



## Independent Accountants' Review Report

To the Board of Directors and Management of Alphabet Inc.

We have reviewed Alphabet Inc.'s Schedule of Select Environmental Indicators for the year ended December 31, 2023 and the Schedule of Base Year GHG Emissions (including Recalculation) for the year ended December 31, 2019 (the "Subject Matter") included in Appendix A 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. The procedures performed in a review vary in nature and timing from and are substantially less in extent 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. Because of the limited nature of the engagement, the level of assurance obtained in a review is substantially lower than the assurance that would have been obtained had an examination been performed. As such, a review does not provide assurance that we became aware of all significant matters that would be disclosed in an examination. We believe that the review evidence obtained is sufficient and appropriate to provide a reasonable basis for our conclusion.

We are required to be independent of Alphabet Inc. and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements related to our review engagement. Additionally, we have complied with the other ethical requirements set forth in the Code of Professional Conduct and applied the Statements on Quality Control Standards established by the AICPA.

The procedures we performed were based on our professional judgment. Our review consisted 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.

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 Standard and GHG Protocol Technical Guidance for Calculating Scope 3 Emissions 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 Schedule of Select Environmental Indicators for the year ended December 31, 2023 or the Schedule of Base Year GHG Emissions (including Recalculation) for the year ended December 31, 2019 included in Appendix A in order for them to be in accordance with the Criteria.

*Ernst + Young LLP*

June 14, 2024  
San Jose, California

## Appendix A: Schedules of Select Environmental Indicators

Alphabet Inc. <sup>1</sup> Schedule of Select Environmental Indicators For the Year Ended December 31, 2023 <sup>2</sup>			
Indicator	Reported Value <sup>3</sup>	Unit	Criteria
Scope 1 greenhouse gas (GHG) emissions <sup>4, 5</sup>	79,400	Metric tons of carbon dioxide equivalent (tCO <sub>2</sub> 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 <sup>6</sup>	18,700	Metric tons of carbon dioxide (tCO <sub>2</sub> )	WRI/WBCSD GHG Protocol
Scope 2 GHG emissions: location-based method (LBM) <sup>5, 7</sup>	9,252,900	tCO <sub>2</sub> e	WRI/WBCSD GHG Protocol Scope 2 Guidance
Scope 2 GHG emissions: market-based method (MBM) <sup>5, 7</sup>	3,423,400	tCO <sub>2</sub> e	
Scope 3 GHG emissions, Category 6 Business Travel <sup>8, 9</sup>	283,000	tCO <sub>2</sub> e	WRI/WBCSD GHG Protocol Corporate Standard, GHG Protocol Technical Guidance for Calculating Scope 3 Emissions
Scope 3 GHG emissions, Category 7 Employee Commuting (including Teleworking emissions) <sup>9, 10</sup>	113,000	tCO <sub>2</sub> e	
Total energy consumption <sup>11</sup>	25,910,500	Megawatt-hour (MWh) <sup>12</sup>	As defined by GRI Disclosure 302-1a, b, c, e, f, g <sup>13, 14</sup>
Scope 1 + 2 Carbon intensity per unit of revenue <sup>15</sup>	11.40	tCO <sub>2</sub> e / million USD (\$)	As defined by GRI Disclosure 305-4a-d <sup>13, 18</sup>
Scope 1 + 2 Carbon intensity per full-time equivalent employee (FTE) <sup>15, 16</sup>	19.02	tCO <sub>2</sub> e / FTE	
Scope 1 + 2 Carbon intensity per MWh of energy consumed <sup>17</sup>	0.1352	tCO <sub>2</sub> 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. <sup>19</sup>
Water withdrawal <sup>20, 23</sup>	8,653.3	Million gallons	Total water withdrawal, excluding seawater, for any use by the Company. <sup>13</sup>
Water discharge <sup>21, 23</sup>	2,301.3	Million gallons	Total water discharge, excluding seawater, for which the Company has no further use. <sup>13</sup>
Water consumption <sup>22, 23</sup>	6,352.0	Million gallons	Total water consumption, excluding seawater, that has been withdrawn and incorporated into the Company's operations, including through evaporation, and is therefore not released back to surface water, groundwater, or a third party. <sup>13</sup>

**Note:** 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 Base Year GHG Emissions (including Recalculation) For the Year Ended December 31, 2019 (tCO <sub>2</sub> e)		
Indicator	Reported Value <sup>3</sup>	Criteria
Recalculated 2019 base year Scope 1 GHG emissions	81,900	WRI/WBCSD GHG Protocol
2019 base year Scope 2 LBM GHG emissions	5,116,900	WRI/WBCSD GHG Protocol
Recalculated 2019 base year Scope 2 MBM GHG emissions	835,500	WRI/WBCSD GHG Protocol
2019 base year Scope 3 Category 6 GHG emissions	369,000	WRI/WBCSD GHG Protocol
2019 base year Scope 3 Category 7 GHG emissions, including teleworking emissions	173,000	WRI/WBCSD GHG Protocol

Alphabet has a recalculation policy, following guidance from the GHG Protocol, to inform how the Company makes adjustments to previously reported metrics – including the 2019 base year for the Company's emissions reduction target – for structural changes, calculation methodology updates, the inclusion of additional activity data and improvements in the accuracy of emission factors or activity data. Alphabet applies a quantitative significance threshold and various qualitative criteria to determine whether a metric needs to be recalculated. 2019 Scope 1 and Scope 2 market-based emissions were recalculated primarily due to changes to the reporting boundary with the inclusion of refrigerant leakage and district system energy emissions.

Alphabet Inc.'s Schedule of Scope 1 & Scope 2 by Region For the Year Ended December 31, 2023 (tCO <sub>2</sub> e)			
Region	Scope 1	Scope 2 Location-based	Scope 2 Market-based
North America	54,600	6,864,600	1,855,700
Europe, Middle East, & Africa	11,300	752,400	59,900
Latin America	1,200	142,000	16,200
Asia Pacific	12,300	1,493,900	1,491,600
<b>Total</b>	<b>79,400</b>	<b>9,252,900</b>	<b>3,423,400</b>

Alphabet Inc.'s Scope 1 & Scope 2 by Region is calculated per the criteria described above for Scope 1 and Scope 2.

Alphabet Inc.'s Schedule of Scope 1 & Scope 2 by Gas For the Year Ended December 31, 2023 (tCO <sub>2</sub> e)			
Gas Type	Scope 1	Scope 2 Location-based	Scope 2 Market-based
CO <sub>2</sub>	54,800	9,183,600	3,388,000
CH <sub>4</sub>	200	16,900	4,800
N <sub>2</sub> O	200	33,100	11,300
HFC	24,200	19,300	19,300
<b>Total</b>	<b>79,400</b>	<b>9,252,900</b>	<b>3,423,400</b>

Alphabet Inc.'s Scope 1 & Scope 2 by Gas is calculated per the criteria described above for Scope 1 and Scope 2.

Alphabet Inc.'s Schedule of Total Electricity & Total Renewable Energy Allocated by Region For the Year Ended December 31, 2023 (MWh)		
Region	Total Electricity <sup>25</sup>	Total Renewable Energy Allocated
North America	18,535,300	11,875,400
Europe, Middle East, & Africa	3,547,200	3,456,200
Latin America	424,900	336,200
Asia Pacific	2,799,600	4,100
<b>Total</b>	<b>25,307,000</b>	<b>15,671,900</b>

Alphabet Inc.'s Total Electricity & Total Renewable Energy Allocated by Region is calculated per the criteria described above for Total Energy Consumption.

Alphabet Inc.'s Schedule of Energy Consumption For the Year Ended December 31, 2023 (MWh)	
Fuel <sup>24</sup>	301,200
Purchased Electricity <sup>25</sup>	25,252,600
Purchased Heat	278,500
Purchased Steam	14,500
Purchased Cooling	53,000
On-site Renewable Electricity	10,700
<b>Total</b>	<b>25,910,500</b>

Alphabet Inc.'s Energy Consumption is calculated per the criteria described above for Total energy consumption.

**Alphabet Inc.'s Schedule of Total Emissions Reduced through Renewable Energy PPAs and MBM Emission Factors**  
**For the Year Ended December 31, 2023**  
(tCO<sub>2</sub>e)

Scope 2 GHG emissions (LBM)	9,252,900
Less: Scope 2 GHG emissions (MBM)	3,423,400
<b>Total emissions reduced from renewable energy PPAs and MBM emission factors:</b>	<b>5,829,500</b>

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 Schedule of electricity procured from renewable sources**  
**For the Year Ended December 31, 2023**  
(MWh)

Renewable electricity procured (PPAs)	19,089,200
Renewable electricity procured (on-site)	10,700
Renewable energy generation from the grids Alphabet Inc. uses	6,207,100
<b>Total electricity procured from renewable sources:</b>	<b>25,307,000</b>

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

**Alphabet Inc.'s Schedule of Water by Data Center Location**  
**For the Year Ended December 31, 2023**  
(million gallons)

Location	Withdrawal	Discharge	Consumption
Ashburn, VA	57.9	3.3	54.6
Berkeley County, SC	847.2	83.8	763.4
Council Bluffs, IA	1,334.9	354.8	980.1
The Dalles, OR	383.7	81.3	302.4
Douglas County, GA	418.8	73.2	345.6
Dublin, Ireland	0.6	0.5	0.1
Eemshaven, Netherlands	296.4	64.4	232.0
Frankfurt, Germany	2.2	1.8	0.4
Fredericia, Denmark	27.0	6.3	20.7
Hamina, Finland	3.0	2.7	0.3
Henderson, NV	273.8	115.0	158.8
Inzai, Japan	11.2	4.4	6.8
Jackson County, AL	159.8	17.6	142.2
Lancaster, OH	15.4	7.7	7.7
Leesburg, VA	246.8	73.6	173.2
Lenoir, NC	358.1	21.3	336.8
Lockbourne, OH	31.8	8.5	23.3
Mayes County, OK	1,037.1	222.0	815.1
Middenmeer, Netherlands	7.1	2.1	5.0
Midlothian, TX	164.3	28.5	135.8
Montgomery County, TN	342.0	53.4	288.6

Alphabet Inc.'s Schedule of Water by Data Center Location For the Year Ended December 31, 2023 (million gallons)			
Location	Withdrawal	Discharge	Consumption
Montreal, Canada	0.04	0.03	0.01
New Albany, OH	152.0	24.9	127.1
Papillion, NE	164.2	29.5	134.7
Quilicura, Chile	190.7	85.5	105.2
St. Ghislain, Belgium	348.9	104.7	244.2
Sterling, VA	81.0	25.4	55.6
Storey County, NV	1.9	1.7	0.2
Sydney, Australia	0.9	0.8	0.1
Other data center locations	698.5	57.9	640.6
<b>Total</b>	<b>7,657.2</b>	<b>1,556.6</b>	<b>6,100.6</b>

Alphabet Inc.'s Water by Data Center Location is calculated per the criteria described above for withdrawal, discharge, and consumption.

- 1 References to Alphabet Inc. include its subsidiaries. For energy and emissions metrics, the scope of the Subject Matter within the Schedule includes Alphabet Inc. and its subsidiaries' data centers, offices, and information technology assets under its operational control ("Global Facilities"). For water metrics, the scope of the Subject Matter within the Schedule includes Alphabet Inc. and its subsidiaries' directly operated data centers and offices under its operational control. 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 and calculates emissions by multiplying relevant activity data by the applicable emission factors. The global warming potentials for each GHG are sourced from the Intergovernmental Panel on Climate Change Fourth Assessment Report (AR4), Appendix A: Global Warming Potentials, as consolidated by the 2023 Climate Registry Default Emission Factors (which also includes additional detail on refrigerant blends beyond what IPCC provides). There are also a few instances where GWPs are sourced from the IPCC Fifth Assessment Report (AR5) due to being embedded in the emission factors developed by 2023 Department for Environment, Food and Rural Affairs (DEFRA) UK Government GHG Conversion Factors. All reported values are rounded to the nearest hundred unless otherwise noted.
- 2 The targets and progress against related targets are not included in this presentation of the subject matter.
- 3 All indicators are reported for the period January 1, 2023 through December 31, 2023, unless otherwise noted.
- 4 "Scope 1 GHG emissions" capture natural gas, back-up generator fuel use, and fugitive emissions from refrigerant leaks at owned Global Facilities, fuel consumption from Alphabet Inc.'s operated vehicles and aircraft and methane and nitrous oxide from biogenic sources. In the limited cases where natural gas consumption from owned offices was not available, Alphabet Inc. estimates consumption. Natural gas estimated consumption is calculated using company square footage and internally developed natural gas intensity factors by office type based on fiscal year 2023 data. The emission factors used to calculate Scope 1 GHG emissions include the 2017 WRI/WBCSD GHG Protocol Emission Factors from Cross Sector Tools, the 2023 Environmental Protection Agency (EPA) Center for Corporate Climate Leadership GHG Emission Factors Hub, the 2023 Climate Registry Default Emission Factors, and the 2023 DEFRA UK Government GHG Conversion Factors. "Scope 1 GHG emissions" includes CO<sub>2</sub> (54,800 tCO<sub>2</sub>), CH<sub>4</sub> (6 tCH<sub>4</sub>), N<sub>2</sub>O (1 tN<sub>2</sub>O), and HFCs (15 tHFC).
- 5 Where refrigerant data was not available, Alphabet Inc. estimates refrigerant leakage using an average of known GWP values and leakage rates from refrigerants within our portfolio based on fiscal year 2023 data and a 20% leakage rate.
- 6 In accordance with the WRI/WBCSD GHG Protocol, Corporate Standard, biogenic CO<sub>2</sub> emissions are reported 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 2023 EPA Center for Corporate Climate Leadership GHG Emission Factors Hub.
- 7 "Scope 2 GHG emissions" capture natural gas, fugitive emissions from refrigerant leaks at leased Global Facilities, and purchased steam, hot water, and chilled water from district energy systems and purchased electricity consumption at Global Facilities. This includes all purchased electricity for owned and operated Global data centers and purchased electricity related to the operation of the company's information technology assets at leased data centers and other locations. In the limited cases where natural gas consumption from offices, electricity consumption for Global Facilities, or activity from district energy systems was not available, Alphabet Inc. estimates consumption. Electricity, natural gas, and activity from district energy systems estimated consumption are calculated using company square footage and internally developed intensity factors by office type based on fiscal year 2023 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 2023 International Energy Agency (IEA) Emission Factors, the 2023 EPA Center for Corporate Climate Leadership GHG Emission Factors Hub, the 2023 DEFRA UK Government GHG Conversion Factors, the 2024 EPA eGRID Emission Factors, and the 2023 Climate Registry Default 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 2023 IEA Emission Factors, the 2023 EPA Center for Corporate Climate Leadership GHG Emission Factors Hub, the 2023 Climate Registry Default Emission Factors, and emission factors specific to energy attribute certificates applied. Outside of Europe, residual emission factors are not available from third-party sources to account for voluntary purchases and this may result in double counting between electricity consumers. "Scope 2 GHG emissions LBM" includes CO<sub>2</sub> (9,183,600 tCO<sub>2</sub>), CH<sub>4</sub> (700 tCH<sub>4</sub>), N<sub>2</sub>O (100 tN<sub>2</sub>O), and HFCs (13 tHFC). "Scope 2 GHG emissions MBM" includes CO<sub>2</sub> (3,388,000 tCO<sub>2</sub>), CH<sub>4</sub> (200 tCH<sub>4</sub>), N<sub>2</sub>O (38 tN<sub>2</sub>O), and HFCs (13 tHFC).
- 8 "Scope 3 GHG emissions, Category 6 Business Travel" includes GHG emissions generated by Alphabet Inc. employees and candidates from air, rail, bus, personal vehicle (when the employee's car is used for business purposes), taxi, rideshare, shuttle, and rental car travel, including emissions from relocation travel. Distance, fuel, and spend-based travel data is collected through Alphabet Inc.'s online booking system or through third-party travel companies for all sources. Data obtained from value chain partners is used to calculate 7% of emissions. Emissions are calculated using 2023 DEFRA UK Government GHG Conversion Factors for air, rail, taxi, rideshare, non-U.S. personal vehicle, and non-U.S. shuttle travel, and the 2023 EPA Center for Corporate Climate Leadership GHG Emission Factors Hub for car rental, U.S. personal vehicle, and U.S. shuttle travel.
- 9 All reported Scope 3 GHG emissions values are rounded to the nearest thousand.

- 10 "Scope 3 GHG emissions, Category 7 Employee Commuting (including Teleworking emissions)" includes two components: Employee Commuting (71,000 tCO<sub>2</sub>e) and Teleworking (42,000 tCO<sub>2</sub>e). Employee Commuting estimates GHG emissions from the transport of Alphabet Inc. employees between their homes and their worksites by passenger car (i.e., carpool, dropoff, taxi, rideshare, or single-occupied vehicle), rail, bus, motorcycle and gas-powered scooter commuting trips. To determine the number of commuting trips by mode made in 2023, Alphabet Inc. surveys its employees to determine typical commuting patterns and applies 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 2022 National Household Travel Survey and mode-specific commuting distance obtained from the American Public Transportation Association's 2021 Fact Book. Value chain partner data is not used at this time. Emissions are calculated using 2023 EPA Center for Corporate Climate Leadership GHG Emission Factors Hub. Teleworking estimates the GHG emissions generated by employees working remotely from their homes (i.e., telecommuting) which are optional emissions for reporting under Category 7. Alphabet Inc. applies the estimation methodology outlined in [EcoAct's 2020 Homeworking emissions Whitepaper](#) to its annual average workforce in 2023, with the exception of the application of a 3 month heating season in the United States. Countries split between both the northern and southern hemispheres are captured as part of the southern hemisphere. Use of air conditioning in homes is captured only in the U.S., Japan, Korea, Saudi Arabia, China, Mexico, Brazil, Indonesia, South Africa, and India.
- 11 Total energy includes all fuel and natural gas consumption as included in Scope 1 GHG emissions, all electricity, natural gas, steam, hot water, and chilled water from district energy systems consumption as included in Scope 2 LBM GHG emissions and all electricity generated on-site from renewable sources.
- 12 Metric is reported in MWh, using a conversion factor of 3600 MJ/MWh.
- 13 Significant contextual information necessary to understand how the data has been compiled has been disclosed.
- 14 Other criteria included in GRI Disclosure 302-1 (e.g., 302-1d: electricity, heating, cooling, and steam consumed sold) are excluded.
- 15 Reported carbon intensity per unit of revenue and per FTE employee values are rounded to the nearest hundredths place.
- 16 FTEs are based on the annual average FTEs.
- 17 Reported carbon intensity per MWh of energy consumed values are rounded to the nearest ten thousandths place.
- 18 The greenhouse gasses included in this metric are CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, and HFCs. These metrics are calculated using the Scope 1 and Scope 2 MBM emissions from global operations.
- 19 The percentage of total global electricity procured from renewable sources is equal to (25,307,000 MWh total renewable energy procured [6,207,100 MWh of renewable energy generation from the grids Alphabet Inc. uses + 10,700 MWh from on-site renewable energy generation + at least 19,089,200 MWh of renewable energy sourced through contractual instruments globally]) / (25,307,000 MWh of Alphabet Inc.'s total electricity consumption). Contractual instruments may include power purchase agreements (PPAs), tax equity investments, PPA-linked renewable energy credit (REC) / guarantee of origin (GO) agreements and utility renewable energy tariffs, which may result in RECs or 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.
- 20 Water withdrawal data is based on actual metered or invoiced data when it is available. At offices where 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 2023 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").
- 23 All water values are rounded to the nearest hundred thousand gallons and reported in million gallons.
- 24 Total fuel consumption from non-renewable sources was 232,900 MWh and total fuel consumption from renewable sources was 68,300 MWh.
- 25 "Total electricity consumption" includes both purchased and self-generated electricity. This differs slightly from "Purchased electricity", which is electricity sourced from an electrical grid and purchased from a local electric utility company.