

## Indicators

### G4-EN15

#### DIRECT GREENHOUSE GAS (GHG) EMISSIONS (SCOPE 1)

- Report gross direct (Scope 1) GHG emissions in metric tons of CO<sub>2</sub> equivalent, independent of any GHG trades, such as purchases, sales, or transfers of offsets or allowances.
- Report gases included in the calculation (whether CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>, NF<sub>3</sub>, or all).
- Report biogenic CO<sub>2</sub> emissions in metric tons of CO<sub>2</sub> equivalent separately from the gross direct (Scope 1) GHG emissions.
- Report the chosen base year, the rationale for choosing the base year, emissions in the base year, and the context for any significant changes in emissions that triggered recalculations of base year emissions.
- Report standards, methodologies, and assumptions used.
- Report the source of the emission factors used and the global warming potential (GWP) rates used or a reference to the GWP source.
- Report the chosen consolidation approach for emissions (equity share, financial control, operational control).

#### GUIDANCE

##### Relevance

This Indicator covers the disclosure of the direct (Scope 1) GHG emissions, in CO<sub>2</sub> equivalents, of the GHGs covered by the UN 'Kyoto Protocol' and the WRI and WBCSD 'GHG Protocol Corporate Accounting and Reporting Standard':

- Carbon dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF<sub>6</sub>)
- Nitrogen trifluoride (NF<sub>3</sub>)

GHG emissions are a major contributor to climate change and are governed by the UN 'United Nations Framework Convention on Climate Change'<sup>100</sup> and the subsequent UN 'Kyoto Protocol'. Some GHGs, including methane (CH<sub>4</sub>), are also air pollutants that have significant adverse impacts on ecosystems, air quality, agriculture, and human and animal health. As a result, different national and international regulations and incentive systems (such as tradable emission permits) aim to control the volume, and reward the reduction of GHG emissions.

Direct (Scope 1) GHG emissions come from sources (physical units or processes that release GHG into the atmosphere) that are owned or controlled by the organization.

Direct (Scope 1) GHG emissions include, but are not limited

to, the CO<sub>2</sub> emissions from the fuel consumption reported in Indicator G4-EN3.

This Indicator may be used in combination with Indicators G4-EN16 (energy indirect Scope 2 emissions) and G4-EN17 (other indirect Scope 3 emissions) to report an organization's total GHG emissions.

The combination of direct and indirect emissions provides insights into the cost implications of taxation or trading systems. It also provides insight into an organization's carbon footprint and environmental performance.

##### Compilation

Identify direct emissions of GHGs from sources owned or controlled by the organization, including:

- Generation of electricity, heating, cooling and steam. These emissions result from combustion of fuels in stationary sources (such as boilers, furnaces, turbines) and from other combustion processes such as flaring
- Physical or chemical processing. Most of these emissions result from the manufacturing or processing of chemicals and materials (such as cement, steel, aluminum, ammonia, and waste processing)
- Transportation of materials, products, waste, employees, and passengers. These emissions result from the combustion of fuels in mobile combustion sources owned or controlled

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by the organization (such as trucks, trains, ships, airplanes, buses, cars)

- Fugitive Emissions. These emissions result from intentional or unintentional releases, such as equipment leaks from joints, seals, packing, and gaskets; methane emissions from coal mines and venting; hydrofluorocarbon (HFC) emissions from refrigeration and air conditioning equipment; and methane leakages from gas transport

Using the sources identified, calculate the organization's gross direct GHG emissions using relevant GWP rates, in CO<sub>2</sub> equivalents, during the reporting period. Exclude any GHG trades, such as purchases, sales, or transfers of offsets or allowances.

Organizations are expected to report standards, methodologies, and assumptions used to calculate and measure emissions, with a reference to the calculation tools used. Organizations subject to different standards and methodologies should describe the approach to selecting them.

Select a consistent consolidation approach for emissions, and apply it to calculate the gross direct (Scope 1) GHG emissions. When possible, select an approach that is consistent with the approach used in Indicator G4-EN16. Organizations select the equity share, financial control, or operational control methods outlined in the WRI and WBCSD 'GHG Protocol Corporate Accounting and Reporting Standard'.

Select and identify the base year for which emissions data are available, and identify the reasons for selecting that particular year. For recalculations of prior year emissions, organizations may follow the approach in the WRI and WBCSD 'GHG Protocol Corporate Accounting and Reporting Standard'.

Organizations may report biogenic CO<sub>2</sub> emissions; however, such emissions are reported separately and not added to the total direct (Scope 1) GHG emissions. These emissions refer to CO<sub>2</sub> emissions from combustion or biodegradation of biomass only, not to emissions of any other GHGs (such as CH<sub>4</sub> and N<sub>2</sub>O), or to any GHG emissions that occur in the life cycle of biomass other than from combustion or biodegradation (such as GHG emissions from processing or transporting biomass).

Information on offsets may be reported in the DMA for the Emissions Aspect.

Methodologies used to calculate the emissions may include:

- Direct measurement of energy source consumed (coal, gas) or losses (refills) of cooling systems and conversion to GHG (CO<sub>2</sub> equivalents)
- Mass balance calculations

- Calculation based on site-specific data (such as for fuel composition analysis)
- Calculation based on published criteria (emissions factors and GWPs)
- Estimations. If estimations are used due to a lack of default figures, the organization indicates the basis and assumptions on which figures were estimated
- Direct measurement of the GHG (such as continuous online analyzers)

Organizations may further disaggregate direct (Scope 1) GHG emissions data where this aids transparency or comparability over time. For example, they may disaggregate data by:

- Business unit or facility
- Country
- Source type (stationary combustion, process, fugitive)
- Activity type

When possible, organizations apply emission factors and GWP rates consistently for the data reported under the Emissions Aspect. Emission factors may originate from mandatory reporting requirements, voluntary reporting frameworks, or be developed by industry groups. Estimates of GWPs change over time as scientific research develops. Organizations may use the GWPs from *Assessment Reports* from the Intergovernmental Panel on Climate Change (IPCC). As the GWPs from the IPCC *Second Assessment Report* are used as the basis for international negotiations under the UN 'Kyoto Protocol', such rates may be used for disclosing GHG emissions where it does not conflict with national or regional reporting requirements. Organizations may also use the latest GWPs from the most recent IPCC *Assessment Report*. GWPs are expressed over a number of different time frames within the IPCC *Assessment Reports*. Organizations use the factors for the 100-year time span.

Further details and guidance for this Indicator are available in the WRI and WBCSD 'GHG Protocol Corporate Accounting and Reporting Standard' and in documents from the IPCC.

### Definitions

See Glossary in *Implementation Manual*, p. 244

- [Base year](#)
- [Carbon dioxide equivalent](#)
- [Direct GHG emissions \(Scope 1\)](#)
- [Global warming potential \(GWP\)](#)

### Documentation sources

Potential sources of information on direct (Scope 1) GHG emissions include part of the data reported in Indicator G4-EN3.

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**References**

- Carbon Disclosure Project (CDP), *Investor CDP Information Request*, updated annually.
- Intergovernmental Panel on Climate Change (IPCC), *Climate Change 1995: The Science of Climate Change, Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change*, 1995.
- Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2007: The Physical Science Basis, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, 2007.
- United Nations (UN) Protocol, 'Kyoto Protocol to the United Nations Framework Convention on Climate Change', 1997.
- World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD), 'GHG Protocol Corporate Accounting and Reporting Standard', Revised Edition, 2004.
- World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD), 'Greenhouse Gas Protocol Accounting Notes, No. 1, Accounting and Reporting Standard Amendment', 2012.