreased by 1%, it is hypothetically possible that we could experience a similar reduction in our share of this activity (i.e. $2,240,000,000).

Cost of response to risk
14000000

Description of response and explanation of cost calculation
Case study: Avoiding or minimizing climate change would help to minimize this risk. As an example of a case study, since Google was founded, our efforts to mitigate climate change have started with our own operations. Our long-standing data center efficiency efforts are important because our data centers represent the vast majority of our direct electricity use. To reduce their energy use, we strive to build the world's most energy-efficient computing network, outfitting each data center with high-performance servers that we've custom-designed to use as little energy as possible. As a result, our efforts have paid off. On average, a Google-owned and -operated data center is more than 1.5 times as energy efficient as a typical enterprise data center and, compared with five years ago, we now deliver approximately three times as much computing power with the same amount of electrical power. We've made significant investments in cleaner cloud computing by making our data centers among the most efficient in the world and sourcing more carbon-free energy. We're helping our customers make real-time decisions to reduce emissions, and mitigate climate risks with data and AI.

Timescale of implementation: Ongoing. We're constantly working on our data center efficiency efforts.

Cost figure & breakdown: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives, which can include data center energy efficiency. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives.

Comment

Identifier
Risk 4

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

Risk type & Primary climate-related risk driver

Current regulation	Other, please specify (Rollback of corporate clean energy procurement policies)

Primary potential financial impact
Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
Description of risk: An elimination of policies that enable corporate end users to purchase clean energy would make it more difficult for Google to meet its carbon-free energy goal by decreasing access to renewable energy in states where we operate. This would mean we would have to find other alternatives to procure carbon-free energy, which could be more expensive or located outside of the grids where we operate.

Running our business requires us to use a lot of energy to power our data centers, offices, and other infrastructure. We have data center locations in the US, Chile, Ireland, Netherlands, Denmark, Finland, Belgium, Taiwan, Japan, and Singapore. In 2022, our total energy consumption was more than 22 million MWh.

Our renewable energy contracts provide long-term power cost certainty. The price of renewable energy has decreased significantly since Google entered the renewable energy market over a decade ago. In 2020, we set a goal to operate on carbon-free energy 24/7 by 2030. Therefore, Google could face the risk of increased costs to meet its carbon-free energy goals if we have decreased access to procure renewable energy in places where we operate.

Time horizon
Short-term

Likelihood
More likely than not

Magnitude of impact
Medium

Are you able to provide a potential financial impact figure?
No, we do not have this figure

Potential financial impact figure (currency)
<Not Applicable>

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

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

Explanation of financial impact figure
We are unable to make precise estimates for this risk.

Cost of response to risk
14000000

Description of response and explanation of cost calculation
We have been working directly with federal and state policymakers, NGOs, and others in industry to provide support for strong climate policies.

Case study: As an example of a case study, members of Google's energy and public policy teams have engaged directly with policymakers from the U.S. (including the White House, the U.S. Congress and Governors), the European Union (EU), and other countries to call for policies that promote renewable energy and/or reduce carbon emissions. For example, in the U.S., Google filed comments on the Clean Hydrogen Production Standard draft guidance, in which we highlighted the need for strong quality criteria—hourly temporal correlation, geographic correlation, and additionality—to ensure that grid-based clean hydrogen is produced using clean electricity. In the EU, Google worked through Digital Europe and RE-Source to advocate for the inclusion of time-stamping for Guarantees of Origin in the EU Renewable Energy Directive, enabling hourly carbon-free energy matching and greater transparency of clean energy claims. As a result, Google organized an industry letter encouraging the European Commission to issue strong rules that maintain the environmental integrity of grid-based hydrogen production.

Timescale of implementation: Ongoing. Engagement on sustainability policy has been a top priority at Google for many years.

Cost figure & breakdown: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives, which can include engagement on renewable energy. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives.

Comment

Identifier
Risk 5

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

Risk type & Primary climate-related risk driver

Acute physical	Other, please specify (Increased severity of extreme weather events such as cyclones and floods)

Primary potential financial impact
Other, please specify (Increased capital costs)

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
Description of risk: The availability of our products and services and fulfillment of our customer contracts depend on the continuing operation of our information technology and communications systems. Our systems are vulnerable to damage, interference, or interruption from modifications or upgrades, terrorist attacks, natural disasters or

pandemics, geopolitical tensions or armed conflicts, the effects of climate change (such as sea level rise, drought, flooding, heat waves, wildfires and resultant air quality effects and power shutoffs associated with wildfire prevention, and increased storm severity), power loss, telecommunications failures, computer viruses, ransomware attacks, computer denial of service attacks, phishing schemes, or other attempts to harm or access our systems.

In 2020, we conducted an assessment of Google's exposure to climate risk in the near-term (2030) and mid-term (2050). The study found that, based on RCP 4.5 and 8.5, Google's global portfolio of offices and data centers is likely to experience increased exposure to extreme heat and flooding, including flooding from sea level rise, in both 2030 and 2050. This updated analysis incorporated both absolute risk exposure and business criticality of each location. Some of our high-growth office locations and data center sites are at high risk when mapped against anticipated climate risk factors. For example, many of Google's office buildings in the San Francisco Bay Area are located in the current 100-year floodplain and, therefore, are at risk to impacts from coastal flooding in the present day. Those risks will only be further exacerbated by sea level rise throughout the century. Coastal flooding, which will be worsened by rising sea levels, could have the following impacts on Google's facilities and operations: 1) Flood impacts to Google's buildings could result in damage to the structure, building equipment, and contents, as well as potential risks to employee safety, 2) Flood impacts to major roadways and other transportation routes may impact the ability of employees to get to work, and 3) On a more global scale, sea level rise and coastal flooding could impact Google's global supply chains and business operations.

Time horizon
Long-term

Likelihood
Likely

Magnitude of impact
Medium

Are you able to provide a potential financial impact figure?
No, we do not have this figure

Potential financial impact figure (currency)
<Not Applicable>

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

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

Explanation of financial impact figure
We are unable to make precise estimates for this risk.

Cost of response to risk
0

Description of response and explanation of cost calculation
We are actively evaluating climate risk over multiple time horizons. Flooding and extreme heat have been identified as climate risks that could have a significant impact on physical assets, and have been considered as part of the overall development strategy. To determine and manage the significance of climate-related risks in relation to other risks, we have evaluated several factors including: potential impact on our financial bottom line, potential impact to our company's reputation, and progress towards our 24/7 carbon-free energy and greenhouse gas emissions reduction targets. As a result, we are addressing risk through a number of ecological approaches.

Case study: As an example of a case study, when we launched Google's Ecology Program in 2014, our goal was to enhance ecological resilience. We leveraged cutting-edge science and data to create the Landscape Resilience Framework for ecological planning in the region, in partnership with the San Francisco Estuary Institute. We engaged with ecologists, landscape architects, planners, and local nongovernmental organizations to ensure that our outdoor environments would enhance the region's existing ecology over time. Together, we focused on the following objectives: expanding wildlife habitat, creating diverse landscapes that can withstand the stresses of climate change, and restoring many of the ecological functions lost with the development of office parks across Silicon Valley. As a result, Google has planted 1.4 acres of native vegetation in our "Green Loop," added roughly 5.9 acres of riparian habitat and 1,800 native trees to the Charleston Retention Basin, and designed our Bay View site like a bay's edge, with large meadows, emergent and freshwater marsh, and one of the largest willow groves ever planted in the region. For more information on Google's Urban Ecology program, see: https://sustainability.google/operating-sustainably/stories/urban-ecology/

Timescale of implementation: Ongoing

Cost figure: We are unable to make precise estimates for this risk, so we have put $0 for the cost of response to this risk.

Comment

Identifier
Risk 6

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

Risk type & Primary climate-related risk driver

Chronic physical	Other, please specify (Rising mean temperatures)

Primary potential financial impact
Increased indirect (operating) costs

Climate risk type mapped to traditional financial services industry risk classification
<Not Applicable>

Company-specific description
Description of risk: We must cool our data centers to keep them in operation, and the amount of energy needed to cool them is related to the outside air temperature. If global temperatures increase, this will increase the amount of energy required to cool our data centers and increase the cost of running our operations. Given that climate change is expected to increase average temperatures globally and we have facilities and operations around the world, this is a risk we face at all of our facilities globally. In particular, this may impact our data centers located in warm climates, such as our data center in Singapore.

As of December 31, 2022, Google had 24 data center locations across North America, South America, Europe, and Asia. To learn more about our data centers and their

locations, see: https://www.google.com/about/datacenters/inside/locations

Time horizon
Medium-term

Likelihood
Very likely

Magnitude of impact
Medium-low

Are you able to provide a potential financial impact figure?
No, we do not have this figure

Potential financial impact figure (currency)
<Not Applicable>

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

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

Explanation of financial impact figure
In general, we expect that our cooling costs will go up if there were an increase in cooling-degree-days due to increasing average temperatures. We are not able to predict the exact temperature increase, but if, for example, the number of cooling-degree-days increased by 10%, we would expect a noticeable rise in our cooling costs, assuming we were not further able to improve our energy efficiency. This would have a low-medium negative financial impact.

Potential financial impact figure: We are unable to make precise estimates for this risk.

Cost of response to risk
0

Description of response and explanation of cost calculation
Case study: As an example of a case study, while the risk to our business is low-medium, we are minimizing our exposure to this risk (as well as regulatory risk) by working to run the most efficient computing infrastructure in the world. Through efficiency innovations, we've cut energy usage in our data centers so that we're using significantly less energy than the industry average. As a result, in 2022, the average annual PUE (power usage effectiveness) for our global fleet of data centers was 1.10, compared with the industry average of 1.55. We achieved this through the use of increasingly efficient power supplies, evaporative cooling technology, machine learning, and other innovations.

In addition, because our data centers are located around the world, we minimize the risk that an unusually large increase in a particular region's temperature would force us to increase energy use and emissions in the most vulnerable locations or increase our costs disproportionately compared to the average global temperature increase.

Timescale of implementation: Ongoing. We're constantly working on our data center efficiency efforts.

Cost figure & breakdown: Though there is an upfront capital cost associated with our data center efficiency (and specifically cooling efficiency) improvements, these projects have financial paybacks because they improve our energy efficiency, reduce our emissions, and reduce our operational costs. From a net point of view, these improvements therefore come at zero net cost, so our cost of response to this risk is $0.

Comment

C2.4

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

C2.4a

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

Identifier
Opp1

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

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

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
Description of opportunity: Any regulation that imposes a price on carbon or regulates carbon emissions may incentivize customers to switch their technology infrastructure to Google Workspace and Google Cloud. We've made significant investments in cleaner cloud computing by making our data centers some of the most efficient in the world and sourcing more carbon-free energy. In 2022, we introduced the Carbon Sense Suite, which is enabling Google Cloud customers to accurately measure, report, and reduce their cloud-related carbon emissions. We're helping developers and organizations make low-carbon architecture decisions and provide best practices to improve sustainability. This could create additional demand for Google's existing products and/or services. An example of one such regulation that could impact our operations is the European Emissions Trading System (EU ETS) that regulates carbon emissions across several sectors of the European Economy. Google has data centers in Europe,

across Belgium, Denmark, Finland, Ireland, and the Netherlands. If a change in regulation under the EU ETS results in increased power prices for those purchasing higher-carbon electricity, then it may make switching to Google Cloud more attractive.

Time horizon
Short-term

Likelihood
About as likely as 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)
26300000

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

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

Explanation of financial impact figure
Potential financial impact figure & breakdown: If new carbon regulations are implemented, Google is in a position to grow its products and services as a Google-owned and -operated data center is, on average, more than 1.5 times as energy efficient as a typical enterprise data center. For illustrative purposes, if a new energy efficiency regulation resulted in a hypothetical advantage for Google Cloud and yielded an unpredictable 0.1% increase in Google Cloud revenue, based on our FY2022 Google Cloud revenue of approximately $26.3 billion, 0.1% would equate to approximately $26.3 million.

It is very difficult to predict the magnitude or potential occurrence of this opportunity.

Cost to realize opportunity
14000000

Strategy to realize opportunity and explanation of cost calculation
We've worked hard to minimize the environmental impact of our products and services and we continue to find new ways to reduce our impacts even further.

Case study: As an example of a case study, our data centers are some of the most efficient in the world. On average, a Google-owned and -operated data center is more than 1.5 times as energy efficient as a typical enterprise data center. In 2013, we became the first company in North America—and the only major internet company—to achieve a multi-site energy management system certification to ISO 50001. In 2022, we maintained our ISO 50001 certification for all Google-owned and -operated data centers in Europe that met our operational threshold for power usage. We're working to support transition of the world's power to more renewables like wind and solar. From 2010 to 2022, we signed more than 80 agreements totaling approximately 10 GW of clean energy generation capacity. As a result, we've made significant investments in cleaner cloud computing by making our data centers some of the most efficient in the world and sourcing more carbon-free energy. This could create additional demand for Google's existing products and/or services. In 2022, we introduced the Carbon Sense Suite, which includes products such as Carbon Footprint and Active Assist, and tools such as Cloud region picker. The suite is enabling Google Cloud customers to accurately measure, report, and reduce their cloud-related carbon emissions.

Timescale of implementation: Ongoing. We're constantly working on our data center efficiency efforts.

Cost figure & breakdown: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives, which can include efforts to drive cleaner cloud computing. As a rough estimate, this cost may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives.

Comment

Identifier
Opp2

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

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

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
Description of opportunity: Addressing climate change opportunities head on could result in an increased demand for our goods and services by positively impacting our reputation. We have always been a company committed to building helpful products that can improve the lives of millions of people. Our product innovations have made our services widely used, and our brand one of the most recognized in the world. Google Services' core products and platforms include ads, Android, Chrome, hardware, Gmail, Google Drive, Google Maps, Google Photos, Google Play, Search, and YouTube, each with broad and growing adoption by users around the world. Google Cloud includes Google's infrastructure and platform services, collaboration tools, and other services for enterprise customers. We own and lease office facilities and data centers around the world, primarily in North America, Europe, and Asia, including 24 data center locations across four continents. In 2022, we matched 100% of our global electricity use with purchases of renewable energy for the sixth year in a row, which could positively impact our reputation in regions where we operate.

In 2022, we helped more than 1 billion users make more sustainable choices through our products. We reached that through innovative solutions offered to users, including sustainability product features in Google Maps, Google Nest, and Google Travel.

Time horizon
Medium-term

Likelihood
About as likely as not

Magnitude of impact
Medium

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

Potential financial impact figure (currency)
282800000

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

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

Explanation of financial impact figure
Potential financial impact figure & breakdown: This opportunity driver could have a positive impact on our revenue. For illustrative purposes, if an increase in our reputation yielded an unpredictable 0.1% increase in revenue, based on our FY2022 revenue of $282.8 billion, 0.1% would equate to approximately $282.8 million.

It is very difficult to predict the magnitude or potential occurrence of this opportunity, given the indirect nature of the relationship between climate change and online consumer economic activity.

Cost to realize opportunity
14000000

Strategy to realize opportunity and explanation of cost calculation
Google works to accelerate the development of renewable energy by procuring renewable energy for our operations and through renewable energy investments; to promote electricity market reforms that unlock access to carbon-free power around the world; and to build and run some of the most efficient data centers in the world. As a result, all these efforts can have positive impacts on our reputation and potentially increase demand for Google's products and services.

Case study: We strive to make our processes more efficient and reduce our impact on the environment, thereby helping our customers reduce their footprints as well by choosing our products and services. We're making it easier to use Google Maps for sustainable commuting in urban areas, by providing mass transit options, bike routes, bike shares, and walking directions. As an example of a case study, as demand increases for information about alternative transportation options, there may be more users of Google Maps and Google Transit. By tapping on the Google Maps transit icon, individuals can get directions to their destination by bus, train, subway, and even ferry. We continue to add new features and cities to Google Maps to help people better understand and reduce their personal environmental impact. As a result, Google Maps provides, on average, more than 2 billion km of public transit results per day.

Timescale of implementation: Ongoing

Cost figure & breakdown: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives.

Comment

Identifier
Opp3

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

Primary climate-related opportunity driver
Development of new products or services through R&D and innovation

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
Description of opportunity: We're building products and tools that empower billions of people to better understand and reduce their personal environmental impact, help drive carbon mitigation efforts, and inform climate science. Google has developed Google Earth Engine (earthengine.google.com), a planetary scale platform for geospatial data analysis that brings together the world's environmental and Earth observation satellite imagery, and makes it available for analysis online globally. In 2022, Google Earth Engine was expanded for commercial use by businesses and governments as an enterprise-grade service through Google Cloud. Researchers from academic institutions, NGOs, and intergovernmental organizations have leveraged and built upon our tools for a wide variety of use cases from measuring habitat ranges to protecting forest and ocean ecosystems. We see an opportunity to help raise awareness about the physical changes to the Earth's natural resources and climate through Google Earth and other products, resulting in wide social benefits. The wider social benefits created by Google Earth may result in increased brand loyalty for Google.

Time horizon
Short-term

Likelihood
Virtually certain

Magnitude of impact
Medium

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

Potential financial impact figure (currency)
252000000

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

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

Explanation of financial impact figure
Google Earth Engine is a leading technology platform for planetary-scale environmental monitoring. If customers value Google Earth Engine as a tool to examine the physical changes to the Earth's natural resources and climate, this could result in increased customer loyalty or brand value.

Potential financial impact figure & breakdown: This opportunity driver could have a positive impact on our brands. For example, the 2022 Best Global Brands report, produced independently by Interbrand, estimates Google's brand value at approximately $252 billion. Using Interbrand's estimated brand value, a hypothetical increase in brand value of 0.1% could result in a gain of future brand equity of approximately $252 million via brand loyalty created by wider social benefits. It is very difficult to predict the magnitude or potential occurrence of this opportunity, given the indirect nature of the relationship between climate change and online consumer economic activity.

Cost to realize opportunity
14000000

Strategy to realize opportunity and explanation of cost calculation
Google Earth Engine was developed to bring together the world's satellite imagery and make it available online with tools for scientists, independent researchers, and nations.

Case study: We put Google technology to work helping others study and respond to environmental challenges. As an example of a case study, in 2018, Google launched the Environmental Insights Explorer (EIE)—an online tool that uses exclusive data sources and modeling capabilities in a freely available platform to help cities measure emission sources, run analyses, and identify strategies to reduce emissions. EIE makes actionable climate data available to more than 40,000 cities and regions worldwide. As a result, we've empowered city planners and policymakers with EIE to make it easier for cities to measure progress against their climate action plans. The cities of Hamburg, Germany; Hartford, Connecticut, United States; Kyoto, Japan; and Melbourne, Australia, are just a few leading examples of how access to innovative data sources for measuring and tracking impacts of GHG emissions helps cities act in a timely, effective way.

Timescale of implementation: Ongoing

Cost figure: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives. In addition to Google’s longstanding and ongoing initiatives in sustainability, some of the costs associated with our Earth Engine and Environmental Insights Explorer efforts are staff time to manage software development as well as data storage and processing (i.e. running scientific algorithms) in our data centers.

Comment

Identifier
Opp4

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Energy source

Primary climate-related opportunity driver
Shift toward decentralized energy generation

Primary potential financial impact
Returns on investment in low-emission technology

Company-specific description
Description of opportunity: With the rising need for energy, we expect renewable energy to play an integral part in the world's energy infrastructure. In addition to purchasing renewable energy for our own operations, we also make targeted investments in renewable energy. From 2010 to 2022, we entered into agreements to invest nearly $2.9 billion in renewable energy projects with an expected combined generation capacity of approximately 4.2 GW. By being an early investor and deploying smart capital to fund utility-scale projects, we have helped accelerate the deployment of the latest clean energy technologies and provided more capital for developers to build additional renewable projects. This is a global opportunity as there are renewable energy opportunities worldwide, across different geographies and technology types. We've invested in large scale renewable energy projects, as well as in funds that help to deploy solar PV panels on residential homes, where the falling costs of solar PV has made distributed generation much more economic.

Time horizon
Short-term

Likelihood
Very likely

Magnitude of impact
Medium

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

Potential financial impact figure (currency)
2900000000

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

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

Explanation of financial impact figure

The International Energy Agency published a roadmap for the global energy sector in 2021, which estimates that to reach net zero emissions across the global economy by 2050, annual clean energy investment worldwide will need to more than triple by 2030 to around $4 trillion. This presents a tremendous business opportunity for the private sector to help build a clean energy future.

Potential financial impact figure: In addition to purchasing renewable energy for our own operations, we also make targeted investments in renewable energy. From 2010 to 2022, we entered into agreements to invest nearly $2.9 billion in renewable energy projects with an expected combined generation capacity of approximately 4.2 GW. This figure represents the cumulative value of the investment agreements we've entered into from 2010 to 2022.

Cost to realize opportunity
14000000

Strategy to realize opportunity and explanation of cost calculation
Case study: As an example of a case study, in 2010, Google began investing in a clean energy future to help scale renewable energy solutions to meet society's long-term energy needs and to green electrical grids worldwide. Google aims to enable 5 GW of new carbon-free energy through investments in our key manufacturing regions by 2030. In 2022, we signed agreements to invest approximately $350 million to support 0.5 GW of renewable energy projects towards this 5 GW total. This builds on our long-standing track record in this space; From 2010 to 2022, we entered into agreements to invest nearly $2.9 billion in renewable energy projects with an expected combined generation capacity of approximately 4.2 GW. As a result, these investments help deploy renewable energy at scale.

Cost figure & breakdown: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives.

Comment

Identifier
Opp5

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Energy source

Primary climate-related opportunity driver
Use of lower-emission sources of energy

Primary potential financial impact
Returns on investment in low-emission technology

Company-specific description
Description of opportunity: Future regulatory systems that put a price on carbon could increase the amount of renewable power that states are incentivized or required to procure. Both of these are likely to provide great economic opportunity for efforts to develop and invest in renewable power, as well as to draw more attention to this important issue. In addition to purchasing renewable energy for our own operations, we also make targeted investments in renewable energy. From 2010 to 2022, we entered into agreements to invest nearly $2.9 billion in renewable energy projects with an expected combined generation capacity of approximately 4.2 GW. These investments help deploy renewable energy at scale.

Time horizon
Short-term

Likelihood
About as likely as not

Magnitude of impact
Medium-high

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

Potential financial impact figure (currency)
2900000000

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

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

Explanation of financial impact figure
The International Energy Agency published a roadmap for the global energy sector in 2021, which estimates that to reach net zero emissions across the global economy by 2050, annual clean energy investment worldwide will need to more than triple by 2030 to around $4 trillion. This presents a tremendous business opportunity for the private sector to help build a clean energy future.

Potential financial impact figure: In addition to purchasing renewable energy for our own operations, we also make targeted investments in renewable energy. From 2010 to 2022, we entered into agreements to invest nearly $2.9 billion in renewable energy projects with an expected combined generation capacity of approximately 4.2 GW. This figure represents the cumulative value of the investment agreements we've entered into from 2010 to 2022.

Cost to realize opportunity
14000000

Strategy to realize opportunity and explanation of cost calculation
Google employs investment professionals to conduct due diligence and oversee investments in renewable energy projects. We also engage external consultants for financial and technical due diligence.

Case study: As an example of a case study, in 2010, Google began investing in a clean energy future to help scale renewable energy solutions to meet society's long-term energy needs and to green electrical grids worldwide. Google aims to enable 5 GW of new carbon-free energy through investments in our key manufacturing regions by

2030. In 2022, we signed agreements to invest approximately $350 million to support 0.5 GW of renewable energy projects towards this 5 GW total. This builds on our long-standing track record in this space; From 2010 to 2022, we entered into agreements to invest nearly $2.9 billion in renewable energy projects with an expected combined generation capacity of approximately 4.2 GW. As a result, these investments help deploy renewable energy at scale.

Cost figure & breakdown: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives.

Comment

Identifier
Opp6

Where in the value chain does the opportunity occur?
Downstream

Opportunity type
Products and services

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

Primary potential financial impact
Increased revenues resulting from increased demand for products and services

Company-specific description
Description of opportunity: As climate change occurs, energy prices may increase and hence, more consumers may use public and alternative transportation rather than private vehicles. Therefore, there is an opportunity for increased use of Google Maps Transit, which provides public transit directions and walking and biking routes in Google Maps. As can be seen at www.google.com/transit, Google Maps Transit provides maps and schedules for public transit systems in cities worldwide. On average, Google Maps provides more than 2 billion km of public transit results per day.

Time horizon
Short-term

Likelihood
Very likely

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)
282800000

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

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

Explanation of financial impact figure
Google Transit and biking/walking routes are features of Google Maps, a free online tool that helps people as they navigate, explore and get things done in the world. As demand increases for information about alternative transportation options, we expect that there will be more users of Google Maps.

Potential financial impact figure & breakdown: This opportunity driver could have a positive impact on our revenue. For illustrative purposes, if an increase in our reputation yielded an unpredictable 0.1% increase in revenue, based on our FY2022 revenue of $282.8 billion, 0.1% would equate to approximately $282.8 million.

It is very difficult to predict the magnitude or potential occurrence of this opportunity, given the indirect nature of the relationship between climate change and online consumer economic activity.

Cost to realize opportunity
14000000

Strategy to realize opportunity and explanation of cost calculation
Case study: As an example of a case study, as demand increases for information about alternative transportation options, there may be more users of Google Maps and Google Transit. Transit on Google Maps is a public transportation trip planning tool for users that combines the latest agency data with the power of Google Maps, and we are continually improving this tool. For agencies around the world, Google Maps is a cost-effective solution targeted at transit novices and seasoned travelers alike. We've made the Transit and Cycling Directions features on Google Maps available in many countries around the the world. As a result, Google Maps provides, on average, more than 2 billion km of public transit results per day. We're also enabling users to search for information about electric vehicle charging stations, view live traffic delays for buses, public transit crowdedness predictions, bikeshare information, scooter availability, and first- or last-mile transit directions paired with biking and ridesharing.

Timescale of implementation: Ongoing

Cost figure: Google has various longstanding and ongoing initiatives in sustainability, some of which have been announced publicly, while others remain confidential. One of the costs associated with properly addressing climate change opportunities and impacts is the time related to FTEs managing key sustainability initiatives. As a rough estimate, this may be estimated to be approximately $14 million per year. This was calculated by multiplying the median employee total compensation for the year ended December 31, 2022 by a hypothetical estimated number of full-time employee equivalents that would manage sustainability initiatives. This hypothetical cost figure may vary over time and may not be representative of the workload resources currently dedicated to these initiatives. In addition to Google's longstanding and ongoing initiatives in sustainability, some of the costs associated with our Google Transit efforts and Google Maps features are the team's staff time on engineering, product management, partner management, and software development.

Comment

C3. Business Strategy

C3.1

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

Row 1

Climate transition plan

Yes, we have a climate transition plan which aligns with a 1.5°C world

Publicly available climate transition plan

Yes

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

We have a different feedback mechanism in place

Description of feedback mechanism

We proactively engage with our stockholders and other stakeholders throughout the year on a broad range of topics that are of interest and priority to the company and our stockholders. These include business strategy and performance, ESG topics such as environmental sustainability, human capital, workforce diversity, executive compensation, and Board leadership and composition.

Our engagement enables us to better understand our stockholders' priorities and perspectives, gives us an opportunity to elaborate on our initiatives, policies, and practices, and fosters open and constructive dialogue. We share the feedback from these conversations with our Board, which considers these perspectives as part of its evaluation and review of our practices including those on governance, compensation, and ESG matters.

Details about our climate-related initiatives and strategy, which are part of our low-carbon transition plan, have been presented at past Annual Meetings of Stockholders. As an example, our sustainability efforts were highlighted in detail at the 2021 Annual Meeting of Stockholders. Google's Chief Sustainability Officer presented on three key ways that we're working towards creating a carbon-free future for all: operating our business sustainably, working together with our partners and customers, and empowering individuals to take action.

We have also presented our company response to climate-related stockholder proposals during recent Annual Meetings of Stockholders.

Frequency of feedback collection

More frequently than annually

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

2023 Google Environmental Report
google-2023-environmental-report.pdf

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

<Not Applicable>

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

<Not Applicable>

C3.2

(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
Physical climate scenarios: RCP 4.5	Company-wide	<Not Applicable>	In 2017, we established Google's climate baseline by assessing future changes due to climate change on the following: sea level rise, precipitation, temperature, and water stress. We used WRI's definitions of water stress and high-stress/extremely high-stress areas. Each of these climate factors were assessed against 2 emissions pathways & across 3 time horizons (2020/2025, 2050, and 2100) to capture a short-, mid-, and long-term understanding of Google's future climate exposure. These time horizons correlate with Google's intentions to increase climate resilience of its data centers and office buildings, while providing information about immediate actions needed to improve operational resilience. For each of these time horizons, we conducted an analysis of the Paris-compliant scenario (RCP4.5) and the business as usual scenario (RCP8.5) to understand the range of possible future climate impacts. The emissions scenarios were based on the representative concentration pathways (RCPs) developed by the IPCC as part of its Fifth Assessment Report. Based on this climate baseline data, we identified the climate exposure for each of Google's sites included in the assessment & developed high-level recommendations & priorities to shape Google's next steps toward a climate resilience strategy. Our CSO led development of this for Google, including a global assessment of the impacts of sea level rise, precipitation, temperature, and water stress on our major real estate operations (our top 23 sites by headcount) and 15 data center sites. The two key results of the scenario analysis were: exposure to increased temperatures is likely to impact many of our global sites and combined effects of sea level rise and flooding could be significant in our San Francisco Bay Area headquarters, both as early as 2050. As a result, the scenario analysis has primarily informed our real estate development objectives and strategy in the Bay Area. Through Google's Urban Ecology Program, we've planted 1.4 acres of native vegetation in our "Green Loop," added roughly 5.9 acres of riparian habitat, and 1,800 native trees to the Charleston Retention Basin. In 2022, we updated our climate risk assessment (including physical and transition risks) to align efforts with the company's overall enterprise risk management process as we continue to align our disclosures and adopt the recommendations of the TCFD. Evaluation is in progress and updates will be shared in our future reporting.
Physical climate scenarios: RCP 8.5	Company-wide	<Not Applicable>	In 2017, we established Google's climate baseline by assessing future changes due to climate change on the following: sea level rise, precipitation, temperature, and water stress. We used WRI's definitions of water stress and high-stress/extremely high-stress areas. Each of these climate factors were assessed against 2 emissions pathways & across 3 time horizons (2020/2025, 2050, and 2100) to capture a short-, mid-, and long-term understanding of Google's future climate exposure. These time horizons correlate with Google's intentions to increase climate resilience of its data centers and office buildings, while providing information about immediate actions needed to improve operational resilience. For each of these time horizons, we conducted an analysis of the Paris-compliant scenario (RCP4.5) and the business as usual scenario (RCP8.5) to understand the range of possible future climate impacts. The emissions scenarios were based on the representative concentration pathways (RCPs) developed by the IPCC as part of its Fifth Assessment Report. Based on this climate baseline data, we identified the climate exposure for each of Google's sites included in the assessment & developed high-level recommendations & priorities to shape Google's next steps toward a climate resilience strategy. Our CSO led development of this for Google, including a global assessment of the impacts of sea level rise, precipitation, temperature, and water stress on our major real estate operations (our top 23 sites by headcount) and 15 data center sites. The two key results of the scenario analysis were: exposure to increased temperatures is likely to impact many of our global sites and combined effects of sea level rise and flooding could be significant in our San Francisco Bay Area headquarters, both as early as 2050. As a result, the scenario analysis has primarily informed our real estate development objectives and strategy in the Bay Area. Through Google's Urban Ecology Program, we've planted 1.4 acres of native vegetation in our "Green Loop," added roughly 5.9 acres of riparian habitat, and 1,800 native trees to the Charleston Retention Basin. In 2022, we updated our climate risk assessment (including physical and transition risks) to align efforts with the company's overall enterprise risk management process as we continue to align our disclosures and adopt the recommendations of the TCFD. Evaluation is in progress and updates will be shared in our future reporting.
Transition scenarios: Bespoke transition scenario	Company-wide	1.5ºC	New laws, regulations, policies, and international accords relating to ESG matters, including sustainability, climate change, human capital, and diversity, are being developed and formalized in Europe, the U.S., and elsewhere, which may entail specific, target-driven frameworks and/or disclosure requirements. We have implemented robust ESG programs, adopted reporting frameworks and principles, and announced a number of goals and initiatives. We consider current and emerging regulatory risks due to climate change, including regulatory risks that could increase energy costs, across all of Alphabet's operations globally. These risks and opportunities are primarily assessed at a company level by modeling likely future energy cost scenarios under climate change regulation, and applying these scenarios to estimate the cost impact to our overall operations. Running our business requires us to use a lot of energy to power our data centers, offices, and other infrastructure. In 2022, our total energy consumption was more than 22 million MWh. Google faces the risk of increased costs of energy if a price on carbon is applied through legislation such as cap and trade (or other mechanisms such as taxation). We use carbon intensity as part of our risk assessment evaluation to support strategic decision-making related to future capital investments. To mitigate this risk, we operate some of the most efficient data centers in the world, procure carbon-free energy for our operations, and generate onsite renewable energy at several of our offices and at our data centers. In an effort to mitigate energy risks and to work towards our goal of operating on carbon-free energy on a 24/7 basis by 2030, we look for opportunities to procure renewable energy via long-term contracts with stable prices, such as power purchase agreements (PPAs). From 2010 to 2022, we signed more than 80 agreements totaling approximately 10 GW of clean energy generation capacity. In 2022, we updated our climate risk assessment (including physical and transition risks) to align efforts with the company's overall enterprise risk management process as we continue to align our disclosures and adopt the recommendations of the TCFD. Evaluation is in progress and updates will be shared in our future reporting.

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

In 2017, we conducted an assessment of Google's exposure to climate risk in the near-term (2020-2025), mid-term (2050), and long-term (2100). We conducted an updated global assessment of near-term (2030) and mid-term (2050) climate risks in 2020. Some of our focal questions included:
-- How could climate-related physical risks possibly affect our data centers sites?
-- How could climate-related physical risks possibly affect our major office locations?
-- What is our exposure to climate risk in the mid-term and long-term?

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

Description of scenario analysis: In 2020, Google conducted an updated climate risk assessment, building on the previous risk assessment that was conducted in 2017. This included climate scenario analysis, referencing RCP 4.5 and 8.5, and an assessment of the impact of flooding, water stress, extreme heat, and wildfires on 26 priority office sites and 23 data center locations.

The focal questions were used to consider geographical areas at risk, such as Google's Bay Area headquarters, which is located in Mountain View, California, as well as some of our major global offices and global data center locations.

Results: The key result of this scenario analysis was that increased exposure to extreme heat and flooding is likely to impact many of our major office locations and data centers as early as 2030. Since flooding and extreme heat emerged as critical climate risks that could have a significant impact on physical assets and occupants, they have been considered as part of the overall development strategy for Google's expanding footprint. As an example of actions taken to address climate-related physical risks at our offices, we are incorporating nature-based solutions such as native habitat enhancement and ecosystem protection, which can help reduce flood impacts, wildfires, and many other severe weather events that occur with increasing frequency. In 2022, we opened our Bay View campus in Mountain View, California, which is designed to integrate with the native landscape and regenerate local ecosystems such as wetlands. It features over 17 acres of high-value natural areas—including wet meadows, woodlands, and a marsh. As another example, we created the Green Loop, a publicly accessible pedestrian and cycling trail connecting some of our buildings in Mountain View. The Green Loop was designed with native vegetation to enhance habitats for pollinators and other wildlife (including nearly 100 native trees), as well as to help manage stormwater.

Also, through our Ecology Program, we're enhancing ecological resilience, expanding wildlife habitat, creating diverse landscapes that can withstand the stresses of climate change, and restoring many of the ecological functions lost with the development of office parks across Silicon Valley. We've engaged ecologists, landscape architects, planners, and local nongovernmental organizations to ensure that our outdoor environments enhance the region's existing ecology over time.

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	Since our founding, we've focused on providing the best user experience possible and taken great care to ensure the products and services we provide serve our customers. We value efficiency in everything we do, and we continually strive to make our processes more efficient and to reduce our impact on the environment, thereby helping our customers reduce their footprint, too. Any regulation that imposes a price on carbon or regulates carbon emissions may incentivize customers to switch their technology infrastructure to take advantage of Google Cloud and Google Workspace products, which are enabling millions of businesses to shift their computing needs from self-managed data centers or colocation facilities to Google Cloud's highly efficient computing infrastructure. This could create additional demand for Google's existing products and/or services. The potential time horizon for this impact is predicted to be short-term. Some of the most substantial business decisions we've made to date that were influenced by climate change include: developing a goal to operate on carbon-free energy 24/7 by 2030, signing new clean energy deals, our ongoing data center efficiency efforts, and climate and clean energy policy and regulatory advocacy. As an example, if new carbon regulations are implemented, Google is in a position to grow its products and services as, on average, a Google-owned and -operated data center is more than 1.5 times as energy efficient as a typical enterprise data center. We achieved this through the use of increasingly efficient power supplies, cooling technology designed to meet local demands and geographical constraints, machine learning, and other innovations. We've released carbon-free energy scores for our Google Cloud regions to help customers choose regions that would maximize the carbon-free energy that powers their application and reduce gross carbon emissions. With AI at an inflection point, predicting the future growth of energy use and emissions from AI compute in our data centers is challenging. We have used tested practices to reduce the carbon footprint of workloads by large margins; together these principles have reduced the energy of training a model by up to 100x and emissions by up to 1000x. We plan to continue applying these tested practices and to keep developing new ways to make AI computing more efficient.
Supply chain and/or value chain	Yes	We have few direct emissions of greenhouse gasses relative to our indirect emissions, therefore we do not expect our operations to be directly impacted by regulatory and policy measures that limit GHG emissions, nor do we expect to participate in any current or future compliance markets for carbon trading, in the United States. Google could face the risk of increased costs of energy if a price on carbon is applied through legislation such as cap and trade (or other mechanisms such as taxation). To the extent that a price on carbon is applied through legislation and passed on to us from a regulated entity, the cost of running our operations would likely increase. The potential time horizon for this impact is predicted to be short-term. Our strategy has been influenced in two ways: (1) we purchase clean electricity for our operations, and (2) we design and operate our facilities to be as energy efficient as possible. Some of the most substantial business decisions we've made to date that were influenced by climate change include: developing a goal to operate on carbon-free energy 24/7 by 2030, signing new clean energy deals, our ongoing data center efficiency efforts, and climate and clean energy policy and regulatory advocacy. As an example, we work to reduce our exposure to the risk of a price on carbon applied through legislation by operating some of the most efficient data centers in the world, procuring carbon-free energy for our operations, and generating onsite renewable energy at several of our offices and at our data center in Belgium. As a result, in 2022, the average annual Power Usage Effectiveness (PUE) for our global fleet of data centers was 1.10, compared with the industry average of 1.55. From 2010 to 2022, we signed more than 80 agreements totaling approximately 10 GW of clean energy generation capacity. In 2021, we set a goal to achieve net-zero emissions across all of our operations and value chain by 2030. We aim to reduce 50% of our combined Scope 1, Scope 2 market-based, and Scope 3 absolute emissions (versus our 2019 baseline) before 2030, and plan to invest in nature-based and technology-based carbon removal solutions to neutralize our remaining emissions.
Investment in R&D	Yes	Some of the most substantial business decisions we've made to date that were influenced by climate change include: developing a goal to operate on carbon-free energy 24/7 by 2030, signing new clean energy deals, our ongoing data center efficiency efforts, and climate and clean energy policy and regulatory advocacy. Energy efficiency remains an important component of our short-term strategy influenced by climate change. This includes our desire to maximize energy efficiency in order to increase the utilization of each kWh we purchase. For example, compared with five years ago, our data centers now deliver approximately three times as much computing power with the same amount of electrical power. We focus on reducing the energy we use by designing and building energy- and resource-efficient data centers and office buildings, as well as supporting energy efficient operations. With AI at an inflection point, predicting the future growth of energy use and emissions from AI compute in our data centers is challenging. We have used tested practices to reduce the carbon footprint of workloads by large margins; together these principles have reduced the energy of training a model by up to 100x and emissions by up to 1000x. We plan to continue applying these tested practices and to keep developing new ways to make AI computing more efficient. The potential time horizon for this impact is predicted to be short-term. As an example, we believe that our scale, resources, and technological expertise can help the world meet its energy and resource needs in a responsible way that drives innovation and growth. That's why we strive to develop products that help drive carbon mitigation efforts and inform climate science. Seeing an opportunity to help raise awareness about the physical changes to the Earth's natural resources and climate, we developed Google Earth Engine (earthengine.google.com), a planetary scale platform for environmental data and analysis that brings together the world's satellite imagery and makes it available online. We also launched the Environmental Insights Explorer (EIE) in 2018 as a freely available tool that helps cities measure emission sources, identify strategies to reduce emissions, and track change over time. EIE makes actionable climate data available to more than 40,000 cities and regions worldwide.
Operations	Yes	We must cool our data centers to keep them in operation, and the amount of energy needed to cool them is related to the outside air temperature. If global temperatures increase, this will increase the amount of energy required to cool our data centers and increase the cost of running our operations. Given that climate change is expected to increase average temperatures globally and we have facilities and operations around the world, this is a risk we face at all of our facilities globally. In particular, this may impact our data centers located in warm climates, such as our data center in Singapore. In general, we expect that our cooling costs will go up if there were an increase in cooling-degree-days due to increasing average temperatures. If, for example, the number of cooling-degree-days increased by 10%, we would expect a noticeable rise in our cooling costs, assuming we were not further able to improve our energy efficiency. This would have a low-medium negative financial impact. The potential time horizon for this impact is predicted to be medium-term. In addition, the potential increase in electricity prices due to the physical impacts of climate change and any resulting regulations may increase our push to source long-term contracts for renewable electricity to avoid exposure to electricity price volatility and/or increases. Some of the most substantial business decisions we've made to date that were influenced by climate change include: developing a goal to operate on carbon-free energy 24/7 by 2030, signing new clean energy deals, our ongoing data center efficiency efforts, and climate and clean energy policy and regulatory advocacy. As an example, we mitigate potential increases in long-term energy prices and work towards our goal of operating on carbon-free energy on a 24/7 basis by 2030 by looking for opportunities to procure renewable energy via long-term contracts with stable prices, such as power purchase agreements (PPAs). From 2010 to 2022, we signed more than 80 agreements totaling approximately 10 GW of clean energy generation capacity.

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	Indirect costs Capital expenditures Capital allocation Assets Liabilities	Capital expenditures: The availability of our products and services depends on the continuing operation of our information technology and communications systems. We invest in land and buildings for data centers and offices, and information technology assets, which includes servers and network equipment, to support the long-term growth of our business. Our systems are vulnerable to damage, interference, or interruption from modifications or upgrades, terrorist attacks, state-sponsored attacks, natural disasters or pandemics, and the effects of climate change (such as sea level rise, drought, flooding, heat waves, wildfires and resultant air quality effects and power shutoffs associated with wildfire prevention, and increased storm severity), among other factors. Our headquarters are located in Mountain View, California. We own and lease office facilities and data centers around the world, primarily in North America, Europe, and Asia. We own and operate data centers in the U.S., Europe, South America, and Asia. As an example of a case study, in 2017, we conducted an assessment of Google's exposure to climate risk in the near-term (2020-2025), mid-term (2050), and long-term (2100). This included a global assessment of the impact of flooding on our real estate operations. Based on RCP 4.5 and 8.5, the San Francisco Bay Area is projected to experience sea level rise between 18.5-26.0 inches by the end of the century. Even though the location of Google's Bay Area headquarters is not projected to experience the highest level of sea level rise when compared to the other Google sites assessed as part of this study, the location of the buildings in Mountain View, Sunnyvale, and Palo Alto and the importance of these sites as Google's global headquarters places those facilities at a particularly high risk when mapped against anticipated sea level rise. Many of Google's buildings in these locations are located in the current 100-year floodplain and, therefore, are at risk to impacts from coastal flooding in the present day. Those risks will only be further exacerbated by sea level rise throughout the century. Since flooding and extreme heat have emerged as critical climate risks that could have a significant impact on physical assets and occupants, they have been considered as part of the overall development strategy for Google's expanding footprint. In an effort to address this risk, Google's Urban Ecology Program focuses on designing healthy, biodiverse ecosystems that can endure and evolve with a changing climate. As a result, Google has planted 1.4 acres of native vegetation in our "Green Loop," added roughly 5.9 acres of riparian habitat and 1,800 native trees to the Charleston Retention Basin, and designed our Bay View site like a bay's edge, with large meadows, emergent and freshwater marsh, and one of the largest willow groves ever planted in the region. For more information on Google's Urban Ecology program, see: https://sustainability.google/operating-sustainably/stories/urban-ecology/ In 2020, Google conducted an updated climate risk assessment, building on the previous risk assessment that was conducted in 2017. This included climate scenario analysis, referencing RCP 4.5 and 8.5, and an assessment of the impact of flooding, water stress, extreme heat, and wildfires on 26 priority office sites and 23 data center locations. The key result of this scenario analysis was that increased exposure to extreme heat and flooding is likely to impact many of our global offices and data centers as early as 2030. Through our Ecology Program, we're enhancing ecological resilience, creating diverse landscapes that can withstand the stresses of climate change. Indirect costs: Running our business requires us to use a lot of electricity to power our data centers, offices, and other infrastructure. Google has 24 data center locations across four continents. In 2022, our total energy consumption was more than 22 million MWh. We must cool our data centers to keep them in operation, and the amount of energy needed to cool them is related to the outside air temperature. If global temperatures increase, this will increase the amount of energy required to cool our data centers and increase the cost of running our operations. Given that climate change is expected to increase average temperatures globally and we have facilities and operations around the world, this is a risk we face at all of our facilities globally. In particular, this may impact our data centers located in warm climates, such as our data center in Singapore. The potential time horizon for this impact is predicted to be medium-term. In general, we expect that our cooling costs would go up if there were an increase in cooling-degree-days due to increasing average temperatures. We are not able to predict the exact temperature increase, but if, for example, the number of cooling-degree-days increased by 10%, we would expect a noticeable rise in our cooling costs, assuming we were not further able to improve our energy efficiency. This would have a low-medium negative financial impact.

C3.5

(C3.5) In your organization's financial accounting, do you identify spending/revenue that is aligned with your organization's climate transition?

	Identification of spending/revenue that is aligned with your organization's climate transition	Indicate the level at which you identify the alignment of your spending/revenue with a sustainable finance taxonomy
Row 1	No, but we plan to in the next two years	<Not Applicable>

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

Is this a science-based target?

Yes, we consider this a science-based target, and we have committed to seek validation of this target by the Science Based Targets initiative in the next two years

Target ambition

1.5°C aligned

Year target was set

2021

Target coverage

Company-wide

Scope(s)
Scope 1
Scope 2
Scope 3

Scope 2 accounting method
Market-based

Scope 3 category(ies)
Category 1: Purchased goods and services
Category 2: Capital goods
Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2)
Category 4: Upstream transportation and distribution
Category 5: Waste generated in operations
Category 6: Business travel
Category 7: Employee commuting
Category 8: Upstream leased assets
Category 9: Downstream transportation and distribution
Category 10: Processing of sold products
Category 11: Use of sold products
Category 12: End-of-life treatment of sold products
Category 13: Downstream leased assets
Category 14: Franchises
Category 15: Investments
Other (upstream)
Other (downstream)

Base year
2019

Base year Scope 1 emissions covered by target (metric tons CO2e)
66700

Base year Scope 2 emissions covered by target (metric tons CO2e)
794300

Base year Scope 3, Category 1: Purchased goods and services emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 2: Capital goods emissions covered by target (metric tons CO2e)
2157000

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 4: Upstream transportation and distribution emissions covered by target (metric tons CO2e)
459000

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 6: Business travel emissions covered by target (metric tons CO2e)
369000

Base year Scope 3, Category 7: Employee commuting emissions covered by target (metric tons CO2e)
173000

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 10: Processing of sold products emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 11: Use of sold products emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 14: Franchises emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Category 15: Investments emissions covered by target (metric tons CO2e)
0

Base year Scope 3, Other (upstream) emissions covered by target (metric tons CO2e)
8509000

Base year Scope 3, Other (downstream) emissions covered by target (metric tons CO2e)
0

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

11667000

Total base year emissions covered by target in all selected Scopes (metric tons CO2e)
12528000

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, Category 1: Purchased goods and services emissions covered by target as % of total base year emissions in Scope 3, Category 1: Purchased goods and services (metric tons CO2e)
100

Base year Scope 3, Category 2: Capital goods emissions covered by target as % of total base year emissions in Scope 3, Category 2: Capital goods (metric tons CO2e)
100

Base year Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions covered by target as % of total base year emissions in Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) (metric tons CO2e)
100

Base year Scope 3, Category 4: Upstream transportation and distribution covered by target as % of total base year emissions in Scope 3, Category 4: Upstream transportation and distribution (metric tons CO2e)
100

Base year Scope 3, Category 5: Waste generated in operations emissions covered by target as % of total base year emissions in Scope 3, Category 5: Waste generated in operations (metric tons CO2e)
100

Base year Scope 3, Category 6: Business travel emissions covered by target as % of total base year emissions in Scope 3, Category 6: Business travel (metric tons CO2e)
100

Base year Scope 3, Category 7: Employee commuting covered by target as % of total base year emissions in Scope 3, Category 7: Employee commuting (metric tons CO2e)
100

Base year Scope 3, Category 8: Upstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 8: Upstream leased assets (metric tons CO2e)
100

Base year Scope 3, Category 9: Downstream transportation and distribution emissions covered by target as % of total base year emissions in Scope 3, Category 9: Downstream transportation and distribution (metric tons CO2e)
100

Base year Scope 3, Category 10: Processing of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 10: Processing of sold products (metric tons CO2e)
100

Base year Scope 3, Category 11: Use of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 11: Use of sold products (metric tons CO2e)
100

Base year Scope 3, Category 12: End-of-life treatment of sold products emissions covered by target as % of total base year emissions in Scope 3, Category 12: End-of-life treatment of sold products (metric tons CO2e)
100

Base year Scope 3, Category 13: Downstream leased assets emissions covered by target as % of total base year emissions in Scope 3, Category 13: Downstream leased assets (metric tons CO2e)
100

Base year Scope 3, Category 14: Franchises emissions covered by target as % of total base year emissions in Scope 3, Category 14: Franchises (metric tons CO2e)
100

Base year Scope 3, Category 15: Investments emissions covered by target as % of total base year emissions in Scope 3, Category 15: Investments (metric tons CO2e)
100

Base year Scope 3, Other (upstream) emissions covered by target as % of total base year emissions in Scope 3, Other (upstream) (metric tons CO2e)
100

Base year Scope 3, Other (downstream) emissions covered by target as % of total base year emissions in Scope 3, Other (downstream) (metric tons CO2e)
100

Base year total Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)
100

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]

6264000

Scope 1 emissions in reporting year covered by target (metric tons CO2e)
91200

Scope 2 emissions in reporting year covered by target (metric tons CO2e)
2492200

Scope 3, Category 1: Purchased goods and services emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 2: Capital goods emissions in reporting year covered by target (metric tons CO2e)
2096000

Scope 3, Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2) emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 4: Upstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)
556000

Scope 3, Category 5: Waste generated in operations emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 6: Business travel emissions in reporting year covered by target (metric tons CO2e)
211000

Scope 3, Category 7: Employee commuting emissions in reporting year covered by target (metric tons CO2e)
151000

Scope 3, Category 8: Upstream leased assets emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 9: Downstream transportation and distribution emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 10: Processing of sold products emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 11: Use of sold products emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 12: End-of-life treatment of sold products emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 13: Downstream leased assets emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 14: Franchises emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Category 15: Investments emissions in reporting year covered by target (metric tons CO2e)
0

Scope 3, Other (upstream) emissions in reporting year covered by target (metric tons CO2e)
4586000

Scope 3, Other (downstream) emissions in reporting year covered by target (metric tons CO2e)
0

Total Scope 3 emissions in reporting year covered by target (metric tons CO2e)
7600000

Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)
10183400

Does this target cover any land-related emissions?
No, it does not cover any land-related emissions (e.g. non-FLAG SBT)

% of target achieved relative to base year [auto-calculated]
37.4297573435504

Target status in reporting year
Underway

Please explain target coverage and identify any exclusions
In 2021, we set a goal to achieve net-zero emissions across all of our operations and value chain by 2030. We aim to reduce 50% of our combined Scope 1, Scope 2 market-based, and Scope 3 absolute emissions (versus our 2019 baseline) before 2030, and plan to invest in nature-based and technology-based carbon removal solutions to neutralize our remaining emissions.

In 2022, our total GHG emissions were approximately 10.2 million tCO2e. We revised our Scope 3 methodology to calculate upstream emissions related to consumer hardware manufacturing, by moving away from using a spend-based methodology to a Life Cycle Assessment (LCA)-based methodology. We also made improvements to the quality of data used to estimate our emissions associated with manufacturing our data center hardware, as well as the LCAs and LCA emission factors used to calculate emissions related to data center construction. These changes are reflected in our reported Scope 3 emissions for fiscal year 2022, but not for the prior years.

Plan for achieving target, and progress made to the end of the reporting year
We aim to reduce 50% of our combined Scope 1, Scope 2 market-based, and Scope 3 absolute emissions (versus our 2019 baseline) before 2030, and plan to invest in nature-based and technology-based carbon removal solutions to neutralize our remaining emissions.

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
2015

Target coverage
Company-wide

Target type: energy carrier
Electricity

Target type: activity
Consumption

Target type: energy source
Renewable energy source(s) only

Base year
2015

Consumption or production of selected energy carrier in base year (MWh)
5221500

% share of low-carbon or renewable energy in base year
48

Target year
2022

% share of low-carbon or renewable energy in target year
100

% share of low-carbon or renewable energy in reporting year
100

% of target achieved relative to base year [auto-calculated]
100

Target status in reporting year
Achieved

Is this target part of an emissions target?
No

Is this target part of an overarching initiative?
RE100

Please explain target coverage and identify any exclusions
In 2012, we set a long-term goal to purchase enough renewable energy to match all the electricity we consume globally on an annual basis. In 2022, we matched 100% of the annual electricity consumption of our global operations with renewable energy purchases for the sixth consecutive year. While we're still drawing power from the grid, some of which is from fossil fuel resources, we're purchasing enough wind and solar energy to match every megawatt-hour (MWh) of electricity our data center and office operations consume annually.

From 2010 to 2022, we signed more than 80 agreements totaling approximately 10 gigawatts of clean energy generation capacity. Reaching our 100% renewable purchasing goal means that Google buys on an annual basis the same amount of megawatt-hours (MWh) of renewable energy as the amount of MWh of electricity that we consume for our operations around the world. Where possible, we buy this energy directly from our utility providers and from green energy facilities in the same grid regions as our data centers.

Matching 100% renewable energy is just the beginning. We're building new data centers and offices, and as demand for Google products grows, so does our electricity load. We need to be constantly adding renewables to our portfolio to keep up. So we'll keep signing contracts to buy more renewable energy. And in those regions where we can't yet buy renewables, we'll keep working on ways to help open the market. In 2020, we set a goal to run on 24/7 carbon-free energy on every grid where we operate by 2030.

In 2015, Google joined the RE100 initiative—an initiative led by the Climate Group and CDP—as well as the We Mean Business coalition, committing to procure 100% of our electricity from renewable sources.

Plan for achieving target, and progress made to the end of the reporting year
<Not Applicable>

List the actions which contributed most to achieving this target
We've worked to make Google data centers some of the most energy efficient in the world. In 2017, we became the first major company to match 100% of the annual electricity consumption of our global operations with renewable energy purchases.

But we're not stopping there. Our 100% renewable match was only an interim solution, and the urgency of the climate challenge demands a bigger and bolder vision. That's why we set a goal to run on 24/7 carbon-free energy by 2030.

We can't do it alone; that's why in 2021, we launched a 24/7 Carbon-Free Energy Compact with Sustainable Energy for All—an international organization working in partnership with the United Nations—to bring together an array of stakeholders on a collective mission to transform global electricity grids to "absolute zero" by advancing 24/7 Carbon-free Energy. We're carving a path forward to fully decarbonize our electricity supply and operate on carbon-free energy.

Target reference number
Low 2

Year target was set
2020

Target coverage
Company-wide

Target type: energy carrier
Electricity

Target type: activity
Consumption

Target type: energy source
Low-carbon energy source(s)

Base year
2019

Consumption or production of selected energy carrier in base year (MWh)
12237200

% share of low-carbon or renewable energy in base year
61

Target year
2030

% share of low-carbon or renewable energy in target year
100

% share of low-carbon or renewable energy in reporting year
64

% of target achieved relative to base year [auto-calculated]
7.69230769230769

Target status in reporting year
Underway

Is this target part of an emissions target?
Yes

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

Please explain target coverage and identify any exclusions
Low2 represents our commitment to to run our business on carbon-free energy everywhere, at all times by 2030. This is one of the ways in which we are working toward our net-zero emissions goal.

In 2018, we announced a long-term ambition to sourcing carbon-free energy for our operations 24/7. This means that we'll evolve from matching our annual energy consumption with renewable energy to sourcing carbon-free energy around the clock. In 2020, building on what we'd learned and due to the transformation underway in the global energy system, we set a deadline for our carbon-free energy goal: By 2030, Google intends to run on carbon-free energy 24/7—everywhere, at all times. Starting with our data centers, and then moving on to our office campuses, we aim to bring clean energy to Google's operations in a way that eliminates our emissions and accelerates a global energy transition.

In 2022, we achieved approximately 64% global average carbon-free energy across our data centers and offices. This is the regional percentage carbon-free energy scores, averaged across Google's global portfolio of data centers and offices for 2022. This represents the clean energy procured to meet our electricity needs, every hour of every day, within every grid where we operate. In 2022, we expanded our carbon-free energy reporting from only Google-owned and -operated data centers to also incorporate offices and third-party data centers.

Plan for achieving target, and progress made to the end of the reporting year
We're working to achieve 24/7 CFE through three main initiatives: purchasing carbon-free energy, accelerating new and improved technologies, and transforming the energy system through partnerships and advocacy.

As of 2022 we achieved approximately 64% carbon-free energy across our data centers and offices. We continue to advance progress toward this goal by developing new technologies, scaling new transaction models, and creating initiatives, like the 24/7 CFE compact, to align advocacy efforts across the globe for stronger clean energy policies.

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
2030

Is this a science-based target?
Yes, we consider this a science-based target, and we have committed to seek validation of this target by the Science Based Targets initiative in the next two years

Please explain target coverage and identify any exclusions
At Google, our goal is to achieve net-zero emissions across all of our operations and value chain by 2030. We aim to reduce 50% of our combined Scope 1, Scope 2 (market-based), and Scope 3 absolute emissions (versus our 2019 baseline) before 2030, and plan to invest in nature-based and technology-based carbon removal solutions to neutralize our remaining emissions.

We've formally committed to the Science Based Targets initiative to seek their validation of our absolute emissions reduction target.

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
In 2022, we contributed $200 million towards a $925 million total pledge to Frontier, an advanced market commitment that's accelerating the development of carbon removal technologies by guaranteeing future demand. As a founding member of Frontier, we're signing our first offtake deals in 2023, with removals expected to be delivered starting in 2024.

Planned actions to mitigate emissions beyond your value chain (optional)
We've been working hard to transition our operations and the electricity grids that serve us towards cleaner sources of power, through a combination of clean energy procurement, technology innovation, and policy advocacy. And we expect this work to contribute to decarbonization across our value chain as well.

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*	20	12700
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 (Various energy efficiency projects)

Estimated annual CO2e savings (metric tonnes CO2e)
2100

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 1
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
1325878

Investment required (unit currency – as specified in C0.4)
5102474

Payback period
4-10 years

Estimated lifetime of the initiative
Ongoing

Comment
Implementation of ongoing energy efficiency improvements in our San Francisco Bay Area offices. In 2022, six individual projects were implemented.

Google has many emissions reduction initiatives and we've chosen only a small subset to detail out here as examples of the activities we've implemented in the reporting year.

Initiative category & Initiative type

Energy efficiency in buildings	Other, please specify (Various energy efficiency projects)

Estimated annual CO2e savings (metric tonnes CO2e)
100

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)
400547

Investment required (unit currency – as specified in C0.4)
400366

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Implementation of initiatives to improve energy management at four of our offices in Kirkland, Washington in 2022.

Google has many emissions reduction initiatives and we've chosen only a small subset to detail out here as examples of the activities we've implemented in the reporting year.

Initiative category & Initiative type

Energy efficiency in buildings	Other, please specify (Various energy efficiency projects)

Estimated annual CO2e savings (metric tonnes CO2e)
200

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)
265610

Investment required (unit currency – as specified in C0.4)
265006

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Implementation of initiatives to improve energy management at two of our offices in Krakow, Poland in 2022.

Google has many emissions reduction initiatives and we've chosen only a small subset to detail out here as examples of the activities we've implemented in the reporting year.

Initiative category & Initiative type

Energy efficiency in buildings	Other, please specify (Various energy efficiency projects)

Estimated annual CO2e savings (metric tonnes CO2e)
100

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)
466704

Investment required (unit currency – as specified in C0.4)
466148

Payback period
<1 year

Estimated lifetime of the initiative
Ongoing

Comment
Implementation of initiatives to improve energy management at three of our offices in Sydney, Australia in 2022.

Google has many emissions reduction initiatives and we've chosen only a small subset to detail out here as examples of the activities we've implemented in the reporting year.

Initiative category & Initiative type

Transportation	Employee commuting

Estimated annual CO2e savings (metric tonnes CO2e)
10000

Scope(s) or Scope 3 category(ies) where emissions savings occur
Scope 3 category 7: Employee commuting

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)
0

Investment required (unit currency – as specified in C0.4)
0

Payback period
No payback

Estimated lifetime of the initiative
Ongoing

Comment
This initiative covers employee commuting. Our Transportation team plans, implements, and operates mobility solutions to support Google's global growth. We set ambitious goals for helping Googlers transition to shuttles, carpooling, public transit, biking, and walking. In 2022, our shuttle buses in the Bay Area produced savings of more than 10,000 tCO2e emissions.

Monetary savings and investment required are confidential, so we've input $0.

Google has many emissions reduction initiatives and we've chosen only a small subset to detail out here as examples of the activities we've implemented in the reporting year.

Initiative category & Initiative type

Energy efficiency in buildings	Lighting

Estimated annual CO2e savings (metric tonnes CO2e)
200

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)
18221

Investment required (unit currency – as specified in C0.4)
30000

Payback period
1-3 years

Estimated lifetime of the initiative
16-20 years

Comment
Small pilot to upgrade fluorescent fixtures to LEDs with smart controls at our Iowa data center. This represents progress made on this project in 2022.

Google has many emissions reduction initiatives and we've chosen only a small subset to detail out here as examples of the activities we've implemented in the reporting

year.

C4.3c

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

Method	Comment
Other (Carbon-free energy)	We conduct payback calculations to decide which emissions reduction activities will best help us meet our emissions reductions and carbon-free energy goals and deliver the best financial returns to the company. By 2030, Google aims to run on 24/7 carbon-free energy. We're committed to action far beyond our own operations, creating tools and investing in technologies to help build a carbon-free future for everyone. We'll continue to support policies that drive rapid deployment of clean energy, help commercialize next-generation technologies, and speed retirement of carbon-based resources. Additionally, we'll fund important research that charts pathways to decarbonization on grids around the world. In addition to purchasing renewable energy for our own operations, we also make targeted investments in renewable energy. Investment in renewable capacity is a scalable approach to creating system-level change by driving grid decarbonization and enabling greater access to carbon-free energy.

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 (Eco-friendly routing in Google Maps)

Description of product(s) or service(s)
In 2020, we committed to help 1 billion people make more sustainable choices through our core products. We've shared several new ways people can use Google products —such as Google Flights, Google Maps, Google Search, and Google Shopping—to make more sustainable choices. For more details, see https://blog.google/outreach-initiatives/sustainability/sustainability-2021/ .

Additionally, we're developing tools to help everyone reduce their environmental impact, understand the planet, and take sustainable action. For more details, see https://sustainability.google/empowering-individuals/ .

The following is an example of how we're empowering individuals with technology. Google Maps assists people as they navigate, explore, and get things done in the world. In 2021, we launched eco-friendly routing in Google Maps to help users get to their destinations as quickly as possible while minimizing fuel or battery consumption. In 2022, we expanded it to Canada and nearly forty European countries, as well as in Egypt ahead of COP-27.

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 (For more information about how we calculated the emissions impact of eco-friendly routing, see more details below.)

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

Functional unit used
Vehicle kilometers

Reference product/service or baseline scenario used
To calculate enabled emissions reductions, we tally the fuel usage from the chosen fuel-efficient routes and subtract it from the predicted fuel consumption that would have occurred on the fastest route without eco-friendly routing, and apply adjustments for factors such as: CO2e factors, fleet factors, well-to-wheels factors, and powertrain mismatch factors. See more details below.

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
1200000

Explain your calculation of avoided emissions, including any assumptions
Google uses a high-quality machine learning prediction model to estimate the expected fuel or energy consumption for each route option when users request driving directions. We identify the route that we predict will consume the least amount of fuel or energy. If this route is not already the fastest one and it offers meaningful energy and fuel savings with only a small increase in driving time, we recommend it to the user. To calculate enabled emissions reductions, we tally the fuel usage from the chosen fuel-efficient routes and subtract it from the predicted fuel consumption that would have occurred on the fastest route without eco-friendly routing, and apply adjustments for factors such as: CO2e factors, fleet factors, well-to-wheels factors, and powertrain mismatch factors. We then input the estimated prevented emissions into the EPA's Greenhouse Gas Equivalencies Calculator to calculate equivalent cars off the road for a year. The 2022 figure covers estimated emissions prevented after eco-friendly routing was launched, from October 2021 through December 2022. Enabled emissions reductions estimates include inherent uncertainty due to factors that include the lack of primary data and precise information about real-world actions and their effects. These factors contribute to a range of possible outcomes, within which we report a central value.

Eco-friendly routing was first launched in the U.S. in 2021. In 2022, we expanded it to Canada and nearly forty European countries, as well as in Egypt ahead of COP-27. As of the end of 2022, it's estimated to have helped prevent more than 1.2 million metric tons of carbon emissions since launch—equivalent to taking approximately 250,000 fuel-based cars off the road for a year.

Explanation of revenue %: We are unable to provide precise estimates for this figure, so we have put 1% for the 'revenue generated from low carbon product(s) or service(s) as % of total revenue in the reporting year'.

Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year
1

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

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

Details of structural change(s), including completion dates
Acquisitions, joint ventures, investments, and divestitures are important elements of our overall corporate strategy and use of capital. In 2022, the acquisition of Mandiant was the only transaction of this kind that met the relevant thresholds for financial reporting purposes.

In September 2022, we closed the acquisition of Mandiant to help expand our offerings in dynamic cyber defense and response. See Note 8. Acquisitions in Alphabet's 2022 Form 10-K for further information https://abc.xyz/investor/static/pdf/20230203_alphabet_10K.pdf

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	Yes, a change in methodology Yes, a change in boundary	Reporting boundary changes: - In September 2022, we closed the acquisition of Mandiant. The FY2022 emissions from the Mandiant organization have been added to our reporting boundary. - Beginning in 2022, in an effort to continuously implement best practice methodologies, we included fugitive emissions from refrigerant leakage in our operational boundary for Scope 1 and Scope 2 emissions. Change in methodology: - In 2022, we revised our Scope 3 methodology to calculate upstream emissions related to consumer hardware manufacturing by moving away from using a spend-based methodology to a Life Cycle Assessment (LCA)-based methodology. We also made improvements to the quality of data used to estimate our emissions associated with manufacturing our data center hardware, as well as the LCAs and LCA emission factors used to calculate emissions related to data center construction.

C5.1c

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

	Base year recalculation	Scope(s) recalculated	Base year emissions recalculation policy, including significance threshold	Past years' recalculation
Row 1	No, because the impact does not meet our significance threshold	<Not Applicable>	We did not recalculate base year emissions as a result of the acquisition of Mandiant in 2022 because the impact did not meet our significance threshold, when compared to our overall emissions footprint. Separately, we did not recalculate our Scope 1 GHG emissions for prior years or prior year Scope 2 GHG emissions to include refrigerant leakage, and we did not recalculate prior year Scope 3 GHG emissions to reflect the changes to our methodology described above.	No

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)
66700

Comment

Scope 2 (location-based)

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
5116900

Comment

Scope 2 (market-based)

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
794300

Comment

Scope 3 category 1: Purchased goods and services

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 2: Capital goods

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
2157000

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)
0

Comment

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)
459000

Comment

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)
0

Comment

Scope 3 category 6: Business travel

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
369000

Comment

Scope 3 category 7: Employee commuting

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
173000

Comment

Scope 3 category 8: Upstream leased assets

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 9: Downstream transportation and distribution

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 10: Processing of sold products

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 11: Use of sold products

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

Comment

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

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

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)
0

Comment

Scope 3 category 14: Franchises

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

Comment

Scope 3 category 15: Investments

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

Comment

Scope 3: Other (upstream)

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
8509000

Comment

Scope 3: Other (downstream)

Base year start
January 1 2019

Base year end
December 31 2019

Base year emissions (metric tons CO2e)
0

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)
The Greenhouse Gas Protocol: Scope 2 Guidance

C6. Emissions data

C6.1

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

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)
91200

Start date
<Not Applicable>

End date
<Not Applicable>

Comment

C6.2

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

Row 1

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

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

Comment

C6.3

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

Reporting year

Scope 2, location-based
8045400

Scope 2, market-based (if applicable)
2492200

Start date
<Not Applicable>

End date
<Not Applicable>

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1, Scope 2 or Scope 3 emissions that are within your selected reporting boundary which are not included in your disclosure?
No

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, calculated

Emissions in reporting year (metric tons CO2e)
0

Emissions calculation methodology
Hybrid method

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

Please explain
Purchased goods and services includes emissions generated from manufacturing consumer devices and our food program. To estimate full supply chain emissions generated from manufacturing consumer devices, we perform third-party verified Life Cycle Assessments (LCAs) in accordance with ISO 14040 and 14044. For our food program, we use LCA emission factors from WRI and annual Bay Area procurement volumes to estimate emissions, which we extrapolate to our global operations using building admittances.

We are not breaking this data out specifically for business reasons. The emissions from manufacturing consumer devices are presented in "Category 2: Capital goods." Emissions from our food program are also presented in the "Other (upstream)" category below.

Capital goods

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
2096000

Emissions calculation methodology
Hybrid method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
37

Please explain
Capital goods includes upstream emissions from the production of capital goods we have purchased, including computing and storage hardware used in our data centers. This category also includes emissions from data center construction. For manufacturing of capital goods, we collect supplier Scope 1 and 2 GHG emissions data directly from our hardware contract manufacturers, component suppliers, and fabless suppliers through the CDP Supply Chain Program; these suppliers represent our key “Tier 1” hardware manufacturing suppliers with whom we have a direct relationship. Where supplier emissions data is not available, we estimate with industry-average GHG intensities by commodity type and spend data. Data center construction emissions are estimated by using an LCA analysis to derive construction emissions data and then applying this to our construction activity.

The emissions from our Tier 1 hardware manufacturing suppliers are presented in “Category 2: Capital goods,” and emissions beyond our Tier 1 hardware manufacturing suppliers are presented in “Other categories.” Data center construction emissions are also presented in the "Other (upstream)" category below.

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

Evaluation status
Not relevant, calculated

Emissions in reporting year (metric tons CO2e)
0

Emissions calculation methodology
Average data method

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

Please explain
We estimated that the emissions associated with fuel-and-energy-related activities not covered in our Scope 1 and 2 are de minimis relative to our overall footprint.

Upstream transportation and distribution

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
556000

Emissions calculation methodology
Fuel-based method
Distance-based method
Site-specific method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
90

Please explain
Upstream transportation and distribution includes emissions generated primarily from transportation and warehousing of our consumer products and data center equipment. We collect consumer products and data center equipment transportation emissions from our logistics providers. These well-to-wheel (WTW) GHG emissions are calculated based on fuel use or weight-distance data and routing associated with a shipment. Where logistics provider emissions data is not available, we use weight and distance data by shipment collected from the providers to estimate WTW emissions, using emissions factors from the 2019 Global Logistics Emissions Council (GLEC) framework. Where logistics provider data is not available, emissions are estimated based on reported data from other transportation providers and the number of units shipped. For warehousing emissions, we collect energy data directly from the warehouses and estimate emissions using LCA electricity and fuel factors from the 2022 Sphera LCA for Experts database. Where warehouse energy data is not available, we estimate using the 2018 Commercial Buildings Energy Consumption Survey (CBECS) data and the warehouse square footage allocated to Alphabet.

Waste generated in operations

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
For the emissions associated with waste generated in our operations, we performed an analysis using our annual spend and annual waste generation, and used life cycle inventories (LCI) and Environmentally Extended Input-Output (EEIO) datasets to estimate the total emissions. Overall, the data quality is estimated to be low, as the LCI and EEIO datasets might not be fully representative of the geographies and technologies used in the counties and municipalities where we operate. Emissions associated with waste from our operations were estimated to be de minimis relative to our overall footprint.

Business travel

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
211000

Emissions calculation methodology
Fuel-based method
Distance-based method

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

Please explain
Business travel includes emissions from air, rail, and car rental travel, as well as emissions from relocation travel. Business travel from personal vehicle usage is not included. Distance and fuel-based travel data is collected through our online booking system or through a third-party travel agency for all sources. Data obtained from our value chain partners is not used at this time. Emissions are calculated using 2022 DEFRA UK Government GHG Conversion Factors for air travel, the 2017 WRI/WBCSD GHG Protocol Emission Factors from Cross Sector Tools for rail travel, and the 2023 EPA Center for Corporate Climate Leadership GHG Emission Factors Hub for car rental travel.

Employee commuting

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
151000

Emissions calculation methodology
Average data method
Distance-based method

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

Please explain
Employee commuting, including teleworking, includes emissions from the transport of our full-time employees between their homes and their worksites by private vehicle, public transit, motorcycle and gas-powered scooter commuting trips. To determine the number of commuting trips by mode made in 2022, we surveyed our employees to determine typical commuting patterns and applied these commuting patterns to our global employee population. The calculation uses an average commuting distance for passenger vehicles obtained from the U.S. Department of Transportation's 2017 National Household Travel Survey and an average fuel efficiency for passenger vehicles obtained from the U.S. Department of Transportation's Transportation Statistics Table 4-23. Data obtained from our value chain partners is not used at this time. Emissions are calculated using 2022 DEFRA UK Government GHG Conversion Factors for passenger vehicles. This category also includes teleworking emissions, which we began to estimate and report in 2020, when teleworking became prevalent due to the global pandemic. Teleworking represents emissions generated by employees working remotely from their homes. We apply the estimation methodology outlined in EcoAct's 2020 Homeworking emissions Whitepaper to our annual average workforce in 2022.

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
We do not have significant emissions from upstream leased assets.

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
Emissions associated with downstream transportation and distribution were estimated to be de minimis relative to our overall footprint.

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
We do not sell intermediate goods that require further processing.

Use of sold products

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
0

Emissions calculation methodology
Methodology for direct use phase emissions, please specify (See the "Please explain" section for more details)

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

Please explain
Use of sold products includes emissions generated by all of Google's flagship consumer hardware products sold in 2022. Flagship consumer hardware products are products that can provide their main functionality without connection to another product. For example, this does not include accessories, such as cases. Use impact was calculated using laboratory power draw measurements, data on use patterns, common industry assumptions on product lifetimes, and LCA electricity emission factors from the 2022 Sphera LCA for Experts database.

We are not breaking this data out specifically for business reasons. The emissions from use of sold products are presented in the "Other (upstream)" category below.

End of life treatment of sold products

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
0

Emissions calculation methodology
Average data method

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

Please explain
End-of-life treatment of sold products includes GHG emissions associated with the end-of-life treatment of all of Google’s flagship consumer hardware products sold in 2022. End-of-life impact was calculated through our LCA process using emission factors from the 2022 Sphera LCA for Experts database. Our initial assessments identify this category to be one that does not have significant life-cycle impact. We continue to develop programs to extend the life of our sold products and also to ensure efficient management of end-of-life materials.

We are not breaking this data out specifically for business reasons. The emissions from end-of-life treatment of sold products are presented in the "Other (upstream)" category below.

Downstream 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
We do not have significant 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
We do not have 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
As defined by the GHG Protocol, we do not have investments relevant to this category.

Other (upstream)

Evaluation status
Relevant, calculated

Emissions in reporting year (metric tons CO2e)
4586000

Emissions calculation methodology
Hybrid method

Percentage of emissions calculated using data obtained from suppliers or value chain partners
8

Please explain
This category includes certain emissions from Category 1, Category 2, Category 11, and Category 12 as an aggregated subtotal for business reasons. This includes emissions from beyond our Tier 1 hardware manufacturing suppliers, from our food production, from use of sold products, and from end-of-life treatment of sold products. See more details in the respective category explanations above.

Other (downstream)

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
We do not have significant emissions from other relevant downstream activities.

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?
Yes

C6.7a

(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	17900	

(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
0.00000913

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
2583400

Metric denominator
unit total revenue

Metric denominator: Unit total
282836000000

Scope 2 figure used
Market-based

% change from previous year
25.99

Direction of change
Increased

Reason(s) for change
Change in renewable energy consumption

Please explain
As a large and complex multi-national company, it's not possible to determine the exact cause of year-over-year changes in emissions or emissions intensity.

In 2022, our wind and solar deals, together with the RE that comes from the grid, produced enough renewable energy to match 100% of the electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year. Despite an increase in our total procurement of renewable energy in 2022 to match 100% of the electricity consumption of our operations, we have a few data center locations (i.e. Singapore) on grids where we are not currently able to source large volumes of renewable energy or where we are not currently able to source renewable energy. Our operations at some of these sites grew in 2022, which resulted in an increase in our total market-based Scope 2 emissions. However, due to increases in our unit total revenue and our emissions in 2022, there was an increase in the amount of combined Scope 1 and 2 emissions per unit of total revenue.

This revenue intensity figure was calculated by taking our combined 2022 Scope 1 and market-based Scope 2 emissions divided by our total revenue for fiscal year 2022.

Because of our emissions-reduction efforts, our carbon intensity has decreased even as our company has grown and our energy use has correspondingly increased. Since 2011, our carbon intensity per unit of revenue decreased by 76%.

Intensity figure
14.76

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
2583400

Metric denominator
full time equivalent (FTE) employee

Metric denominator: Unit total
175030

Scope 2 figure used
Market-based

% change from previous year
14.68

Direction of change
Increased

Reason(s) for change
Change in renewable energy consumption

Please explain
As a large and complex multi-national company, it's not possible to determine the exact cause of year-over-year changes in emissions or emissions intensity.

In 2022, our wind and solar deals, together with the RE that comes from the grid, produced enough renewable energy to match 100% of the electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year. We also operate our data centers and offices more efficiently (See: https://www.google.com/about/datacenters/efficiency/).

Despite an increase in our total procurement of renewable energy in 2022 to match 100% of the electricity consumption of our operations, we have a few data center locations (i.e. Singapore) on grids where we are not currently able to source large volumes of renewable energy or where we are not currently able to source renewable energy. Our operations at some of these sites grew in 2022, which resulted in a slight increase in our total market-based Scope 2 emissions. Even though there was an increase in the number of employees in 2022, an increase in the amount of combined Scope 1 and 2 emissions per employee occurred.

This FTE employee intensity figure was calculated by taking our combined 2022 Scope 1 and market-based Scope 2 emissions divided by our average 2022 FTE employee.

Because of our emissions-reduction efforts, our carbon intensity has steadily decreased even as our company has grown and our energy use has correspondingly increased. Since 2011, our carbon intensity per FTE employee decreased by 72%.

Intensity figure
0.1159

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
2583400

Metric denominator
Other, please specify (megawatt hour (MWh) of energy consumed)

Metric denominator: Unit total
22288800

Scope 2 figure used
Market-based

% change from previous year
15.21

Direction of change
Increased

Reason(s) for change
Change in renewable energy consumption

Please explain
As a large and complex multi-national company, it's not possible to determine the exact cause of year-over-year changes in emissions or emissions intensity.

In 2022, our wind and solar deals, together with the RE that comes from the grid, produced enough renewable energy to match 100% of the electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

We calculated the FY2022 intensity figure by taking the 2022 Scope 1 and market-based Scope 2 emissions total divided by total energy consumption (MWh) in 2022.

C7. Emissions breakdowns

C7.1

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

C7.1a

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

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	74700	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	200	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	200	IPCC Fourth Assessment Report (AR4 - 50 year)
HFCs	16100	IPCC Fourth Assessment Report (AR4 - 100 year)

C7.2

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

Country/area/region	Scope 1 emissions (metric tons CO2e)
Other, please specify (North America)	62100
Other, please specify (EMEA)	20900
Other, please specify (Latin America)	1600
Other, please specify (APAC)	6600

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)
Alphabet Inc.	91200

C7.5

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

Country/area/region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Other, please specify (North America)	5990900	1228900
Other, please specify (EMEA)	685200	27300
Other, please specify (Latin America)	138500	9400
Other, please specify (APAC)	1230800	1226600

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)
Alphabet Inc.	8045400	2492200

C7.7

(C7.7) Is your organization able to break down your emissions data for any of the subsidiaries included in your CDP response?
Yes

C7.7a

(C7.7a) Break down your gross Scope 1 and Scope 2 emissions by subsidiary.

Subsidiary name
Google Spain SL

Primary activity
Web-based services

Select the unique identifier(s) you are able to provide for this subsidiary
No unique identifier

ISIN code – bond
<Not Applicable>

ISIN code – equity
<Not Applicable>

CUSIP number
<Not Applicable>

Ticker symbol
<Not Applicable>

SEDOL code
<Not Applicable>

LEI number
<Not Applicable>

Other unique identifier
<Not Applicable>

Scope 1 emissions (metric tons CO2e)
148

Scope 2, location-based emissions (metric tons CO2e)
1418

Scope 2, market-based emissions (metric tons CO2e)
129

Comment

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 in emissions	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	800100	Decreased	43	In 2022, we reported Scope 2 location-based emissions of approximately 8 million tCO2e, which doesn't take into account our renewable energy procurement, and Scope 2 market-based emissions of approximately 2.5 million tCO2e. This means that through our PPAs, in 2022, we achieved a reduction in our emissions from our electricity use of approximately 5.5 million tCO2e. In 2021, through our PPAs, we achieved a reduction in our emissions from our electricity use of approximately 4.7 million tCO2e. We arrived at this total, 800,100 tCO2e, by assessing the difference between our emissions reduced from PPAs in 2022 (location-based Scope 2 emissions minus market-based Scope 2 emissions) and the emissions reduced from renewable energy PPAs in 2021. In 2021, our total Scope 1 and market-based Scope 2 emissions were 1,868,200 tCO2e. Therefore we arrived at this percentage decrease as follows: (800,100 / 1,868,200) x 100 = 43%. From 2011 to 2022, our renewable energy purchasing has resulted in emissions savings of more than 30 million tCO2e. We have a few facilities located in geographies where we're not currently able to source large volumes of renewable energy, so we currently make up for this by buying surplus renewable energy in regions where it's abundant. For example, by buying larger amounts of wind energy in places like Europe, we compensate for our lack of renewable energy purchases in Asia. This approach results in Google's Scope 2 market-based emissions being greater than zero as per the Greenhouse Gas Protocol Scope 2 Guidance, despite us achieving our 100% renewable energy match globally.
Other emissions reduction activities	12700	Decreased	0.7	In addition to our renewable energy purchases, we continued to expand our portfolio of LEED-certified office space as well as to implement other efficiency and emission reduction initiatives, such as making operational improvements to office buildings, improving transportation programs, and encouraging our employees to operate IT equipment more efficiently. We continue to look for ways to increase our use of renewable energy, including trying new, innovative technologies at our offices. In 2022, our energy efficiency efforts resulted in a reduction of 12,700 tCO2e. In 2021, our total Scope 1 and market-based Scope 2 emissions were 1,868,200 tCO2e. Therefore we arrived at this percentage decrease as follows: (12,700 / 1,868,200) x 100 = 0.7%. We believe that our emissions reduction activities are much larger than the savings we are able to quantify from our energy efficiency initiatives. We have done our best to estimate the contribution from our emissions reduction activities, but the actual numbers could be different due to changes in other factors, such as emissions factors and weather. This estimate should be considered a lower bound as it does not include the many small emission reductions projects we've undertaken that are difficult to quantify.
Divestment		<Not Applicable>		
Acquisitions		<Not Applicable>		
Mergers		<Not Applicable>		
Change in output	715200	Increased	38	As a large and complex multi-national company, there are many factors impacting our emissions and it's not possible to isolate any one particular factor and quantify it exactly. Based upon the comparison of 2021 to 2022 reported data, growth of our business created a 38% increase in our emissions compared to the emissions we reported last year. This change in output was calculated by taking our 2022 Scope 1 and market-based Scope 2 emissions minus the 2021 Scope 1 and market-based Scope 2 emissions, divided by the 2021 Scope 1 and market-based Scope 2 emissions, then multiplied by 100. Therefore we arrived at this percentage increase as follows: (715,200 / 1,868,200) x 100 = 38%. Our Scope 2 (market-based) emissions increased by 37%, primarily due to increased data center electricity consumption and a lack of full regional coverage of renewable energy procurement in the United States and Asia Pacific regions. Despite an increase in our total procurement of renewable energy in 2022 to match 100% of the electricity consumption of our operations, we have a few data center locations (i.e. Singapore) on grids where we are currently not able to source large volumes of renewable energy or where we are currently not able to source renewable energy. Our operations at some of these sites grew last year, resulting in a slight increase in our total market-based Scope 2 emissions. This is one contributor to this increase in emissions.
Change in methodology		<Not Applicable>		
Change in boundary		<Not Applicable>		
Change in physical operating conditions		<Not Applicable>		
Unidentified		<Not Applicable>		
Other		<Not Applicable>		

C7.9b

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

Market-based

C8. Energy

C8.1

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

More than 0% but less than or equal to 5%

C8.2

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

	Indicate whether your organization 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	Yes
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)	LHV (lower heating value)	65300	309500	374800
Consumption of purchased or acquired electricity	<Not Applicable>	14963000	6722300	21685300
Consumption of purchased or acquired heat	<Not Applicable>	0	219100	219100
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>	9600	<Not Applicable>	9600
Total energy consumption	<Not Applicable>	15037900	7250900	22288800

C8.2b

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

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

C8.2c

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

Sustainable biomass

Heating value

Unable to confirm heating value

Total fuel MWh consumed by the organization

0

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

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
Unable to confirm heating value

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

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
LHV

Total fuel MWh consumed by the organization
65300

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

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
Renewable diesel (i.e. 100% renewable with no fossil fuels) is not used for self-generation.

Coal

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

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
LHV

Total fuel MWh consumed by the organization
198200

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

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 includes consumption of the following fuel types: diesel / gas oil, jet kerosene, motor gasoline. aviation gasoline, and on-road diesel.

Gas

Heating value
LHV

Total fuel MWh consumed by the organization
111300

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

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

Heating value
Unable to confirm heating value

Total fuel MWh consumed by the organization
0

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

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

Total fuel

Heating value
LHV

Total fuel MWh consumed by the organization
374800

MWh fuel consumed for self-generation of electricity
0

MWh fuel consumed for self-generation of heat
0

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	73000	73000	9600	9600
Heat	111300	111300	0	0
Steam	0	0	0	0
Cooling	0	0	0	0

C8.2g

(C8.2g) Provide a breakdown by country/area of your non-fuel energy consumption in the reporting year.

Country/area
Other, please specify (North America)

Consumption of purchased electricity (MWh)
15539000

Consumption of self-generated electricity (MWh)
46200

Is this electricity consumption excluded from your RE100 commitment?
Please select

Consumption of purchased heat, steam, and cooling (MWh)
106400

Consumption of self-generated heat, steam, and cooling (MWh)
98400

Total non-fuel energy consumption (MWh) [Auto-calculated]
15790000

Country/area
Other, please specify (EMEA)

Consumption of purchased electricity (MWh)
3391400

Consumption of self-generated electricity (MWh)
38100

Is this electricity consumption excluded from your RE100 commitment?
Please select

Consumption of purchased heat, steam, and cooling (MWh)
40200

Consumption of self-generated heat, steam, and cooling (MWh)
12500

Total non-fuel energy consumption (MWh) [Auto-calculated]
3482200

Country/area
Other, please specify (Latin America)

Consumption of purchased electricity (MWh)
365500

Consumption of self-generated electricity (MWh)
800

Is this electricity consumption excluded from your RE100 commitment?
Please select

Consumption of purchased heat, steam, and cooling (MWh)
4000

Consumption of self-generated heat, steam, and cooling (MWh)
0

Total non-fuel energy consumption (MWh) [Auto-calculated]
370300

Country/area
Other, please specify (APAC)

Consumption of purchased electricity (MWh)
2389400

Consumption of self-generated electricity (MWh)
5800

Is this electricity consumption excluded from your RE100 commitment?
Please select

Consumption of purchased heat, steam, and cooling (MWh)
68500

Consumption of self-generated heat, steam, and cooling (MWh)
500

Total non-fuel energy consumption (MWh) [Auto-calculated]
2464200

C8.2h

(C8.2h) Provide details of your organization's renewable electricity purchases in the reporting year by country/area.

Country/area of consumption of purchased renewable electricity
Chile

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Solar

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
307700

Tracking instrument used
Other, please specify (Environmental Attributes Attestation)

Country/area of origin (generation) of purchased renewable electricity
Chile

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2017

Vintage of the renewable energy/attribute (i.e. year of generation)
2022

Supply arrangement start year
2017

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

Country/area of consumption of purchased renewable electricity
Singapore

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Solar

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
10800

Tracking instrument used
Other, please specify (Environmental Attributes Attestation)

Country/area of origin (generation) of purchased renewable electricity
Singapore

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2020

Vintage of the renewable energy/attribute (i.e. year of generation)
2021

Supply arrangement start year
2020

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

Country/area of consumption of purchased renewable electricity
United States of America

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Renewable electricity mix, please specify (Wind, Solar)

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
11288300

Tracking instrument used
US-REC

Country/area of origin (generation) of purchased renewable electricity
United States of America

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2009

Vintage of the renewable energy/attribute (i.e. year of generation)
2022

Supply arrangement start year
2010

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

Country/area of consumption of purchased renewable electricity
Denmark

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Solar

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
35600

Tracking instrument used
GO

Country/area of origin (generation) of purchased renewable electricity
Denmark

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2020

Vintage of the renewable energy/attribute (i.e. year of generation)
2021

Supply arrangement start year
2020

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

We selected Sweden in the 'Country/area of renewable electricity consumption', however, the renewable electricity from these PPAs is consumed in the European market, including Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom.

Country/area of consumption of purchased renewable electricity
Finland

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Wind

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
187800

Tracking instrument used
GO

Country/area of origin (generation) of purchased renewable electricity
Finland

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2019

Vintage of the renewable energy/attribute (i.e. year of generation)
2021

Supply arrangement start year
2019

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

We selected Sweden in the 'Country/area of renewable electricity consumption', however, the renewable electricity from these PPAs is consumed in the European market, including Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom.

Country/area of consumption of purchased renewable electricity
Netherlands

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Renewable electricity mix, please specify (Wind, solar)

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
208900

Tracking instrument used
GO

Country/area of origin (generation) of purchased renewable electricity
Netherlands

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2016

Vintage of the renewable energy/attribute (i.e. year of generation)
2022

Supply arrangement start year
2016

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

We selected Sweden in the 'Country/area of renewable electricity consumption', however, the renewable electricity from these PPAs is consumed in the European market, including Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom.

Country/area of consumption of purchased renewable electricity
Norway

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Wind

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
722600

Tracking instrument used
GO

Country/area of origin (generation) of purchased renewable electricity
Norway

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2017

Vintage of the renewable energy/attribute (i.e. year of generation)
2022

Supply arrangement start year

2017

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

We selected Sweden in the 'Country/area of renewable electricity consumption', however, the renewable electricity from these PPAs is consumed in the European market, including Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom.

Country/area of consumption of purchased renewable electricity
Sweden

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Wind

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
2108000

Tracking instrument used
GO

Country/area of origin (generation) of purchased renewable electricity
Sweden

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2015

Vintage of the renewable energy/attribute (i.e. year of generation)
2022

Supply arrangement start year
2015

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

We selected Sweden in the 'Country/area of renewable electricity consumption', however, the renewable electricity from these PPAs is consumed in the European market, including Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom.

Country/area of consumption of purchased renewable electricity
Belgium

Sourcing method
Physical power purchase agreement (physical PPA) with a grid-connected generator

Renewable electricity technology type
Wind

Renewable electricity consumed via selected sourcing method in the reporting year (MWh)
93300

Tracking instrument used
GO

Country/area of origin (generation) of purchased renewable electricity
Belgium

Are you able to report the commissioning or re-powering year of the energy generation facility?
Yes

Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)
2019

Vintage of the renewable energy/attribute (i.e. year of generation)
2021

Supply arrangement start year
2020

Additional, voluntary label associated with purchased renewable electricity
No additional, voluntary label

Comment
In 2022, our wind and solar deals, together with the renewable electricity that comes from the grid, produced enough renewable energy to match 100% of the global

electricity consumption of our offices, data centers, and networking infrastructure for the sixth consecutive year.

We selected Sweden in the 'Country/area of renewable electricity consumption', however, the renewable electricity from these PPAs is consumed in the European market, including Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Spain, Sweden, Switzerland, Ukraine, and the United Kingdom.

C8.2i

(C8.2i) Provide details of your organization's low-carbon heat, steam, and cooling purchases in the reporting year by country/area..

Sourcing method
None (no purchases of low-carbon heat, steam, or cooling)

Country/area of consumption of low-carbon heat, steam or cooling
<Not Applicable>

Energy carrier
<Not Applicable>

Low-carbon technology type
<Not Applicable>

Low-carbon heat, steam, or cooling consumed (MWh)
<Not Applicable>

Comment

C8.2j

(C8.2j) Provide details of your organization's renewable electricity generation by country/area in the reporting year.

C8.2k

(C8.2k) Describe how your organization's renewable electricity sourcing strategy directly or indirectly contributes to bringing new capacity into the grid in the countries/areas in which you operate.

C8.2l

(C8.2l) In the reporting year, has your organization faced any challenges to sourcing renewable electricity?

	Challenges to sourcing renewable electricity	Challenges faced by your organization which were not country/area-specific
Row 1	Please select	<Not Applicable>

C9. Additional metrics

C9.1

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

Description
Energy usage

Metric value
0.1

Metric numerator
Noncomputing overhead data center energy use

Metric denominator (intensity metric only)
Energy used to power IT equipment

% change from previous year
0

Direction of change
No change

Please explain
Google's data center energy metric is the ratio of noncomputing overhead energy use divided by IT equipment energy use. This ratio was 0.10 in 2021 and 2022, which indicates relatively constant energy efficiency year-over-year. For more than a decade, we've worked to make Google data centers some of the most efficient in the world, improving their environmental performance even as demand for our products has dramatically risen.

This metric is closely related to power usage effectiveness (PUE), which is a standard data center industry ratio. PUE compares total data center energy (IT + noncomputing overhead like cooling and power distribution) to IT energy. A PUE of 2.0 means that for every watt of IT power, an additional watt is consumed to cool and distribute power to the IT equipment. A PUE closer to 1.0 means nearly all the energy is used for computing.

We measure and monitor PUE vigilantly and Google's data center staff have access to real-time data. Each quarter, we publish PUE data on our public website. For more information, see: https://www.google.com/about/datacenters/efficiency/

In 2022, the average annual PUE for our global fleet of data centers was 1.10, compared with the industry average of 1.55—meaning that Google data centers use about 5.5 times less overhead energy.

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
Alphabet FY2022 Environmental Indicators Assurance Letter.pdf

Page/ section reference
Pages 1 to 7

Relevant standard
Attestation standards established by AICPA (AT105)

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
Alphabet FY2022 Environmental Indicators Assurance Letter.pdf

Page/ section reference
Pages 1 to 7

Relevant standard
Attestation standards established by AICPA (AT105)

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
Alphabet FY2022 Environmental Indicators Assurance Letter.pdf

Page/ section reference
Pages 1 to 7

Relevant standard
Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)
100

C10.1c

(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
Scope 3: Employee commuting

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
Alphabet FY2022 Environmental Indicators Assurance Letter.pdf

Page/section reference
Pages 1 to 7

Relevant standard
Attestation standards established by AICPA (AT105)

Proportion of reported emissions verified (%)
100

C10.2

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

C10.2a

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

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C6. Emissions data	Product footprint verification	ISO 14040:2006 and ISO 14044:2006	We produced product environmental reports for all of our Pixel and Nest flagship products released in 2022 (Pixel 7, Pixel 7 Pro, Pixel 6a, Nest Doorbell (wired, 2nd gen), Nest Wifi Pro, Google Pixel Watch, Chromecast with Google TV (HD)). These are in addition to previously published product environmental reports for products released in earlier years. The reports include carbon footprints based on product life-cycle assessment (LCA) studies, which detail the environmental performance of each product over its full life cycle, from design and manufacturing through usage and recycling. The product environmental reports can be found at https://sustainability.google/reports/ . The LCA reports underwent and successfully passed critical review by an external individual expert. The critical review checked that: - Methods used to carry out the LCA were consistent with standards ISO 14040 and 14044; - Methods used to carry out the LCA were scientifically and technically valid; - Data used were appropriate and reasonable in relation to the goal of the study; - Interpretations reflected the limitations identified and the goal of the study; - Study documentation was transparent and consistent. Critical review statements can be made available upon request.
C6. Emissions data	Other, please specify (Carbon intensity metrics)	Attestation standards established by the American Institute of Certified Public Accountants (AICPA) AT-C section 105, Concepts Common to All Attestation Engagements, and AT-C section 210, Review Engagements	The following carbon intensity metrics are externally assured as part of our Independent Accountants' Review: - Scope 1 + Scope 2 emissions intensity per unit of revenue - Scope 1 + Scope 2 emissions intensity per full-time equivalent employee (FTE) - Scope 1 + Scope 2 emissions intensity per MWh of energy consumed
C8. Energy	Renewable energy products	Our carbon footprint is externally assured according to the Attestation standards established by AICPA (AT105), however the assurance body does not verify the renewable energy credits (RECs) or the Guarantees of Origin (GOOs).	Our carbon footprint is externally assured. The assurance body does not verify the renewable energy contractual instruments, e.g. renewable energy credits (RECs) or the Guarantees of Origin (GOs). The assurance process ensures that the renewable energy contractual instruments used in our Scope 2 emissions accounting meet the Scope 2 Quality Criteria outlined in the GHG Protocol Scope 2 Guidance.
C8. Energy	Energy consumption	Attestation standards established by the American Institute of Certified Public Accountants (AICPA) AT-C section 105, Concepts Common to All Attestation Engagements, and AT-C section 210, Review Engagements	Total energy consumption is externally assured as part of our Independent Accountants' Review.
C6. Emissions data	Other, please specify (Biogenic emissions)	Attestation standards established by the American Institute of Certified Public Accountants (AICPA) AT-C section 105, Concepts Common to All Attestation Engagements, and AT-C section 210, Review Engagements	Our biogenic GHG emissions are externally assured as part of our Independent Accountants' Review.
C8. Energy	Other, please specify (Percentage of electricity procured from renewable sources)	Attestation standards established by the American Institute of Certified Public Accountants (AICPA) AT-C section 105, Concepts Common to All Attestation Engagements, and AT-C section 210, Review Engagements	Our percentage of electricity procured from renewable energy sources is externally assured as part of our Independent Accountants' Review.
C8. Energy	Other, please specify (Total electricity consumption)	Attestation standards established by the American Institute of Certified Public Accountants (AICPA) AT-C section 105, Concepts Common to All Attestation Engagements, and AT-C section 210, Review Engagements	Total electricity consumption is externally assured as part of our Independent Accountants' Review.

C11. Carbon pricing

C11.1

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

Yes

C11.1a

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

EU ETS

C11.1b

(C11.1b) Complete the following table for each of the emissions trading schemes you are regulated by.

EU ETS

% of Scope 1 emissions covered by the ETS
1.45

% of Scope 2 emissions covered by the ETS
0

Period start date
January 1 2022

Period end date
December 31 2022

Allowances allocated
1326

Allowances purchased
1326

Verified Scope 1 emissions in metric tons CO2e
1326

Verified Scope 2 emissions in metric tons CO2e
0

Details of ownership
Facilities we own and operate

Comment

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

Strategy for compliance: Members of Google's data center Environmental Health and Safety, Energy, and Public Policy teams monitor current and emerging energy- and emissions-related regulations related to the EU ETS. The scope of the revised EU ETS legislations covered small emitters and, as a result, our EU data centers were required to apply for ETS Permits. Google has data centers in Belgium, Denmark, Finland, Ireland, and the Netherlands. Based on the regulation, the teams determined which data centers would participate in the EU ETS in 2022. The EU ETS directive requires operators of installations, which are included in the scope to hold a valid GHG emission monitoring plan issued by the relevant Competent Authority, to monitor and report their emissions, to have the reports verified by an independent and accredited verifier, and to purchase and surrender the equivalent number of allowances on an annual basis through approved operators holding accounts on the Union Registry. Our strategy is to continue to follow these directives of the EU ETS.

Results: We were in compliance with the EU ETS in 2022.

Timescale of implementation: In 2022, we followed the annual compliance cycle of the EU ETS. The team reviews current and emerging energy- and emissions-related regulations related to the EU ETS each year.

For more information, see https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification-eu-ets-emission s_en

C11.2

(C11.2) Has your organization canceled any project-based carbon credits within the reporting year?
Yes

C11.2a

(C11.2a) Provide details of the project-based carbon credits canceled by your organization in the reporting year.

Project type
Landfill gas

Type of mitigation activity
Emissions reduction

Project description
Project: Oneida Herkimer Landfill located in Ava, NY (CAR674)

One of Google's long-standing carbon offset project partners is Oneida-Herkimer Solid Waste Management Authority. This Authority operates a landfill in upstate New York, the Oneida-Herkimer Regional Landfill, which serves rural communities. This is a methane gas destruction project. For more details, see: https://sustainability.google/operating-sustainably/stories/landfill-NewYork/

Credits canceled by your organization from this project in the reporting year (metric tons CO2e)
248200

Purpose of cancellation
Voluntary offsetting

Are you able to report the vintage of the credits at cancellation?
Yes

Vintage of credits at cancellation
2021

Were these credits issued to or purchased by your organization?
Purchased

Credits issued by which carbon-crediting program
CAR (The Climate Action Reserve)

Method(s) the program uses to assess additionality for this project
Consideration of legal requirements
Other, please specify (Performance standard test (by meeting a performance threshold))

Approach(es) by which the selected program requires this project to address reversal risk
No risk of reversal

Potential sources of leakage the selected program requires this project to have assessed
Upstream/downstream emissions

Provide details of other issues the selected program requires projects to address
Permanence: Greenhouse gases prevented from entering the atmosphere should be stopped permanently. We need to be certain that the projects we invest in are not temporary methods of carbon reduction or greenhouse gas sequestration. If there is significant risk that the stored carbon would be released through events such as a forest fire or a leak from sequestered carbon, the project would need to account for this, such as through insurance or a buffer of additional reductions

Verifiability: An objective third-party—someone other than the project developer and Google—must be able to look at project data and confirm that the carbon reductions are real and credible. The third-party verifier determines the proper baseline for greenhouse gas reductions and verifies that the reductions adhere to strict monitoring and reporting standards.

Comment

C11.3

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

C11.3a

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

Type of internal carbon price
Shadow price

How the price is determined
Other, please specify (We've referenced and considered the social cost of carbon recommended by the U.S. Federal Government's Interagency Working Group on the Social Cost of Greenhouse Gases, which assessed the value for carbon dioxide at $51 per metric ton for emissions.)

Objective(s) for implementing this internal carbon price
Identify and seize low-carbon opportunities

Scope(s) covered
Scope 1
Scope 2

Pricing approach used – spatial variance
Differentiated

Pricing approach used – temporal variance
Evolutionary

Indicate how you expect the price to change over time
We use carbon prices as part of our risk assessment model, to support strategic decision-making related to future capital investments. For example, the risk assessment at individual data center facilities also includes using a shadow price for carbon to estimate expected future energy costs. We have also used carbon prices for other areas of our business.

We do not disclose the exact carbon price we use, how we determine it, or its variance as we consider this to be competitive information. We use different prices for different implementations, and may reevaluate our carbon price as needed.

Actual price(s) used – minimum (currency as specified in C0.4 per metric ton CO2e)
51

Actual price(s) used – maximum (currency as specified in C0.4 per metric ton CO2e)
51

Business decision-making processes this internal carbon price is applied to
Operations
Procurement

Mandatory enforcement of this internal carbon price within these business decision-making processes
No

Explain how this internal carbon price has contributed to the implementation of your organization's climate commitments and/or climate transition plan
As of December 31, 2022, Google had 24 data center locations across North America, South America, Europe, and Asia. Our long-standing data center efficiency efforts are more important than ever because our data centers represent the vast majority of our electricity use. Google faces the risk of increased costs of energy if a price on carbon is applied through legislation such as cap and trade (or other mechanisms such as taxation). To the extent that this price is passed on to us from a regulated entity, the cost of running our operations will increase. However, we already operate some of the most efficient data centers in the world, procure renewable energy for our operations, and generate onsite renewable energy at several of our offices and data centers, all of which reduce our exposure to this risk. We've also included a shadow price for carbon in our data center siting analysis so we take this risk into account even before we build a data center. Note that we use different prices for different implementations, and may reevaluate our carbon price as needed.

As a hypothetical example, if a carbon price of e.g. $51/metric tonne were established through regulation (social cost of carbon recommended by the U.S. Federal Government as referenced above), this could increase our costs by approximately $131 million, assuming these costs were passed through to electricity consumers and we were not further able to reduce our carbon footprint. This was calculated by adding our 2022 Scope 1 and 2022 Scope 2 market-based emissions, and then multiplying by the aforementioned carbon price example [= (2022 Scope 1 + market-based Scope 2) x $51]. The financial impact would likely be less as we already voluntarily purchase carbon credits. Note that this is a hypothetical example and not our actual internal carbon price.

For more details about the social cost of carbon recommended by the U.S. Federal Government's Interagency Working Group on the Social Cost of Greenhouse Gases, see Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990, Interagency Working Group on Social Cost of Greenhouse Gases, United States Government (February 2021), page 5.

C12. Engagement

C12.1

(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

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

Type of engagement
Engagement & incentivization (changing supplier behavior)

Details of engagement
Run an engagement campaign to educate suppliers about climate change
Provide training, support, and best practices on how to make credible renewable energy usage claims
Directly work with suppliers on exploring corporate renewable energy sourcing mechanisms

% of suppliers by number
98

% total procurement spend (direct and indirect)
98

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

Rationale for the coverage of your engagement
We expect all of our suppliers to report environmental data and we encourage a subset of our suppliers to respond to CDP's Climate Change survey and custom surveys. The majority of our suppliers invited to respond, do: Of the 222 suppliers we invited to participate in 2022, 98% responded.

This represents approximately 98% of our technical infrastructure hardware manufacturing suppliers by spend, which is calculated based on the spend for technical infrastructure hardware manufacturing suppliers that respond to our survey requests compared to the spend on our purchase orders with technical infrastructure hardware manufacturing suppliers providing services or products.

In 2022, in addition to our CDP supply chain disclosure requests, we engaged with suppliers directly to drive improved data and accounting, including increased completeness and accuracy for their Scope 1, 2, and 3 emissions.

We've integrated sustainability criteria into our supplier sourcing and performance management processes, and assess and incorporate suppliers' practices to report, manage and reduce their emissions into our supplier scorecard.

Since setting our net-zero emissions goal, we've engaged our key suppliers to develop roadmaps to reduce emissions across our supply chain. To accelerate decarbonization of our supply chain, we're also engaging with our key suppliers to encourage them to commit to procuring 100% renewable energy for their operations.

Impact of engagement, including measures of success
In 2022, we used the CDP Supply Chain platform and custom surveys to request climate and water data from 222 suppliers (both direct spend and indirect spend) and provided individualized feedback on their performance for key KPIs (e.g. emission reduction targets).

Measures of success from engaging our suppliers in GHG emissions reporting and reduction include: response rates, proportion of suppliers reporting GHG emissions, and proportion of suppliers with GHG emissions reduction targets.

Thresholds to measure success: a response rate of at least 90%, 80% of our suppliers reporting GHG emissions, and 50% of suppliers having a GHG emissions reduction target. Another measure of success is increasing renewable energy use in our supply chain.

Example of impact of engagement on renewable energy use: The high cost of renewables is a persistent barrier in markets outside the United States and Europe. In addition, many energy markets have few mechanisms—or none at all—through which companies can credibly purchase renewable energy. In 2021, to begin addressing this barrier, we worked alongside seven other major corporations on a clean power option in Japan. As a result, the team and its supplier partners have created a clean energy option for buyers in Japan centered on repowering hydroelectric facilities and leveraging retail electricity contracts aligned with local procurement norms. We aim to replicate successes from the platform in Japan to reduce the cost and accelerate supplier adoption of renewable energy in other key supply markets around the world.

Example of impact of engagement on GHG emissions: In 2022, climate change reporting rates by our suppliers increased compared to 2021 across all metrics. We focused our supplier engagement efforts and invited 12% fewer suppliers in 2022 compared to 2021. We achieved a response rate of 98% to our climate change survey requests, with 96% of our suppliers reporting at least one source of GHG emissions (Scope 1 and/or Scope 2 emissions) and 70% of our suppliers reporting emissions for at least one Scope 3 category. Of our suppliers invited to report via the CDP Supply Chain program, 75% of our suppliers reported having a GHG emissions reduction target—with 36% of those suppliers reporting that their target is considered to be science-based—and 26% of our suppliers reported having renewable energy targets.

Comment
For reference, our Supplier Code of Conduct can be found at: https://about.google/supplier-code-of-conduct/

Type of engagement
Information collection (understanding supplier behavior)

Details of engagement
Collect climate-related risk and opportunity information at least annually from suppliers

% of suppliers by number
98

% total procurement spend (direct and indirect)
98

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

Rationale for the coverage of your engagement
We engage with our suppliers to reduce their GHG emissions and energy consumption, as stated in our Supplier Code of Conduct (SCOC). In 2022, our Supplier Responsibility program engaged with 741 active suppliers supporting hardware manufacturing and related services, and professional services. Of those, 634 (86%) active suppliers have signed our SCOC, which forms the basis of our supplier sustainability profile survey and our supplier assessments, and articulates our overall requirements for resource efficiency, including energy and emissions. All suppliers are required to sign our SCOC (included in our contracts).

We expect all of our suppliers to report environmental data and we encourage a subset of our suppliers to respond to CDP's Climate Change survey and custom surveys. The majority of our suppliers invited to respond, do: Of the 222 suppliers we invited to participate in 2022, 98% responded.

This represents approximately 98% of our technical infrastructure hardware manufacturing suppliers by spend, which is calculated based on the spend for technical infrastructure hardware manufacturing suppliers that respond to our survey requests compared to the spend on our purchase orders with technical infrastructure hardware manufacturing suppliers providing services or products.

In 2022, in addition to our CDP supply chain disclosure requests, we engaged with suppliers directly to drive improved data and accounting, including increased completeness and accuracy for their Scope 1, 2, and 3 emissions.

We've integrated sustainability criteria into our supplier sourcing and performance management processes by including assessing suppliers' practices to report, manage and reduce their emissions into our supplier scorecard. In 2022, we continued to refine our assessment of GHG emissions associated with services, such as marketing, professional services, and construction services.

In 2022, we also invited indirect spend suppliers that represent Google's indirect spend strategic supplier segment to report via the CDP Supply Chain program.

Impact of engagement, including measures of success
In 2022, we used the CDP Supply Chain platform and custom surveys to request climate and water data from 222 suppliers (both direct spend and indirect spend) and provided individualized feedback on their performance for key KPIs (e.g. emission reduction targets).

Measures of success from engaging our suppliers in GHG emissions reporting and reduction include: response rates, proportion of suppliers reporting GHG emissions, and proportion of suppliers with GHG emissions reduction targets.

Thresholds to measure success include: a response rate of at least 90%, 80% of our suppliers reporting GHG emissions, and 50% of suppliers having a GHG emissions reduction target.

Example of impact of engagement on GHG emissions: In 2022, climate change reporting rates by our suppliers increased compared to 2021 across all metrics. We focused our supplier engagement efforts and invited 12% fewer suppliers in 2022 compared to 2021. We achieved a response rate of 98% to our climate change survey requests, with 96% of our suppliers reporting at least one source of GHG emissions (Scope 1 and/or Scope 2 emissions) and 70% of our suppliers reporting emissions for at least one Scope 3 category. Of our suppliers invited to report via the CDP Supply Chain program, 75% of our suppliers reported having a GHG emissions reduction target—with 36% of those suppliers reporting that their target is considered to be science-based—and 26% of our suppliers reported having renewable energy targets.

We achieved a response rate of 95% for our indirect spend suppliers. Google's engagement with indirect spend suppliers resulted in additional visibility into supplier reported emissions from our indirect spend procurement activities, which helped inform decisions on how to reduce our GHG emissions from indirect spend procurement activities.

Our supplier data is used to calculate our Scope 3 GHG emissions, and set goals and priorities for our sustainability program, such as identifying hotspot suppliers and commodities based on emissions contributions. At least 90% of our hardware suppliers by spend provide data, and we continue to refine our data quality and methodology for calculating the carbon footprint associated with the manufacturing of our hardware products throughout their life cycle.

Comment
For reference, our Supplier Code of Conduct can be found at: https://about.google/supplier-code-of-conduct/

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 educate customers about the climate change impacts of (using) your products, goods, and/or services

% of customers by number

100

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

Please explain the rationale for selecting this group of customers and scope of engagement

Alphabet reports to CDP's Supply Chain program, making our carbon footprint data available to the 95 customers that requested this data from Alphabet for FY2022.

We believe that environmental impact should be an important consideration—alongside factors such as price, security, openness, & reliability—when it comes to data storage, processing & development. In 2022, we matched 100% of the electricity consumption of our operations with renewable energy purchases for the sixth consecutive year. Reaching this milestone was important to us, but it also mattered to many of our customers.

Rationale for group of customers & scope of engagement: Our Carbon Footprint tool is available to 100% of Google Cloud customers for free in the Cloud Console. It provides customers with the gross carbon emissions associated with their Google Cloud Platform usage. We work with a growing group of cloud customers focused on reducing the carbon impact of their operations. We partner with these customers because they are keen to cut carbon emissions, explore new ways to protect the earth's resources, better harness renewable energy, & improve the sustainability of their IT infrastructure. We've helped evaluate customer IT estates & have seen potential net-carbon reductions from a few thousand kilograms of CO2e to many kilotons. To help our customers achieve these IT carbon reductions & make decisions about moving to more sustainable data center options, we've shared an average hourly carbon-free energy percentage for the majority of our Google Cloud regions, as well as a Google Cloud region picker.

We publish content on cloud.google.com/sustainability about the importance of taking sustainability into account with regards to infrastructure & application development. We host webinars, virtual roundtables, & executive engagement sessions on cloud sustainability. Our sales teams work with customers to share tools for calculating the potential emissions impact of migrations of applications to the cloud, host workshops for architecting applications in the most carbon-free way possible, & share best practices to make their IT more sustainable. We've included information on our climate strategy & performance at Google Cloud Next, & have sponsored a sustainability survey for top-level executives (https://cloud.google.com/blog/transform/2023-google-cloud-sustainability-survey).

Impact of engagement, including measures of success

We're collaborating with customers and commercial partners across a number of sectors—including energy, transportation, agriculture, manufacturing, consumer goods, and financial services—to work towards sustainability goals. In 2022, we announced our Google Cloud climate insights offerings to help government agencies better understand the risks to infrastructure and natural resources due to climate change.

Measure of success: Working with customers to measure, report, and reduce their cloud carbon emissions.

Threshold to measure success: A reported reduction in cloud customer carbon emissions.

Impact of engagement through the Carbon Sense suite of products:
- Customers who run on Google Cloud can instantly improve their sustainability profiles. For example, Salesforce has reduced its cloud carbon emissions for certain workloads by up to 80% (see https://cloud.google.com/blog/topics/google-cloud-next/whats-next-for-digital-transformation-in-the-cloud)
- Developers at companies such as L'Oréal and SAP are using Google Cloud tools to reduce the emissions associated with their technology footprint (see https://cloud.google.com/blog/products/serverless/loreal-combines-google-cloud-serverless-and-data-offerings & https://cloud.google.com/blog/topics/sustainability/new-programs-and-tools-for-sustainable-transformation).
- Data analytics tools from Google Cloud are also helping airlines. Lufthansa Group partnered with Google Cloud and Google Research to develop a platform that facilitates better planning and management of daily flight operations. (See https://cloud.google.com/blog/topics/sustainability/lufthansa-uses-data-to-reduce-carbon-emissions-of-airline-travel)
- Active Assist is an intelligent tool that proactively helps customers reduce cloud emissions. In 2021, Active Assist analyzed the aggregate data from all customers across our platform, and over 600,000 kgCo2e was associated with projects that it recommended for cleanup or reclamation. If customers deleted these projects they would significantly reduce future emissions.
- Low-carbon mode enables customers to restrict their cloud resources to low-carbon locations across our infrastructure. Relative to other choices, customers may be able to lower carbon emissions by 5-10x.

C12.1d

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

By organizing information about our planet and making it actionable through technology and platforms, we can help partners and customers create even more positive impact. Our partners include governments and intergovernmental organizations; customers; and researchers, academics, and non-governmental organizations.

Beyond our own tools and programs, we continue to invest in promising initiatives that aim to create scalable, high-impact collaboration ecosystems for climate change and sustainability.

Google Earth Engine is a leading technology platform for planetary-scale environmental monitoring that was launched in 2010 for scientists and NGOs. It offers over 1,000 earth observation datasets with powerful cloud computing to show timely, accurate, high-resolution insights about the state of the world's habitats and ecosystems—and how they're changing over time. In 2022, it was expanded for commercial use by businesses and governments worldwide as an enterprise-grade service through Google Cloud.

As an example of a case study, Google created the Environmental Insights Explorer (EIE) with and for cities and regions. This freely available online tool brings many of our technological advancements together to help measure emission sources, analyze data, identify strategies to reduce emissions, and adapt to climate change impacts. EIE is supported and offered to cities for validation by leading city networks and alliances including the Global Covenant of Mayors for Climate & Energy (GCoM), C40 Cities Climate Leadership Group, ICLEI, and others. EIE makes actionable climate data available to more than 40,000 cities and regions worldwide. As a result, over a thousand cities globally have signed up to view their data and use the insights for their GHG inventories and climate action planning. For example, Iniciativa Climática de México is working with city officials to evaluate Mexico City's building emissions and the potential to generate renewable energy from rooftop solar, using data from EIE, and support from Google.org and ICLEI.

In 2022, EIE released building emissions data for 4,000 new cities, bringing our total buildings data coverage to over 13,000 cities worldwide. We've substantially increased our geographic coverage of the world, improving it by over 250%—from just over 9.5 million square kilometers to over 35 million square kilometers—resulting in over 50% more buildings counted and 40% more building floor area used to estimate emissions.

In Izmir, Turkey's third most populous city, transportation emissions accounted for almost 23% of total city emissions in 2018. Izmir is using EIE to assess the effectiveness of GHG emissions mitigation actions and apply them to policy and decision-making to align with the goals defined in the city's Sustainable Energy and Climate Action Plan.

EIE also provides Tree Canopy Insights, which uses AI and aerial imagery to detect and map tree canopy coverage in cities to help them create cooler environments. As of March 2023, we expanded our coverage to more than 350 cities on four continents. The City of Austin has used the EIE Tree Canopy tool to prioritize planting trees in vulnerable areas and help place bus shelters to increase shade.

We're helping partners and customers to reduce their emissions and achieve sustainability goals by advancing transformative technology for sustainability and climate action. For more details, see Google's 2023 Environmental Report (see https://www.gstatic.com/gumdrop/sustainability/google-2023-environmental-report.pdf).

C12.2

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

Yes, climate-related requirements are included in our supplier contracts

C12.2a

(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.

Climate-related requirement
Climate-related disclosure through a public platform

Description of this climate related requirement
In 2022, our Supplier Responsibility program engaged with 741 active suppliers supporting hardware manufacturing and related services, marketing and professional services. Of those, 634 (86%) active suppliers have signed our Supplier Code of Conduct, which forms the basis of our supplier sustainability profile survey and our supplier assessments, and articulates our overall requirements for resource efficiency, including energy and emissions. Suppliers are required to track, document, and seek to minimize energy consumption and greenhouse gas emissions. This can be via public or non-public platforms.

We expect all of our suppliers that we invite to respond to CDP's Climate Change survey and custom surveys to do so. The majority of those invited to respond, do: Of the 222 suppliers we invited to participate in 2022, 98% responded.

This represents approximately 98% of our technical infrastructure hardware manufacturing suppliers by spend, which is calculated based on the spend for technical infrastructure hardware manufacturing suppliers that respond to our survey requests compared to the spend on our purchase orders with technical infrastructure hardware manufacturing suppliers providing services or products.

% suppliers by procurement spend that have to comply with this climate-related requirement
100

% suppliers by procurement spend in compliance with this climate-related requirement
98

Mechanisms for monitoring compliance with this climate-related requirement
Supplier self-assessment
On-site third-party verification
Supplier scorecard or rating

Response to supplier non-compliance with this climate-related requirement
Retain and engage

Climate-related requirement
Setting a science-based emissions reduction target

Description of this climate related requirement
In 2022, we used the CDP Supply Chain platform and custom surveys to request climate data from 222 suppliers (both direct and indirect spend). We achieved a response rate of 98% to our climate change survey requests, with 96% of our suppliers reporting at least one source of GHG emissions (Scope 1 / Scope 2), and 75% of our suppliers reporting that they have a GHG emissions reduction target—36% of those suppliers reported that their target is science-based.

Although not implemented as a formal requirement as of the end of 2022, during Google's 2022 Supplier Sustainability Summit we communicated the expectation for suppliers to publicly set targets to reduce GHG emissions. By 2030, Google aims to achieve net-zero emissions across all of our operations and value chain. We will actively work with our suppliers to develop net zero roadmaps. To accelerate decarbonization of our supply chain, we're also engaging with our key suppliers to encourage them to commit to procuring 100% renewable energy for their operations.

Explanation of percentages: Given that this expectation has not been implemented as a formal requirement as of the end of 2022, we are unable to provide estimated percentages for supplier compliance. For the purpose of CDP reporting, we have put 0% for the "% suppliers by procurement spend that have to comply with this climate-related requirement" and for the "% suppliers by procurement spend in compliance with this climate-related requirement."

% suppliers by procurement spend that have to comply with this climate-related requirement
0

% suppliers by procurement spend in compliance with this climate-related requirement
0

Mechanisms for monitoring compliance with this climate-related requirement
Other, please specify (This has not been implemented as of the end of 2022, however, we already have a process to request climate data from suppliers through CDP's Supply Chain platform, which includes requesting details about suppliers' GHG emissions reduction targets.)

Response to supplier non-compliance with this climate-related requirement
Other, please specify (This has not been implemented as of the end of 2022, however, our supplier engagement efforts include collaborating with suppliers to establish net-zero roadmaps that are in alignment with our company-wide net-zero goal.)

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

External engagement activities that could directly or indirectly influence policy, law, or regulation that may impact the climate

Yes, we engage directly with policy makers

Yes, our membership of/engagement with trade associations could influence policy, law, or regulation that may 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?

Yes

Attach commitment or position statement(s)

2023 Google Environmental Report

google-2023-environmental-report.pdf

Describe the process(es) your organization has in place to ensure that your external engagement activities are consistent with your climate commitments and/or climate transition plan

Google's U.S. Public Policy Transparency website provides robust and regularly updated disclosures on topics, including our lobbying-related governance and policies, key issues informing our public policy work, regular reporting on our lobbying expenditures, and a list of trade associations in which we participate.

Our Board and senior management team oversees our corporate political activity to ensure appropriate policies and practices are in place and serving the interest of our stockholders. The Nominating and Corporate Governance Committee reviews Google's corporate political policies and activities, including expenditures made with corporate funds, Google's NetPAC contributions, direct corporate contributions to state and local political campaigns, and our policy prohibiting trade associations and other organizations using Google funds for political expenditures.

Our participation in various trade associations provides us the platform to conduct robust and productive engagement on climate policy. We advocate for strong climate policy outcomes as members of numerous trade associations and third party groups, including the Clean Energy Buyers Association and RE-Source, amongst others. These organizations publicly disclose our participation in their membership information materials.

We assess the alignment of our trade association participation with the goals of the Paris Agreement, and engage within organizations to support advocacy for climate policies needed to limit warming to 1.5° Celsius and create a prosperous and competitive zero-carbon economy. We're in dialogue with our trade associations to encourage alignment between our core public policy objectives and their policy advocacy activities, including on climate change.

All activities related to engagement on climate policy are coordinated and managed by designated members of our operations team who handle policy, our public policy team, and members of our communications team. These employees coordinate the drafting and review of all public-facing content related to our overall energy, sustainability and climate change strategy. Material is tracked centrally for reference and use by other employees and to further ensure consistency. These employees ultimately report to our Chief Legal Officer, who oversees our policy and communications organizations. Sustainability teams throughout the organization use this team for review to ensure consistency with our overall climate change 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

(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?

Specify the policy, law, or regulation on which your organization is engaging with policy makers
We've consistently supported strong climate policies around the world in our public policy engagement and advocacy. In the United States, our federal lobbying report covering Q4 2022 includes our lobbying efforts with regard to U.S. federal climate and energy policy, including the Clean Energy for America Act, the CLEAN Future Act, the Infrastructure Investment and Jobs Act, and the energy provisions of the Inflation Reduction Act, all of which align with our advocacy for ambitious federal climate and clean energy policies. Our executives also expressed support for the clean energy and climate provisions in the Inflation Reduction Act. We provided comments to the SEC's proposed rule on enhanced climate-related disclosure in partnership with nine peer tech companies stating our support for regular and consistent reporting of climate-related matters and noting that investors need consistent, comparable, and reliable information on the material risks and impacts of climate-related events and transition activities.

Category of policy, law, or regulation that may impact the climate
Climate change mitigation

Focus area of policy, law, or regulation that may impact the climate
Climate-related reporting
Renewable energy generation
Other, please specify (Electricity grid access for renewables, Energy attribute certificate systems, Subsidies for renewable energy projects)

Policy, law, or regulation geographic coverage
National

Country/area/region the policy, law, or regulation applies to
United States of America

Your organization's position on the policy, law, or regulation
Support with minor exceptions

Description of engagement with policy makers
We've led significant public policy engagement to support strong sustainability outcomes. In 2022, we engaged on U.S. federal sustainability, climate, and energy policy—as a few examples:

--- Legislative Branch engagement: As detailed in Google's lobbying disclosure filings, we conducted lobbying efforts regarding U.S. federal sustainability, climate, and energy policy, including on the Clean Energy for America Act, the CLEAN Future Act, the Infrastructure Investment and Jobs Act, the Clean Electricity Performance Program provisions of the Build Back Better Act, the wholesale market expansion and reform provisions of the Energy and Water Development and Related Agencies Appropriations Act 2022, and the energy provisions of the Inflation Reduction Act, all of which align with our advocacy for ambitious federal climate and clean energy policies. Google executives expressed support for the clean energy and climate provisions in the Inflation Reduction Act.

--- U.S. Department of Energy engagement: Google filed comments on the Clean Hydrogen Production Standard (CHPS) draft guidance. In particular, we highlighted the need for strong quality criteria—hourly temporal correlation, geographic correlation, and additionality—to ensure that grid-based clean hydrogen is produced using clean electricity.

--- U.S. Securities and Exchange Commission (SEC) engagement: In partnership with nine other peer technology companies, Google provided comments to the SEC's proposed rule on enhanced climate-related disclosures. The comments state our support for regular and consistent reporting of climate-related matters; note that investors need consistent, comparable, and reliable information on the material risks and impacts of climate-related events and transition activities on a registrant's consolidated financial position; and provide guiding principles and recommendations for the SEC to consider as it designs a final rule.

Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation
We support the clean energy and climate provisions in the bipartisan infrastructure and budget reconciliation packages.

Have you evaluated whether your organization's engagement on this policy, law, or regulation is aligned with the goals of the Paris Agreement?
Yes, we have evaluated, and it is aligned

Please explain whether this policy, law or regulation is central to the achievement of your climate transition plan and, if so, how?
In 2020, we published a climate change public policy position statement, Realizing a carbon-free future: Google's Third Decade of Climate Action, expressing our support for public policies that strengthen global climate action efforts through the Paris Agreement, establish emissions reduction targets and technology-neutral pathways to achieve a carbon-free economy, and accelerate the development and deployment of next generation low-carbon technology, among other provisions.

It is critical for governments around the world to enact policies that drive rapid technological and economic transformations, including the full decarbonization of the global energy system. That's why Google advocates for stronger clean energy and climate policies, and partners with many other organizations to accelerate clean energy and climate progress.

C12.3b

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

Trade association
Other, please specify (Advanced Energy Buyers Group)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The Advanced Energy Buyers Group is a coalition of leading advanced energy purchasers, engaging on policies to unlock opportunities for customers to access affordable, reliable, clean, and innovative energy options. For more information, see https://www.advancedenergybuyersgroup.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2017, when it was formed. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Advanced Energy United)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
Advanced Energy United is a national association of businesses that are making the energy we use secure, clean, and affordable. They work to accelerate the move to 100% clean energy and electrified transportation in the U.S. Advanced energy encompasses a broad range of products and services that constitute the best available technologies for meeting energy needs today and tomorrow. These include energy efficiency, demand response, energy storage, solar, wind, hydro, nuclear, electric vehicles, biofuels and smart grid. Advanced Energy United represents more than 100 companies in the $238 billion U.S. advanced energy industry, which employs 3.2 million U.S. workers. For more information, see https://advancedenergyunited.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2019. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Advanced Power Alliance)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The Advanced Power Alliance is the industry trade association created to promote the development of wind, solar and energy storage as resources that can deliver clean, reliable, affordable power for American consumers. For more information, see https://poweralliance.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. We are Board Members of the Advanced Power Alliance, but do not provide any funding beyond membership. We participate principally to support clean energy advocacy in the states, Oklahoma and Texas. And, we also participate actively in the group's engagement in ERCOT and SPP.

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

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

Trade association
Other, please specify (Alliance to Save Energy)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The Alliance to Save Energy was founded in 1977 and is a bipartisan, nonprofit coalition of business, government, environmental, and consumer groups based in Washington, D.C. The group has played an integral role in nearly every major energy efficiency policy achievement on the national stage, becoming the leading national voice for efficiency policy. For more information, see https://www.ase.org/about

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. We are board members and take part in supporting the working groups focused on improving the policy and regulatory environments for energy efficiency and demand response to support decarbonization of power grids in the US. We do not provide funding beyond membership. We maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (American Clean Power Association)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The American Clean Power Association (ACPA) is the voice of companies from across the clean power sector that are powering America's future and providing cost-effective solutions to the climate crisis while creating jobs, spurring massive investment in the U.S. economy, and driving high-tech innovation across the nation. ACP gives a voice to the renewable power sector to speak at a time when renewable investments can help rebuild our economy and address climate change. For more information, see https://www.cleanpower.org

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. This group (formerly the American Wind Energy Association) was created in 2020 to advance all renewable energy technologies in markets across the United States. Google joined in 2020 and was a founding member of this organization. We do not provide funding beyond membership. We maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (American Council on Renewable Energy)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
American Council on Renewable Energy (ACORE) is a 501(c)(3) national nonprofit organization that unites finance, policy and technology to accelerate the transition to a renewable energy economy. ACORE is the focal point for collaborative advocacy across the renewable energy sector. ACORE studies focus on the most significant climate policy options and their impact on renewable energy growth and investment. In an effort to identify the most promising and effective suite of climate policies, their work includes analyses of carbon pricing scenarios, a federal high-penetration renewable energy standard, a technology-neutral tax credit, and complementary measures to ready the electric grid for the higher levels of renewable energy penetration necessary to achieve ambitious greenhouse gas emission reductions.
For more information, see http://www.acore.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. We are not on the Board of this trade association and do not provide funding beyond membership. However, we are founding members of the U.S. Partnership for Renewable Energy Finance (US PREF), which is now part of ACORE. We are also a member of the Partnership for Renewable Integration & Market Expansion (PRIME) (https://acore.org/pref-and-prime/) and serve on the Leadership Council. We maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Americans for a Clean Energy Grid)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
Americans for a Clean Energy Grid (ACEG) is the only non-profit broad-based public interest advocacy coalition focused on the need to expand, integrate, and modernize the North American high-voltage grid. Expanded high-voltage transmission will make America's electric grid more affordable, reliable, and sustainable and allow America to tap all economic energy resources, overcome system management challenges, and create thousands of well-compensated jobs. But an insular, outdated and often short-sighted regional transmission planning and permitting system stands in the way of achieving those goals. ACEG brings together the diverse support for an expanded and modernized grid from business, labor, consumer and environmental groups, and other transmission supporters to educate policymakers and key opinion leaders to support policy which recognizes the benefits of a robust transmission grid. ACEG is a 501(c)(3) organization. For more information, see: https://cleanenergygrid.org

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2019. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Asia Clean Energy Coalition)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The Asia Clean Energy Coalition (ACEC) was established in 2022 to convene a coalition of world-leading renewable energy buyers in Asia, in collaboration with sellers and financiers, to strategically shift policy in key Asian national and regional markets. For governments across Asia seeking capital investment, energy security, and sustainable economic growth, ACEC provides strategic advice based on real demands, and guidance informed by regional and international best practice. For non-government actors seeking to promote renewable electricity in Asia, ACEC is an expert hub for strategic communications and policy coordination, helping to maximize impact. For more information, see https://asiacleanenergycoalition.com/en/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google is a founding member of ACEC, which we helped launch at COP27, and a member of the Steering Group. We also take part in several working groups focused on improving the policy and regulatory environments for corporate clean energy procurement and supporting decarbonization of power grids across the Asia-Pacific region. We do not provide funding beyond membership. We maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Business Environment Leadership Council (BELC) of the Center for Climate and Energy Solutions (C2ES))

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The Center for Climate and Energy Solutions (C2ES) forges practical and innovative solutions to address climate change and engages with leading businesses to accelerate climate progress. Founded in 1998 as the Pew Center on Global Climate Change, C2ES is known worldwide as a thought leader and trusted convener on climate change and energy. For more information, see https://www.c2es.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined C2ES in 2022 to support climate, energy, and sustainability policy in the United States and abroad. We pay annual dues as members of the Business Environment Leadership Council (BELC), focused on scaling business action on climate. We do not provide funding beyond membership. We maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Carolinas Clean Energy Business Association)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The Carolinas Clean Energy Business Association (CCEBA) is a 501(c)(6) non-profit trade association for North and South Carolina's clean energy industry. CCEBA represents businesses throughout the clean energy sector, including independent power producers/developers as well as those in the clean energy supply chain. These include manufacturing, engineering, construction, financial and legal services, as well as businesses who want to purchase clean energy. For more information, see https://carolinasceba.com/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google is on the Board of CCEBA and chairs the CCEBA legislative committee, but does not provide any funding beyond membership.

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

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

Trade association
Other, please specify (Clean Energy Buyers Association)

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

Consistent

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
Clean Energy Buyers Association (CEBA) is a membership association for energy customers seeking to procure clean energy across the U.S. Today, their membership of over 300 includes stakeholders from across the commercial and industrial sector, non-profit organizations, as well as energy providers and service providers. The Clean Energy Buyers Association's aspiration is to achieve a 90% carbon-free U.S. electricity system by 2030 and to cultivate a global community of energy customers driving clean energy. For more information, see https://cebuyers.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google was actively involved in the creation of this national trade organization in 2018, serving as the chair of the Interim Board of Directors during the transition from an NGO-led effort into a corporate-led trade organization. Google also provided financial support for the development of the organization. In 2020, a Google representative served as the Board Chair of this organization.

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

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

Trade association
Other, please specify (Clean Grid Alliance)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
With the mission to advance renewable energy in the midwest, Clean Grid Alliance addresses one of the most important issues of our time by advocating for renewable energy policy and building the foundational infrastructure for a Midwest run on clean energy. For more information, see https://cleangridalliance.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined CGA in 2019 and is an active participant in quarterly member meetings, the MISO working group, and select state specific working groups. Google supports CGA through our membership dues and does not hold a seat on the Board. We do not provide funding beyond membership. We maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Conservation Voters of South Carolina)

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

Has your organization attempted to influence their position in the reporting year?
No, we did not attempt to influence their position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
Conservation Voters of South Carolina is a statewide organization that has been holding elected leaders directly accountable for a safe, clean, and healthy South Carolina since 2003. CVSC fights for air, land, water, and energy through bipartisan and pragmatic political action, making conservation and environmental issues a top priority among South Carolina's elected leaders, political candidates, and voters. For more information, see https://www.cvsc.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. CVSC is working to decarbonize South Carolina's electricity grid, through advocacy, public education and public decision-maker accountability. They are specifically focused on utility reform, market access and clean energy adoption, which are aligned with Google's goals in the state. We do not provide funding beyond membership. We maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Energy Alabama)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position

Energy Alabama advances sustainable energy in the community by advocating for better policy. They work on behalf of their members with cities, counties, utilities, and the state of Alabama. For more information, see: https://alcse.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2019. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Eurelectric

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

Has your organization attempted to influence their position in the reporting year?
No, we did not attempt to influence their position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
Eurelectric is the federation of the European electricity industry with a mission to lead Europe's energy transition with clean electricity. They speak for more than 3500 European utilities active in power generation, distribution and supply. For more information, see https://www.eurelectric.org

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2020, and also supports Eurelectric's 24/7 Hub focused on accelerating power system decarbonization by moving towards 24/7 carbon free energy matching. We are not on the Board of this trade association. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Japan Climate Leaders Partnership)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
Japan Climate Leaders Partnership (JCLP) is a coalition of Japanese companies who hold the firm belief that economic prosperity and sustainability go hand in hand. For more information, see https://japan-clp.jp/en

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2020. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (North Carolina Sustainable Energy Association)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
North Carolina Sustainable Energy Association (NCSEA) works to enable clean energy jobs, economic opportunities, and affordable energy options for North Carolinians. For more information, see http://www.energync.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (RE100)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
RE100 is a global corporate renewable energy initiative bringing together hundreds of large and ambitious businesses committed to 100% renewable electricity. Led by the Climate Group and in partnership with CDP, their mission is to accelerate change towards zero carbon grids at scale. For more information, see http://there100.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined RE100 in December 2015 (see: https://www.there100.org/our-work/news/google-joins-re100-and-announces-new-investments-wind-and-solar-power-news). Google is on the Advisory Committee of RE100, which advises RE100 leadership on issues related to strategy and policy engagement. We do not provide funding beyond membership.

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

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

Trade association
Other, please specify (RE-Source)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The RE-Source Platform is Europe's leading forum for corporate renewable energy sourcing. Through its wide-ranging and innovative Buyers Toolkit and popular annual event for energy buyers and sellers, RE-Source seeks to remove barriers for corporates to renewable energy procurement in support of Europe's climate and energy goals. The RE-Source Platform pushes for the removal of regulatory and administrative barriers to corporate renewable energy procurement in Europe in support of the EU's climate and energy goals. The Platform provides a wealth of free information and resources on corporate energy sourcing, including an annual event which brings together both buyers and sellers from across Europe. For more information, see http://resource-platform.eu/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google was actively involved in the creation of the RE-Source Platform and is one of its founding Strategic Partners and a member of the Steering Group. Google also sponsored the annual RE-Source conference in Amsterdam in 2019, which brought together over 800 government officials and business leaders dedicated to accelerating corporate purchasing of renewable energy in Europe.

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

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

Trade association
Other, please specify (Renewable Northwest)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
Renewable Northwest is a renewable energy advocacy organization. With a granular focus on policy and regulatory proceedings in Oregon, Washington, Idaho and Montana, they are relentless in their effort to ensure transparent, efficient and competitive markets for renewable energy across the Western US. For more information, see https://renewablenw.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2019. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
Other, please specify (Smart Electric Power Alliance)

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
The Smart Electric Power Alliance (SEPA) is a nonprofit organization that envisions a carbon-free energy system that is safe, affordable, reliable, resilient and equitable. For more information, see: https://sepapower.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2019. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
SolarPower Europe

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
SolarPower Europe's mission is to ensure solar becomes Europe's leading energy source by 2030. As the member-led association for the European solar PV sector, SolarPower Europe represents over 260 organizations across the entire solar sector. With solar sitting on the horizon of unprecedented expansion, SolarPower Europe works together with members to create the right regulatory and business environment to take solar to the next level. For more information, see http://www.solarpowereurope.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2018. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

Trade association
WindEurope

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

Has your organization attempted to influence their position in the reporting year?
Yes, we publicly promoted their current position

Describe how your organization's position is consistent with or differs from the trade association's position, and any actions taken to influence their position
WindEurope is the voice of the wind industry, actively promoting wind energy across Europe. They have over 400 members from across the whole value chain of wind energy: wind turbine manufacturers, component suppliers, power utilities and wind farm developers, financial institutions, research institutes and national wind energy associations. WindEurope believes that a rapid renewables-based electrification is the most cost-effective way to decarbonise our economy and reach climate neutrality by 2050. For more information, see https://windeurope.org/

Google is part of many trade associations and has chosen to highlight a select few that are specifically focused on climate and energy issues. Google joined this group in 2018. We are not on the Board of this trade association and do not provide funding beyond membership. However, we maintain regular engagement with top leadership of the key trade associations in which we are members.

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

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

C12.4

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

Publication
In other regulatory filings

Status
Complete

Attach the document
google-2023-eu-nfrd-report.pdf

Page/Section reference
Pages 2 to 5

Content elements
Governance
Strategy
Risks & opportunities
Other metrics

Comment
See Google's 2023 European Union Non-Financial Reporting Directive (NFRD) Report

---

Publication
In mainstream reports

Status
Complete

Attach the document
20230203_alphabet_10K.pdf

Page/Section reference
Ongoing Commitment to Sustainability (Pages 7-8), Other Bets (Pages 6-7), Risk Factors (Page 12, 13, and 19)

Content elements
Strategy
Risks & opportunities
Other metrics

Comment
See Page 7 of Alphabet's FY2022 10-K

Publication
In mainstream reports

Status
Complete

Attach the document
2023_alphabet_proxy_statement.pdf

Page/Section reference
Letter from the Chair of the Board of Directors (Page 4), Environmental & Social Highlights (Page 12), and company response to a climate change-related stockholder proposal (Page 80)

Content elements
Strategy
Risks & opportunities
Other metrics

Comment
See Alphabet's 2023 Proxy Statement

Publication
In voluntary sustainability report

Status
Complete

Attach the document
google-2023-environmental-report.pdf

Page/Section reference
Pages 1 to 103

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

Comment
See Google's 2023 Environmental Report

C12.5

(C12.5) Indicate the collaborative frameworks, initiatives and/or commitments related to environmental issues for which you are a signatory/member.

	Environmental collaborative framework, initiative and/or commitment	Describe your organization's role within each framework, initiative and/or commitment
Row 1	European Climate Pact Exponential Roadmap Initiative Race to Zero Campaign Task Force on Climate-related Financial Disclosures (TCFD) World Business Council for Sustainable Development (WBCSD)	Google partners with many organizations to accelerate progress towards shared sustainability goals. For more details about our climate- and sustainability-related partnerships and memberships, see Google's Environmental Report (see https://www.gstatic.com/gumdrop/sustainability/google-2023-environmental-report.pdf). As a few examples: - Google was among the leading businesses that joined the European Climate Pact in its inaugural year to share our commitment to help achieve a climate neutral Europe. - In 2021, we joined the Exponential Roadmap Initiative and the UN Race to Zero Campaign, the largest ever alliance committed to halving emissions before 2030 towards net zero emissions by no later than 2050. - We've formally expressed support for the TCFD reporting framework and its seven principles for climate disclosure. - Google has been a member of the WBCSD for several years and participates in a number of its initiatives. We're actively involved in initiatives related to improving well-being for people and the planet, including shifting diets, consumer behavior change, and regenerative agriculture.

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	Please select	<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 and publicly endorsed initiatives related to biodiversity	Other, please specify (Google and Google.org are supporting the creation, restoration, and/or enhancement of 600 acres of habitat for monarchs and other pollinators across California, including creating more habitat on our campuses.)	Other, please specify (Santa Clara Valley Audubon Society, San Francisco Estuary Institute (SFEI), Global Fishing Watch, Global Forest Watch, urban ecology research and innovation, Wildlife Insights, Tree Canopy Lab)

C15.3

(C15.3) Does your organization assess the impacts and dependencies of its value chain on biodiversity?

Impacts on biodiversity

Indicate whether your organization undertakes this type of assessment

Value chain stage(s) covered
<Not Applicable>

Portfolio activity
<Not Applicable>

Tools and methods to assess impacts and/or dependencies on biodiversity
<Not Applicable>

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)
<Not Applicable>

Dependencies on biodiversity

Indicate whether your organization undertakes this type of assessment

Value chain stage(s) covered
<Not Applicable>

Portfolio activity
<Not Applicable>

Tools and methods to assess impacts and/or dependencies on biodiversity
<Not Applicable>

Please explain how the tools and methods are implemented and provide an indication of the associated outcome(s)
<Not Applicable>

C15.4

(C15.4) Does your organization have activities located in or near to biodiversity- sensitive areas in the reporting year?

C15.5

(C15.5) 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	Species management

C15.6

(C15.6) 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	State and benefit indicators Response indicators

C15.7

(C15.7) 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
In voluntary sustainability report or other voluntary communications	Details on biodiversity indicators Biodiversity strategy	https://www.gstatic.com/gumdrop/sustainability/google-2023-environmental-report.pdf
In voluntary sustainability report or other voluntary communications	Details on biodiversity indicators	https://blog.google/outreach-initiatives/sustainability/restoring-native-habitats-silicon-valley/
In voluntary sustainability report or other voluntary communications	Details on biodiversity indicators	https://medium.com/google-earth/improved-models-lead-to-improved-maps-d962c0feb1a1
Other, please specify (In 2022, we partnered with the San Francisco Estuary Institute, the International Union for the Conservation of Nature (IUCN) Urban Alliance, and others to publish a "Making Nature's City" Toolkit.)	Details on biodiversity indicators	https://www.makingnaturescity.org/

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.

For more information on how climate change is integrated into our business strategy, see the resources below, as well as the attachments in Question 12.4:

Google Sustainability website: https://sustainability.google

Google Sustainability reports: https://sustainability.google/reports/

Google Sustainability blog: https://blog.google/outreach-initiatives/sustainability

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	Senior Vice President and Chief Financial Officer, Alphabet Inc. and Google LLC.	Chief Financial Officer (CFO)

SC. Supply chain module

SC0.0

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

SC0.1

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

	Annual Revenue
Row 1	282836000000

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

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

SC2.1

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

SC2.2

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

SC4.1

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

Submit your response

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