



Independent Accountants' Review Report

To the Board of Directors and Management of Alphabet Inc.

We have reviewed Alphabet Inc.'s Schedules of Select Environmental Indicators (the "Subject Matter") included in Appendix A for the year ended December 31, 2021 in accordance with the criteria also set forth in Appendix A (the "Criteria"). Alphabet Inc.'s management is responsible for the Subject Matter in accordance with the Criteria. Our responsibility is to express a conclusion on the Subject Matter based on our review.

Our review was conducted in accordance with 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. Those standards require that we plan and perform our review to obtain limited assurance about whether any material modifications should be made to the Subject Matter in order for it to be in accordance with the Criteria. A review consists principally of applying analytical procedures, making inquiries of persons responsible for the Subject Matter, obtaining an understanding of the data management systems and processes used to generate, aggregate and report the Subject Matter and performing such other procedures as we considered necessary in the circumstances. A review is substantially less in scope than an examination, the objective of which is to obtain reasonable assurance about whether the Subject Matter is in accordance with the Criteria, in all material respects, in order to express an opinion. Accordingly, we do not express such an opinion. A review also does not provide assurance that we became aware of all significant matters that would be disclosed in an examination. We believe that our review provides a reasonable basis for our conclusion.

In performing our review, we have also complied with the independence and other ethical requirements set forth in the Code of Professional Conduct and applied the Statements on Quality Control Standards established by the AICPA.

As described in Note A within Appendix A, the Subject Matter 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. Furthermore, Scope 3 emissions are calculated based on a significant number of estimations and management assumptions due to the inherent nature of the Greenhouse Gas Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard criteria.

The information included in the Company's annual Environmental Report and submission to the CDP, formerly the Carbon Disclosure Project, other than the Subject Matter, has not been subjected to the procedures applied in our review and, accordingly, we express no conclusion on it.

Based on our review, we are not aware of any material modifications that should be made to the accompanying Schedules of Select Environmental Indicators included in Appendix A for the year ended December 31, 2021, in order for it to be in accordance with the Criteria.

Ernst & Young LLP

June 7, 2022
San Jose, California

Appendix A: Schedules of Select Environmental Indicators

Alphabet Inc. ¹ Schedule of Select Environmental Indicators (continued) For the Year Ended December 31, 2021			
Indicator	Reported Value ²	Unit	Criteria
Scope 1 greenhouse gas (GHG) emissions ³	45,073	Metric tonnes of carbon dioxide equivalent (tCO ₂ e)	World Resources Institute (WRI)/World Business Council for Sustainable Development's (WBCSD), The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (GHG Protocol)
Biogenic GHG emissions ⁴	3,797	Metric tonnes of carbon dioxide (tCO ₂)	WRI WBCSD GHG Protocol and Global Reporting Initiative (GRI) Disclosure 305-1c ⁵
Scope 2 GHG emissions: location-based method (LBM) ⁶	6,576,239	tCO ₂ e	WRI WBCSD GHG Protocol Scope 2 Guidance
Scope 2 GHG emissions: market-based method (MBM) ⁶	1,823,132	tCO ₂ e	
Scope 3 GHG emissions, Category 6 Business Travel ^{7, 8}	26,000	tCO ₂ e	WRI WBCSD GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard
Scope 3 GHG emissions, Category 7 Employee Commuting (excluding Teleworking emissions) ^{8, 9}	25,000	tCO ₂ e	
Scope 3 GHG emissions, Category 7 Employee Commuting - Teleworking ^{8, 10}	85,000	tCO ₂ e	WRI WBCSD GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard, supplemented by EcoAct's 2020 Homeworking emissions Whitepaper
Total energy consumption ¹¹	18,571,659	Megawatt-hour (MWh)	GRI Disclosure 302-1e ⁵
Electricity consumption - Global ¹²	18,287,143	MWh	GRI Disclosure 302-1c, i ⁵
Electricity consumption - U.S.	12,903,398	MWh	
Electricity consumption - International	5,383,745	MWh	
Scope 1 + 2 Carbon intensity per unit of revenue	7.25	tCO ₂ e / million \$	GRI Disclosure 305-4 ⁵
Scope 1 + 2 Carbon intensity per full-time equivalent employee (FTE) ¹³	12.87	tCO ₂ e / FTE	
Scope 1 + 2 Carbon intensity per MWh of energy consumed	0.1006	tCO ₂ e / MWh	
Percentage of electricity procured from renewable sources	100	%	Alphabet Inc. calculates the percentage of total global electricity procured from renewable sources as the amount of electricity procured from renewable energy globally, divided by the total electricity consumed by its Global Facilities. Electricity procured from renewable energy globally is calculated as the amount of electricity from renewable energy generation from the grids Alphabet Inc. uses, the amount of on-site renewable energy generation, and the amount sourced through contractual instruments globally. ¹⁴

Alphabet Inc.¹ Schedule of Select Environmental Indicators (continued)
For the Year Ended December 31, 2021

Indicator	Reported Value ²	Unit	Criteria
Carbon credits enabled through contracted carbon offset projects	2,004,205	tCO ₂ e	Alphabet Inc. invests in avoidance carbon offset projects. ¹⁵ An avoidance carbon offset project is an investment activity that reduces carbon emissions, ultimately represented by a carbon credit. The carbon credit signifies that GHG emissions are lower than if no one had invested in the carbon offset project. One carbon credit equals one metric tonne of carbon dioxide equivalent prevented from entering the atmosphere. ¹⁶ Alphabet Inc. enters into long-term purchase agreements with their offsets suppliers to secure future deliveries. Once carbon credits from a project under contract are verified by a third-party and issued by a carbon registry, ¹⁷ per the agreement terms, ownership of the carbon credits is transferred from the project owner to Alphabet Inc. ("delivered"). All carbon credits are retired on a public registry after they are delivered to Alphabet Inc. Due to the timing of third-party verifications, delivery and retirement for some 2021 enabled carbon credits occurs after the year ended December 31, 2021. ¹⁸ As a result, this metric includes 53,527 tCO ₂ e of delivered carbon credits and 1,950,678 tCO ₂ e of contracted carbon credits. All carbon offset projects were contracted prior to December 31, 2021. ¹⁹ As the ongoing third-party project verifications and carbon credit issuances are completed, carbon credits will be delivered to Alphabet Inc. and subsequently permanently retired on Alphabet Inc.'s behalf.
Water withdrawal ²⁰	6,297	Million gallons	GRI Disclosure 303-3a (total only, excluding seawater) ⁵
Water discharge ²¹	1,735	Million gallons	GRI Disclosure 303-4a (total only, excluding seawater) ⁵
Water consumption ²²	4,562	Million gallons	GRI Disclosure 303-5a (total only, excluding seawater) ⁵

Note A: Non-financial information 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 standards and frameworks provide acceptable measurement techniques, which may result in materially different measurements. The precision of different measurement techniques may also vary.

Alphabet Inc.'s Schedule of Operational GHG emissions After Compensation Adjustments For the Year Ended December 31, 2021 (tCO ₂ e)	
Scope 1 GHG emissions	45,073
Scope 2 GHG emissions (MBM)	1,823,132
Scope 3 Business Travel GHG emissions	26,000
Scope 3 Employee Commuting GHG emissions	25,000
Scope 3 Employee Commuting - Teleworking GHG emissions	85,000
Total Operational GHG emissions:	2,004,205
Less: compensation adjustments	
Carbon credits enabled through contracted carbon offset projects	2,004,205
Operational GHG emissions after Compensation adjustments:	0

Alphabet Inc.'s Total Operational GHG Emissions is calculated by totaling Scope 1, Scope 2 (MBM), Scope 3 Category 6 Business Travel, Scope 3 Category 7 Employee Commuting and Scope 3 Category 7 Teleworking GHG emissions, per the criteria described above. Alphabet Inc.'s Operational GHG Emissions After Compensation Adjustments is calculated as Alphabet's Total Operational GHG emissions less carbon credits enabled through contracted carbon offset projects. Carbon credits enabled through contracted carbon offset projects are retired at an amount equal to Alphabet Inc.'s Scope 1, Scope 2 (MBM), Scope 3 Category 6 Business Travel, Scope 3 Category 7 Employee Commuting and Scope 3 Category 7 Teleworking GHG emissions.

See **Note A** above.

Alphabet Inc.'s Schedule of total emissions reduced through renewable energy PPAs, MBM emission factors, and compensation for by carbon credits enabled through contracted carbon offset projects For the Year Ended December 31, 2021 (tCO ₂ e)	
Scope 2 GHG emissions (LBM)	6,576,239
Less: Scope 2 GHG emissions (MBM)	1,823,132
Total emissions reduced from renewable energy PPAs and MBM emission factors:	4,753,107
Emissions compensated for by carbon credits enabled through contracted carbon offset projects	2,004,205
Total emissions reduced:	6,757,312

Alphabet Inc.'s total emissions reduced from renewable energy PPAs and MBM emission factors is calculated by subtracting Scope 2 MBM GHG emissions from Scope 2 LBM GHG emissions, which are calculated per the criteria described above. Alphabet Inc.'s total emissions reduced is calculated by totaling the Emissions reduced from renewable energy PPAs and MBM emission factors and Emissions compensated for by carbon credits enabled through contracted carbon offset projects.

See **Note A** above.

Alphabet Inc.'s Schedule of electricity procured from renewable sources For the Year Ended December 31, 2021 (MWh)	
Renewable electricity procured (PPAs and on-site)	14,118,248
Renewable energy generation from the grids Alphabet Inc. uses	4,168,895
Total electricity procured from renewable sources:	18,287,143

Alphabet Inc. calculates the total electricity procured from renewable sources by totaling the amount of renewable electricity generation from the grids Alphabet Inc. uses, the amount of on-site renewable energy generation and the amount sourced through contractual instruments (PPAs) globally.¹²

See **Note A** above.

-
- ¹ References to Alphabet Inc. include its subsidiaries, except otherwise noted. The geographical scope of the Subject Matter within the Schedule includes Alphabet Inc. and its subsidiaries' data centers, offices, and networking infrastructure under its operational control ("Global Facilities") for energy and emissions metrics. For water metrics, the geographical scope of the Subject Matter within the Schedule includes Alphabet Inc. and its subsidiaries' data centers and offices under its operational control. For water, energy and emissions metrics, this excludes Calico. Where possible, based on the company's reporting timeline and requirements, the company uses the most up-to-date emission factors available at the time of their carbon footprint calculation.
- ² All indicators are reported for the period January 1, 2021 through December 31, 2021.
- ³ "Scope 1 GHG emissions" capture natural gas from owned Global Facilities, back-up generator fuel use generated by Global Facilities, fuel consumption from Alphabet Inc.'s operated vehicles and aircraft and methane and nitrous oxide from biogenic sources. The emission factors used to calculate Scope 1 GHG emissions include the 2017 WRI/WBCSD GHG Protocol Emission Factors from Cross Sector Tools, the 2021 Environmental Protection Agency (EPA) Center for Corporate Climate Leadership GHG Emission Factors Hub, and the 2021 Department for Environment, Food and Rural Affairs (DEFRA) UK Government GHG Conversion Factors.
- ⁴ In accordance with the WRI/WBCSD GHG Protocol, Corporate Standard, biogenic CO₂ emissions are called out separately from other Scope 1 GHG emissions. These emissions are generated from Alphabet Inc.'s operated vehicles consuming biogenic fuels. The emission factors used to calculate biogenic emissions come from the 2021 EPA Center for Corporate Climate Leadership GHG Emission Factors Hub.
- ⁵ Reference to GRI metrics means that Alphabet Inc. is aligned with the portion of the GRI criteria that is disclosed within the "Criteria" column.
- ⁶ Scope 2 GHG emissions capture natural gas from leased Global Facilities and electricity consumption generated by Global Facilities. Where natural gas consumption from offices, or electricity consumption for Global Facilities was not available, Alphabet Inc. estimates consumption. Electricity and natural gas estimated consumption are calculated using company square footage and internally developed electricity and natural gas intensity factors by office type based on fiscal year 2021 data. The emission factors used to calculate Scope 2 LBM emissions include the 2017 WRI/WBCSD GHG Protocol Emission Factors from Cross Sector Tools, the 2021 International Energy Agency (IEA) Emission Factors, and the 2021 EPA eGRID Emission Factors. The emission factors used to calculate Scope 2 MBM emissions include the 2017 WRI/WBCSD GHG Protocol Emission Factors from Cross Sector Tools, the 2021 IEA Emission Factors, the 2021 Association for Issuing Bodies European Residual Mixes, the 2021 EPA eGRID Emission Factors and emission factors specific to energy attribute certificates applied.
- ⁷ "Scope 3 GHG Emissions Category 6 Business Travel" includes GHG emissions generated by Alphabet Inc. employees and candidates from air, rail, and car rental travel. Travel data is collected through Alphabet Inc.'s online booking system or through a third-party travel agency for all sources. Emissions are calculated using 2021 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 2021 EPA Center for Corporate Climate Leadership GHG Emission Factors Hub for car rental travel.
- ⁸ Scope 3 GHG emissions are rounded up to the nearest thousand.
- ⁹ "Scope 3 GHG emissions Category 7 Employee Commuting (excluding Teleworking emissions)" estimates GHG emissions generated by private vehicle commuting trips made by Alphabet Inc. employees. To determine the number of private vehicles commuting trips made in 2021, Alphabet Inc. surveyed a sample of its employees to determine typical commuting patterns and applied these commuting patterns to its 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. Emissions are calculated using 2021 DEFRA UK Government GHG Conversion Factors for passenger vehicles.
- ¹⁰ "Scope 3 GHG emissions Category 7 Employee Commuting – Teleworking" estimates the GHG emissions generated by employees working remotely from their homes (i.e., telecommuting). Alphabet Inc. applies the estimation methodology outlined in [EcoAct's 2020 Homeworking emissions Whitepaper](#) to its annual average workforce in 2021. For the purposes of the estimate, countries split between both the northern and southern hemispheres are captured as part of the southern hemisphere and use of air conditioning in homes is captured only in the U.S., Japan, Korea and China.
- ¹¹ Total energy includes all fuel and natural gas consumption as included in Scope 1 GHG emissions, all electricity and natural gas consumption as included in Scope 2 LBM GHG emissions and all electricity generated on-site from renewable and non-renewable sources.
- ¹² "Electricity consumption – Global" is the summation of ("Electricity consumption – International" + "Electricity consumption - U.S.")
- ¹³ FTEs are based on the annual average FTEs
- ¹⁴ The percentage of total global electricity procured from renewable sources is equal to $(18,287,143 \text{ MWh total renewable energy procured} [4,168,895 \text{ MWh of renewable energy generation from the grids Alphabet Inc. uses} + 8,811 \text{ MWh from on-site renewable energy generation} + \text{at least } 14,109,437 \text{ MWh of renewable energy sourced through contractual instruments globally}]) / (18,287,143 \text{ MWh of Alphabet Inc.'s total electricity consumption})$. Contractual instruments may include power purchase agreements (PPAs) and utility renewable energy tariffs, which may result in renewable energy credits (RECs) or guarantees of origin (GOs). Alphabet Inc.'s renewable energy methodology is a custom calculation and is based on a global approach. The numerator includes all renewable energy procured, regardless of the market in which the renewable energy was consumed. Additional details on Alphabet Inc.'s criteria and methodology can be found in the [Achieving Our 100% Renewable Energy Purchasing Goal and Going Beyond](#) disclosure.
- ¹⁵ Alphabet Inc. assesses carbon offset projects against four standards before investing: Additionality, Leakage prevention, Permanence and Verifiability. Refer to Alphabet Inc.'s [Carbon Offset White Paper](#) for additional information.
- ¹⁶ As stated in the WRI/WBCSD GHG Protocol, a GHG target can be met through using offsets that are generated from GHG reduction projects at sources external to the (company's) boundary. Offsets are designed to be interchangeable globally and deliverable from a variety of project types. Alphabet Inc. refers to these emission offsets as "Emissions neutralized by carbon offset projects" within its Environmental Report.
- ¹⁷ Alphabet Inc.'s carbon credits are verified under Climate Action Reserve (CAR), American Carbon Registry (ACR), or Verified Carbon Standard (VCS).
- ¹⁸ Per the carbon registry verification manuals, all projects must complete their initial verification within 12 months of the end of the initial reporting period.
- ¹⁹ Some contracted carbon credits have been generated or will be generated in the 12 months following December 31, 2021.
- ²⁰ Water withdrawal data is based on actual metered or invoiced data when it is available. At offices when actual data is not available, water withdrawal is estimated using facility square footage and internally developed water withdrawal intensity factors by office type based on fiscal year 2021 data.
- ²¹ In all instances where actual potable water discharge is not available, Alphabet Inc. applies a 90% discharge flow factor to the facility water withdrawal to estimate water discharge. For irrigation water, Alphabet Inc. applies a 0% discharge flow factor to the facility water withdrawal to estimate water discharge. This estimation process is applicable to all offices and to potable and irrigation water withdrawal at data centers used for domestic purposes (i.e., water not used for IT cooling) where actual discharge is not available.
- ²² "Water consumption" is equal to ("Water withdrawal" – "Water discharge")