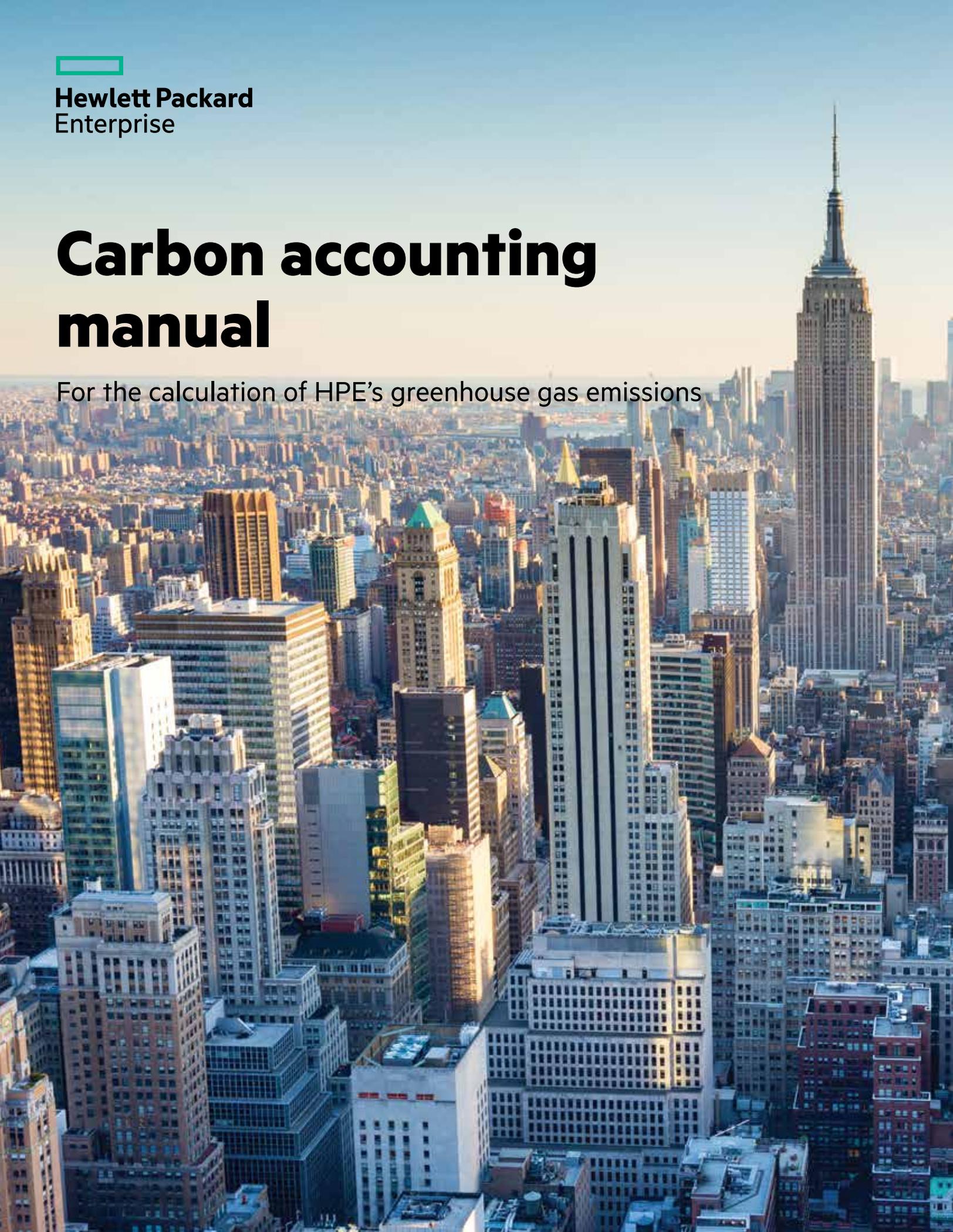




**Hewlett Packard
Enterprise**

Carbon accounting manual

For the calculation of HPE's greenhouse gas emissions



Purpose of the document

The purpose of this document is to provide additional details on the calculation methodology for Scope 1, 2, and 3 greenhouse gas (GHG) emissions of Hewlett Packard Enterprise as communicated in the HPE Living Progress Report (LPR).

GHG reporting standards

Generally, accepted GHG accounting principles exist to provide a standard basis for reporting a faithful, true, and fair account of a company's GHG emissions. HPE calculates its reported GHG emissions in accordance with the industry guidelines as developed by the World Resources Institute (WRI) GHG Protocol.

- For Scope 1 and 2 emissions reporting, HPE utilizes the GHG Protocol Corporate Standard.
 - Scope 1 is defined as direct GHG emissions occurring from sources that are owned or controlled by HPE.
 - Scope 2 Indirect GHG emissions result from the generation of electricity, heat, or steam generated off-site but purchased by HPE.
- For Scope 3 emissions reporting, HPE utilizes the GHG Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.
 - Scope 3 includes indirect GHG emissions from sources not owned or directly controlled by HPE but related to our activities such as product use, vendor supply chains, delivery services, outsourced activities, and employee travel and commuting (other than travel in HPE's transportation fleet). Scope 3 emissions are a consequence of the activities of HPE, but occur from sources not owned or controlled by HPE.

While GHG accounting and reporting principles continue to evolve, HPE uses principles derived in part from generally accepted financial accounting and reporting principles, including relevance, completeness, consistency, transparency, and accuracy.

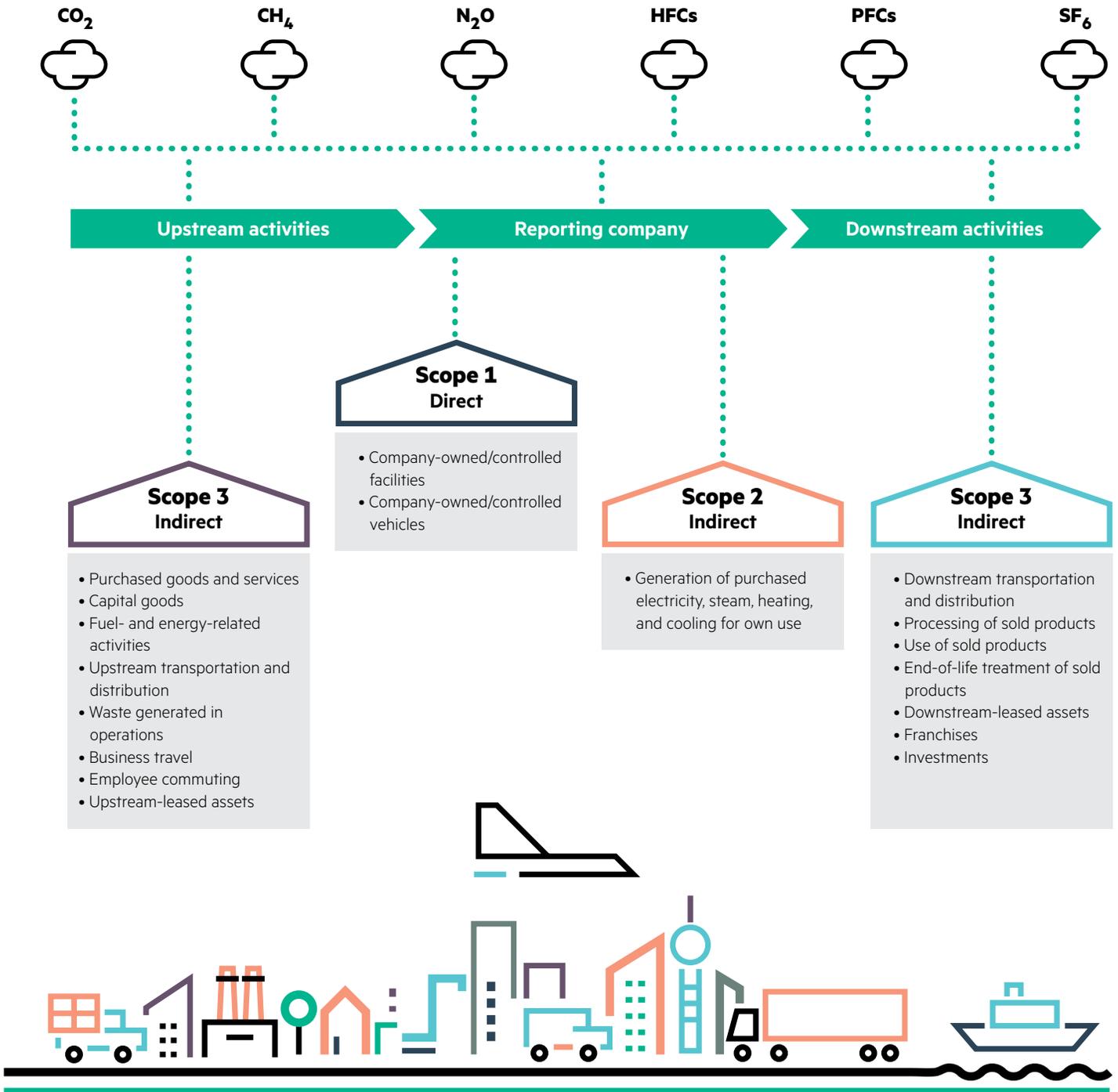


Figure 1: "Overview of GHG Protocol scopes and emissions across the value chain" based on WRI's "Corporate Value Chain Accounting and Reporting Standard," GHG Protocol



Organizational boundaries

Scope 1 and 2 emissions are calculated for all sites within HPE's operational control. Emissions from HPE-owned transportation are reported in Scope 1. In cases where HPE did not receive separate invoice or meter readings for its energy consumption, HPE's consumption was determined using real estate square footage information from internal databases. This primarily applies to the extrapolated activity data.

GHG emissions not within HPE's operational control are accounted for in Scope 3 emissions; these emissions are related to our activities in the reporting year (that is, emissions related to products purchased or sold in the reporting year).

For some Scope 3 categories, emissions occur simultaneously with the activity (for example, from combustion of energy), so emissions occur in the same year as HPE's activities. For some categories, emissions may have occurred in previous years (for example, the purchase of goods used to create a product sold). For other Scope 3 categories,

emissions are expected to occur in future years because the activities in the reporting year have long-term emission impacts. For these categories, reported emissions have not happened yet but are expected to happen as a result of the waste generated, investments made, and products sold in the reporting year. For these categories, the reported data should not be interpreted to mean that emissions have already occurred, but that emissions are expected to occur as a result of activities that occurred in the reporting year.

Fiscal year reporting

GHG emissions are reported using the fiscal year of HPE, 1 November through 31 October. For Scope 1, 2, and 3 emissions, the most recent fiscal year completed is reported in the following year's reporting.

Units

HPE reports GHG emissions in metric tons of carbon dioxide equivalents (mtCO₂e).

Calculation methodology

Sources of emission factors

Emission factors are used to convert an activity (such as purchased electricity in kilowatt-hours) to GHG emissions (in metric tons CO₂e). To calculate emissions from natural gas that is tracked in cubic meters, HPE first converts to kWh using a conversion factor of 10.7 m³/kWh. HPE utilizes the most accurate emission factors where available and feasible. Priority is given to supplier emission factors and then regional emission factors as defined by the United States Environmental Protection Agency or International Energy Agency (IEA). HPE uses Global Warming Potential (GWP) rates from the Intergovernmental Panel on Climate Change's (IPCC) Fifth Assessment Report to calculate GHG emissions.

Data collection and estimations

For electricity, natural gas, and refrigerant use, we collected data from all HPE-owned manufacturing sites and our largest owned and leased office, warehouse, data center, and distribution sites. This accounted for the majority of our total floor space. For the remaining sites where data is not tracked directly, we extrapolated data as available from comparable operations, primarily data centers and office space, for the remaining floor space, by developing intensity factors, unless stated otherwise. Data extrapolation is performed on a quarterly basis. For vacant space, we assumed natural gas consumption to be 10% of the operational space intensity factor, and the vacant space intensity factor for electricity is assumed as 0.6 kWh/ft². We continue to refine the process by which we collect data and calculate trends.

Scope 1

Scope 1 emissions related to natural gas consumption are calculated using factors from the Climate Registry's Default Emission Factors report released in April of 2015. For emissions resulting from air fleet activity,

HPE uses emission factors from the U.S. Energy Information Administration (EIA) Form EIA-1605 Appendix H: Fuel Emission Factors. Auto fleet emissions for the U.S. are calculated using factors from the WRI's Emissions Factors from Cross Sectors Tool dated April 2014. Auto fleet emissions for Canada are calculated using emission factors from the 2015 Canadian National Inventory Report (NIR).

Accounting for refrigerants

Refrigerants are generally used in air conditioning units in HPE's buildings and GHG emissions are linked to leakages in these systems. Leakage from these systems is generally very small; however, the global warming potential of these chemicals is high. Numerous refrigerant types are used and reported from sites for which different emission factors exist.

- When actual consumption values are available based on invoices, GHG emissions are calculated using the appropriate emissions factor for each type of refrigerant.
- Other sites have not ever reported refrigerant leakage because no measured or invoiced data is available—refrigerant use for these sites is estimated using a regional intensity factor (refrigerant CO₂e per square foot). This factor is based on an average of measured refrigerant-emission values and tracked square footage for these sites from the previous year in each region. Refrigerant use is estimated quarterly.

Auto fleet

HPE's auto fleet emissions are compiled based on different data acquisition systems worldwide. Auto fleet data is calculated using different methods for different regions. The U.S. and Canada fleet GHG emissions are calculated using direct fuel consumption data. For Europe, Middle East, and Africa (EMEA), country-specific vehicle distances that have been derived from historic data and reported averages, are applied across known vehicle types (as described in Table 1). Asia Pacific and Japan (APJ) emissions are calculated by applying average annual emissions per vehicle from EMEA to the number of vehicles used in APJ. Latin America emissions used a similar process but with U.S. average emissions per vehicle.

Table 1: EMEA country-specific vehicle distances

Country	Estimated mileage (km)
Austria	27,000
Belgium	27,000
Czech Republic	29,000
Switzerland	28,000
Germany	31,000
Denmark	28,000
Spain	24,000
Finland	28,000
France	30,000
Great Britain	32,000
Greece	25,000
Ireland	26,000
Italy	29,000
Luxembourg	52,000
Netherlands	32,000
Portugal	27,000
Romania	30,000
Russia	22,000
Slovakia	25,000
Sweden	25,000

Scope 2

In 2016, HPE reported Scope 2 emissions using both the location-based and market-based methods. HPE's overall electricity consumption reported in the market-based method reflects actual markets with contractual information where available.

For Scope 2 emissions (location-based-method), HPE uses EPA 2012 eGRID emission factors for U.S. locations. With the exception of Australia, international locations use the IEA's 2013 CO₂ Emission from Fuel Combustion report for CO₂ emissions and the Energy Information Administration's (EIA) Form EIA-1605, Appendix F for CH₄ and N₂O emissions. For sites in Australia, HPE applies CO₂e factors from the Australian Government's Department of National Greenhouse Accounts Factors report, dated August 2015.

HPE's voluntary renewable energy purchases consist of Renewable Energy Credits (RECs) from power purchase agreements, unbundled RECs, purchased renewables (sourced mostly from wind), and zero-carbon electricity (sourced mostly from large hydro).

HPE purchases RECs and generates renewable energy at some sites. Renewable energy is accounted for in different ways depending on how the contract is entered or metered.

For on-site production (such as solar), the renewable energy is metered separately, and it is included in our total consumption. This amount of consumption is considered to have zero Scope 1 and Scope 2 emissions.

HPE reports location-based and market-based Scope 2 emissions in accordance with the GHG Protocol. In the market-based method, a zero emission factor is applied to renewable energy. In the location-based method, renewable energy has no effect on emission figures.

Residual mix

For the market-based method, HPE uses 2014 residual mix factors published on June 15, 2015 by RE-DISS (Reliable Disclosure Systems for Europe). For countries beyond the European Union where a residual mix is not available, emissions are calculated using grid averages, which may result in double counting of voluntary purchases of renewable energy between electricity consumers.

Scope 3

HPE calculates its Scope 3 GHG emissions in accordance with the GHG Protocol, which defines fifteen distinct categories of Scope 3 emissions and provides a systematic framework to organize, understand, and report on Scope 3 activities within a corporate value chain.

HPE uses life cycle assessment (LCA) tools to calculate product-related impacts. An LCA evaluates all stages of a product's life using an inventory of relevant energy and material inputs and environmental releases. LCAs are designed to provide the total product carbon footprint (PCF) and a percentage breakdown of emissions among the four lifecycle stages: manufacturing, transport, use, and end of life.

HPE completed a wide range of LCAs for products across its portfolio that are representative of the high-volume products that HPE sells. HPE uses different methods or models to calculate LCAs for the various types of products it sells.

Separate models that use Company-specific information have been created for the non-product related Scope 3 categories. Table 2 provides additional details for each category.

Table 2. Calculation methodology for Scope 3 emissions categories

Category	Description	Calculation methodology
Purchased goods and services (Extraction to production)	Emissions associated with the extraction, production, and transportation of the products HPE sells in each of its major business groups.	<p>HPE uses separate LCA methods to calculate GHG emissions associated with the following two product categories:</p> <ul style="list-style-type: none"> • Servers, including all BLs, DLs, MLs, SLs, and MicroServers. • Storage products <p>Server LCAs are derived using a detailed energy analysis for the use phase, the primary Scope 3 impact for servers. The energy consumption is calculated using the publicly available HPE Power Advisor using the typical configuration (memory, processor, chassis, etc.) of the most representative server families, determined by selecting the most shipped server within each category during the reporting fiscal year. Utilization is estimated between 15 and 30% based on the type of server running 365 days by 24 hours per day. The server carbon footprint is calculated using two different models. The use phase is calculated using HPE's Power Advisor tool. The other phases (Materials and Manufacturing, Transportation, and End of Life) are generated using the Product Attribute to Impact Algorithm (PAIA) model, created by HPE and other manufacturers. The inputs to the PAIA model include component characteristics, product energy use and transport information.</p> <p>The storage carbon footprint is calculated by applying publicly available Storage LCA information to all the storage drives sold by the Storage subunit of the "Enterprise Group" Business unit of HPE. We assume that storage drives account for an overwhelming portion of carbon emissions from storage arrays, which are the complete storage products used by customers. The approach obtains the total number of drives sold during the reporting year from HPE's financial reporting databases. We assume that approximately 80% of the power consumption of storage arrays is attributed to drives, an assumption indirectly confirmed by storage array testing performed by the Storage Networking Industry Association (SNIA) Emerald™ program. Two publicly available LCAs, completed by Seagate Technology, are used to estimate the GHG emissions of each drive. Emissions from the HDD (Hard Disk Drive) LCA are applied across all HDD drives. Emissions from the SSD (Solid State Drive) LCA are applied to SSDs and all other drives sold by HPE, which makes for a conservative estimate because the SSD LCA presents significantly greater emissions than the HDD LCA. Finally, we assume that 76% of the emissions in the "Extraction to production" lifecycle phase of storage arrays is attributable to drives (with the rest attributable to components such as enclosures and power supplies).</p> <p>The calculation methodology for both LCAs encompasses the following Scope 3 categories: 4 and 9 for transportation; 11 for use of sold products; and 12 for end-of-life treatment of sold products.</p>

Table 2. Calculation methodology for Scope 3 emissions categories (continued)

Category	Description	Calculation methodology	
Capital goods	Emissions associated with the extraction, production, and transportation of the capital goods purchased by HPE.	Capital expenditures are identified on HPE's balance sheet; generally, the goods identified in property, plant, and equipment (PP&E) represents the annual investment in capital goods by HPE. The upstream impacts of these investments are estimated using the following category factors:	
		Buildings	589,000 mtCO ₂ e/\$ USD (in billion)
		Mechanical equipment	567,000 mtCO ₂ e/\$ USD (in billion)
		Electronic equipment	454,000 mtCO ₂ e/\$ USD (in billion)
		Other	464,000 mtCO ₂ e/\$ USD (in billion)
Fuel- and energy-related activities	All upstream emissions of purchased energy, including raw material extraction up to the point of combustion, as well as transportation and distribution losses (T+D).	This category accounts for all of the upstream emissions associated with the energy purchased by HPE (Scope 1) and electricity consumed by HPE (Scope 2) for facilities under our operational control and as defined by the boundary for Scope 1 and 2 emissions. This category excludes emissions from the combustion of fuels or electricity consumed by the reporting Company since they are already included in Scope 1 or Scope 2. A total factor of 18% is applied to estimate the upstream impacts and is based on transportation and distribution losses, plant use losses, and emissions associated with extraction and transportation of fuels. Location-based method Scope 2 emissions are used to calculate this category.	
Upstream transportation and distribution	The upstream transportation and distribution of the products HPE sells in each of its major business groups, including any retail and storage.	This category is calculated using the methods described for Category 1 (Purchased Goods and Services) and is considered together with Category 9 for upstream transportation.	
Waste generated in operations	Disposal and treatment of nonhazardous waste generated in HPE's facilities.	The total nonhazardous waste activity across HPE is reported in the annual Living Progress Report. An emissions factor determined by the United States Environmental Protection Agency's (EPA) Waste Reduction Model (WARM) is used to convert this to GHG emissions. A portion of nonhazardous waste is diverted from the waste stream and reused; emissions from this portion are not considered at this time, which is considered a conservative approach. The emission associated with processing hazardous waste is assumed negligible given the low relative volumes and comprehensive management practices HPE has in place.	
Business travel	Commercial air travel by employees	The estimation takes into account the type of aircraft, passenger and cargo load, cabin class, and miles traveled for each ticketed purchase. HPE utilizes emission factors from Defra's 2016 report, which are valid until June 31, 2017. HPE includes emissions from commercial air travel but excludes emissions relating to car rental and hotel stays since the data is currently not available. Emissions from transportation in vehicles owned or controlled by HPE are accounted for in Scope 1 (for fuel use).	
Employee commuting	Transportation of all worldwide employees between their homes and their worksites (in vehicles not owned and operated by HPE), including teleworking.	Assumptions for commute distance, vehicle type, and number of working days for categories of employees (office, teleworkers, and mobile sales) are based on the U.S. Department of Transportation's (DOT) 2009 National Household Travel Survey. HPE assumes there are 235 working days in the year, and that on any given day 10% of standard employees are working from home. The calculation further assumes per the DOT Survey that of the employees commuting to offices each day, 89% drive, 8% take public transportation, and 3% walk (no emissions). Emission factors for the conversion of gasoline and other fuel types to carbon dioxide equivalents are obtained from the EPA's Greenhouse Gases Equivalencies Calculator and 2006 IPCC Guidelines for National Greenhouse Gas Inventories, chapter on "Mobile Combustion." Fuel efficiency factors are obtained from the DOT's Highway Statistics, published March 3, 2016. For teleworkers, the household emissions for an eight-hour workday are calculated by using the average U.S. household energy per day times the IEA worldwide electricity conversion factor of 519 grams of CO ₂ e per kWh, per the IEA's 2016 CO ₂ emissions from fuel combustion report.	
Upstream-leased assets	There are no known facilities that are excluded from Scope 1 and 2 at this time that would require inclusion in this category.	Not applicable.	
Downstream transportation and distribution	The downstream transportation and distribution of the products HPE sells in each of its major business groups, including any retail and storage.	This category is calculated using the methods described for Category 1 (Purchased Goods and Services) and is considered together with Category 4 for upstream transportation.	

Table 2. Calculation methodology for Scope 3 emissions categories (continued)

Category	Description	Calculation methodology
Processing of sold products	HPE does not currently have any major product lines that require additional processing and the majority of products are accounted for in the product LCAs.	It is assumed that this category is negligible.
Use of sold products	The use-phase emissions associated with energy consumption of the products HPE sells in each of its major business groups.	This category is calculated using the methods described for Category 1 (Purchased Goods and Services).
End-of-life treatment of sold product	Emissions associated with the disposal and treatment of sold products.	This category is calculated using the methods described for Category 1 (Purchased Goods and Services).
Downstream-leased assets	Emissions associated with the operation of assets leased to other entities where HPE is a lessor and the facilities are not accounted for in our Scope 1 and 2 emissions.	HPE calculates this category using square footage from buildings leased to third parties as reported in HPE's annual report assuming that these facilities are outside of its operational control and not included in HPE's Scope 1 or 2 emissions. Only real estate assets are included in the calculation; product equipment leasing is accounted for in the shipped volume of each business group. The U.S. Department of Energy Commercial Building Energy Consumption Survey data for average office building emissions intensity and the worldwide average emissions factor intensity per the IEA are used. According to the survey, the average energy consumption of office buildings is 92,860 BTU per square foot, the emission factor of the worldwide average from IEA is 519 grams of CO ₂ e per kWh and the conversion rate of BTU to kilowatt-hours is 1 BTU to 0.00029307 kWh.
Franchises	HPE's franchising activities are negligible.	Not applicable.
Investments	This category includes all investments that HPE makes as indicated in the annual report.	It is assumed that this category is negligible. Investments in the reporting year are predominately in software-related businesses where the associated GHG emissions are relatively low. If the investments increase within HPE, the team will consider looking closer at each investment for possible inclusion in the Scope 3 GHG emission calculation.

Data validation

Each year, HPE compares the net revenue recorded in HPE's Form 10-K to the sources of Scope 3 emissions to verify that the key sources are included for each component of net revenue. This analysis especially considers the LCA portion of the calculation.

HPE performs a yearly analysis to consider the other Scope 3 categories for possible GHG emissions that should be included in the overall calculation.

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