

# GHG Emissions Methodology Report 2023

## ***Qatar University***

17<sup>th</sup> April 2025

Version: 1

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## 1. Introduction

In 2023, Qatar University embarked on a strategic initiative to monitor its 2023 overall carbon footprint and lay the foundation for monitoring its footprint. This report outlines the comprehensive methodology employed, detailing the calculations of greenhouse gas (GHG) emissions, and presents the results alongside key findings. It serves as a crucial step in Qatar University's sustainability journey, providing insights and a baseline for future environmental performance assessments and action planning.

This report covers the pertinent Scope 1, 2 and 3 emissions from anthropogenic sources of greenhouse gases (GHG) within Qatar University's organizational boundary. The methodology aligns with the GHG Protocol Guidance<sup>1</sup>.

- **Consolidation approach:** Operational control
- **Organizational boundary:** All locations
- **Operational boundary:**
- The report encompasses Scope 1 and Scope 2 emissions, as well as relevant Scope 3 categories that significantly contribute to Qatar University's overall carbon footprint. The Scope 3 categories are reported based on the data availability, contributing to a holistic understanding of Qatar University's overall operational carbon footprint.

The **Scope 3** categories applicable to Qatar University include:

- Category 1: Purchased goods and services\*
- Category 2: Capital goods\*
- Category 3: Fuel & energy related activities
- Category 5: Waste generated in operations
- Category 6: Business travel\*
- Category 9: Downstream transportation and distribution

\* The category is applicable to Qatar University; however, it has not been calculated due to insufficient data.

The inclusion of these categories reflects Qatar University's commitment to comprehensive and transparent reporting of its environmental impact.

- **Reporting period:** 1<sup>st</sup> January 2023 - 31<sup>st</sup> December 2023

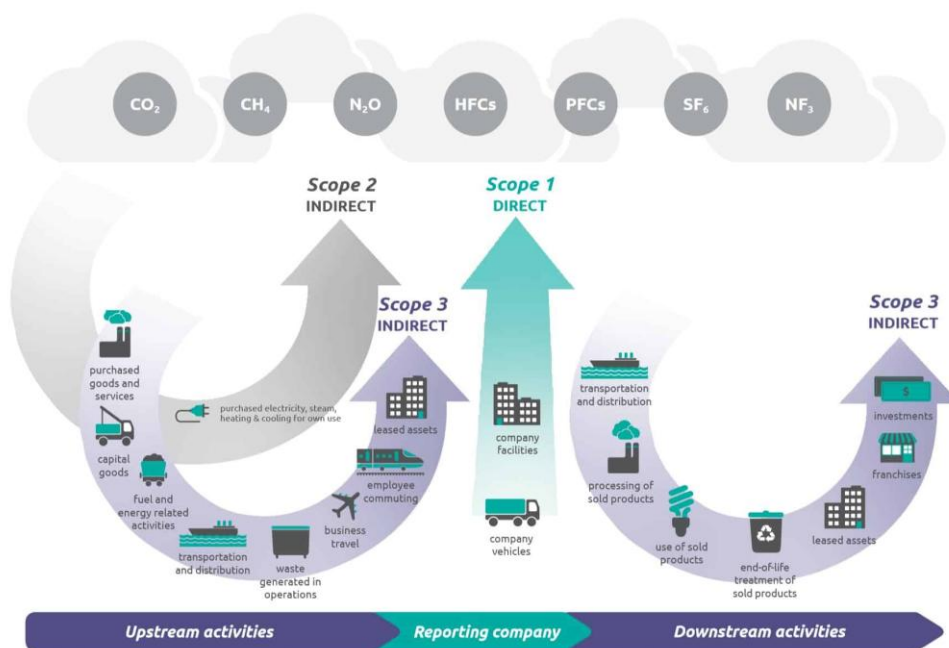
### 1.1 GHG Protocol

The Greenhouse Gas (GHG) Protocol, developed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), is the most widely used and accepted methodology for greenhouse gas accounting. It provides a framework for businesses, governments, and entities to measure and report greenhouse gas emissions that support ongoing reduction efforts in a consistent manner.

Under the GHG Protocol, emission sources are divided into scopes 1, 2 and 3. Scope 1 emissions are a result of an organization's direct operations, whereas scope 2 and 3 emissions result from indirect activities through importing electricity (scope 2) and from the value chain (scope 3). The figure below provides a description of the emission categories by scope.<sup>1</sup>

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<sup>1</sup> GHG Protocol Guidance - <https://ghgprotocol.org/corporate-standard>



## 1.2 Greenhouse Gases covered

The GHG Protocol Corporate Standard requires the inclusion of the seven GHGs covered by the Kyoto Protocol:

- carbon dioxide (CO<sub>2</sub>),
- methane (CH<sub>4</sub>),
- nitrous oxide (N<sub>2</sub>O),
- hydrofluorocarbons (HFCs),
- perfluorocarbons (PFCs),
- nitrogen trifluoride (NF<sub>3</sub>), and
- sulphur hexafluoride (SF<sub>6</sub>).

Each gas has its own global warming potential (GWP). By comparing each gas's GWP to that of Carbon Dioxide (CO<sub>2</sub>), it is possible to derive a Carbon Dioxide equivalent value (CO<sub>2</sub>e). E.g., if 1kg of methane is emitted, this can be expressed as 28kg of CO<sub>2</sub>e (1kg CH<sub>4</sub> \* 28 = 28kg CO<sub>2</sub>e).

The emissions calculated for Qatar University are expressed in terms of tonnes of CO<sub>2</sub>e.

## 1.3 Data sources

The data sources used to calculate Qatar University's emissions are listed below:

| Published by   | Description  | Link                 |
|--|--|----------------------|
| UK Department for Energy Security and Net Zero and Department for Business, Energy & Industrial Strategy | UK based Emission factors for all sizes of company reporting | <a href="#">Link</a> |
| Intergovernmental Panel on Climate Change (IPCC)   | 2006 IPCC Guidelines for National Greenhouse Gas Inventories | <a href="#">Link</a> |

|  |  |                      |
|--|--|----------------------|
| International Energy Agency (IEA)                                      | Qatar's country-based emission factor                        | 2023 database        |
| US EPA's Supply Chain Greenhouse Gas Emission Factors v1.3 by NAICS-6. | Supply Chain Greenhouse Gas Emission Factors v1.3 by NAICS-6 | <a href="#">Link</a> |

## 2. Methodology

### 2.1 Scope 1 emissions

#### 2.1.1 Overview

Scope 1 emissions are direct GHG emissions from sources that are owned or controlled by Qatar University. Sources of Scope 1 emissions include fuel combustion from both stationary, mobile sources, fugitive emissions from the leakage of refrigerants, fire suppression and other processed industrial reactions.

#### 2.1.2 Reporting period

Reporting is aligned to the calendar year: 1<sup>st</sup> January 2023 - 31<sup>st</sup> December 2023.

#### 2.1.3 Boundaries

All operations were considered for the calculation of scope 1 emissions. For stationary combustion, mobile combustion, refrigerant leakage, fire suppression and fertilizers used, all Qatar University generators, owned vehicles and refrigerant cylinders were considered.

#### 2.1.4 Assumptions

As 2023 data was unavailable, 2024 diesel generator data was used as a proxy for stationary combustion. It was assumed that the extent of use remained similar across both years.

Qatar University has operational control over daily employee and student transportation to and from the campus. The vehicles are either leased or owned and operated by Qatar University. As such, this data has been included under Scope 1 mobile combustion.

#### 2.1.5 Data owners

All information were provided by the facility management (operations) team.

#### 2.1.6 Exclusions

All activities required for scope 1 reporting have been included in the GHG emissions calculations.

#### 2.1.7 Unit of measurement

Scope 1 carbon emissions are reported in tonnes of carbon dioxide equivalent (tCO<sub>2e</sub>).

#### 2.1.8 Emission factors

The emission factors used for calculating scope 1 emissions were derived from [BEIS 2023 GHG Conversion Factors](#) and [IPCC](#) (specifically for processed emission from fertilizers).

| Subcategory  | Description  | Year |
|--|--|------|
| Diesel consumption                                     | Scope 1 > Fuels > Liquid fuels > Diesel (100% mineral diesel) > litres                                     | 2023 |
| Petrol & Diesel consumption for distance activity data | Scope 1 > Delivery vehicles > Vehicle type > Vehicle fuel > km   | 2023 |
| R410A  | Scope 1 > Refrigerant & other > Blends > R410A > Emissions including only Kyoto products > kg              | 2023 |
| HCFC-22/R22  | Scope 1 > Refrigerant & other > Blends > HCFC-22/R22 > Emissions including only non-Kyoto products > kg    | 2023 |
| HFC-134a   | Scope 1 > Refrigerant & other > Blends > HFC-134a > Emissions including only Kyoto products > kg           | 2023 |
| R407C  | Scope 1 > Refrigerant & other > Blends > R407C > Emissions including only Kyoto products > kg              | 2023 |
| HFC-125  | Scope 1 > Refrigerant & other > Blends > HFC-125 > Emissions including only Kyoto products > kg            | 2023 |
| Carbon dioxide/CO2                                     | Scope 1 > Refrigerant & other > Blends > Carbon dioxide/CO2 > Emissions including only Kyoto products > kg | 2023 |
| Fertilizers  | Scope 1 > Description/Source > Nitrogen content > kg   | 2023 |

### 2.1.9 Calculation methodology

Scope 1 emissions were calculated using the activity-based approach, whereby activity data was multiplied by its corresponding emission factor as follows:

$$\begin{aligned} & \text{Emissions from petrol combustion (t CO}_2\text{e)} \\ & = \text{Petrol EF} \left( \frac{\text{kg CO}_2\text{e}}{\text{litre}} \right) \times \frac{\text{Petrol consumption (litres)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

$$\begin{aligned} & \text{Emissions from diesel combustion (t CO}_2\text{e)} \\ & = \text{Diesel EF} \left( \frac{\text{kg CO}_2\text{e}}{\text{litre}} \right) \times \frac{\text{Diesel consumption (litres)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

$$\begin{aligned} & \text{Fugitive emissions from refrigerant leakage (t CO}_2\text{e)} \\ &= \text{Refrigerant EF } \left( \frac{\text{kg CO}_2\text{e}}{\text{kg}} \right) \times \frac{\text{Refrigerant leakage (kg)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

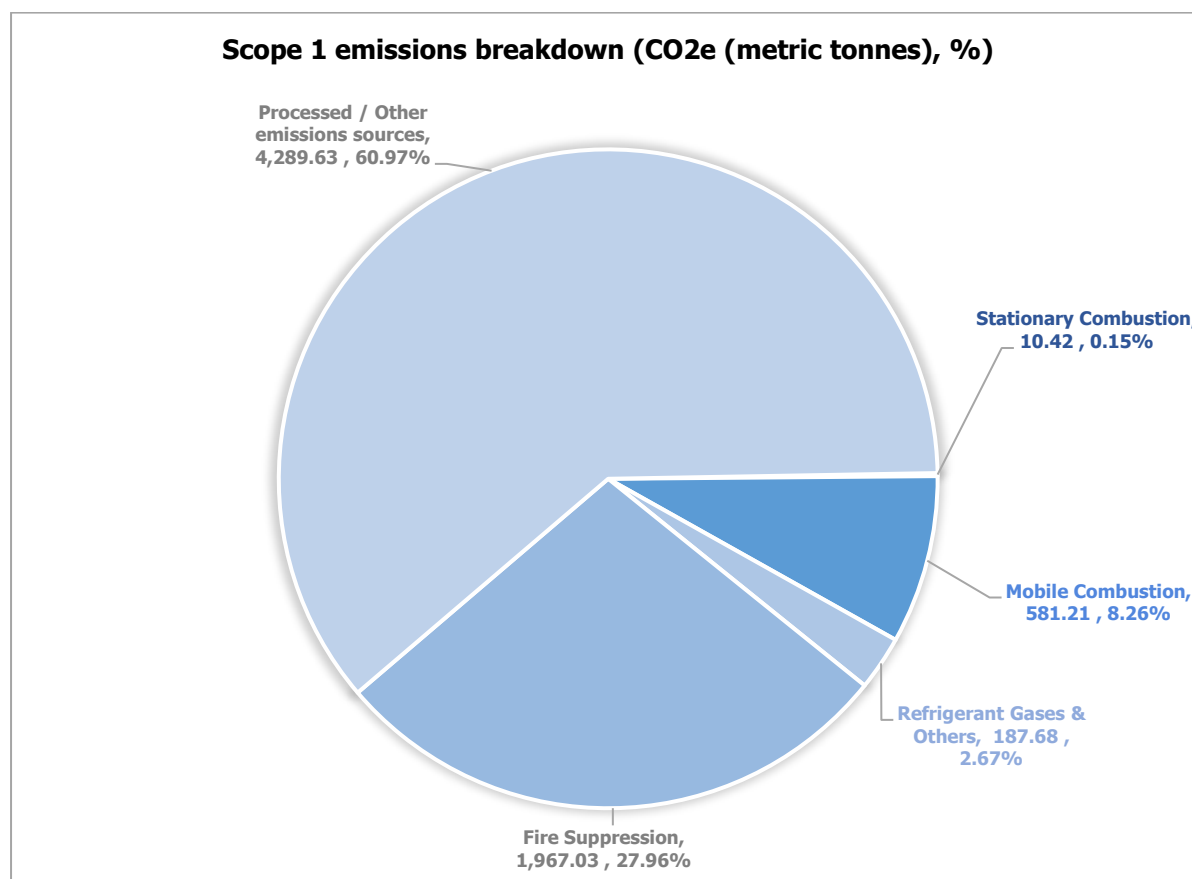
$$\begin{aligned} & \text{Emissions from fire suppression (t CO}_2\text{e)} \\ &= \text{Fire suppression EF } \left( \frac{\text{kg CO}_2\text{e}}{\text{kg}} \right) \times \frac{\text{Inventory change (kg)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

$$\text{Emissions from Processed/Other (t CO}_2\text{e)} = \text{N}_2\text{O EF } \left( \frac{\text{kg N}_2\text{O}}{\text{kg N}} \right) \times \text{GWP of N}_2\text{O}$$

$$\begin{aligned} & \text{Total scope 1 emissions (t CO}_2\text{e)} \\ &= \text{Emissions from petrol combustion (t CO}_2\text{e)} \\ &+ \text{Emissions from diesel combustion (t CO}_2\text{e)} \\ &+ \text{Fugitive emissions from refrigerant leakage (t CO}_2\text{e)} \\ &+ \text{Emissions from fire suppression (t CO}_2\text{e)} \\ &+ \text{Emissions from Processed/Other (t CO}_2\text{e)} \end{aligned}$$

#### 2.1.10 Results

| Scope 1 category                    | Emissions (t CO <sub>2</sub> e) |
|-------------------------------------|---------------------------------|
| Stationary combustion               | 10.42                           |
| Mobile combustion                   | 581.21                          |
| Refrigerants for Kyoto products     | 32.80                           |
| Refrigerants for non-Kyoto products | 154.88                          |
| Fire suppression                    | 1,967.03                        |
| Processed / other emissions sources | 4,289.63                        |
| <b>Total scope 1</b>                | <b>7,035.96</b>                 |



## 2.2 Scope 2 emissions

### 2.2.1 Overview

Scope 2 GHG emissions include indirect emissions from the consumption of purchased electricity and district cooling.

### 2.2.2 Reporting period

Reporting is aligned to the calendar year: 1<sup>st</sup> January 2023 - 31<sup>st</sup> December 2023.

### 2.2.3 Boundaries

All campus buildings of Qatar University were considered for the calculation of scope 2 GHG emissions.

### 2.2.4 Assumptions

No assumptions were made for calculating scope 2 emissions.

### 2.2.5 Data owners

The electricity consumption and district cooling information were provided by the facility management (operations) team.

### 2.2.6 Exclusions

For district cooling, data was not available for two cooling units CSU-3 and CSU-4, so this has been excluded.

### 2.2.7 Unit of measurement

Scope 2 carbon emissions are reported in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).

### 2.2.8 Emission factors

The electricity and district cooling emission factors used for calculating scope 2 emissions was derived from International Energy Agency (IEA).

| Published by                      | Description                           | Year          |
|-----------------------------------|---------------------------------------|---------------|
| International Energy Agency (IEA) | Qatar's country-based emission factor | 2023 database |

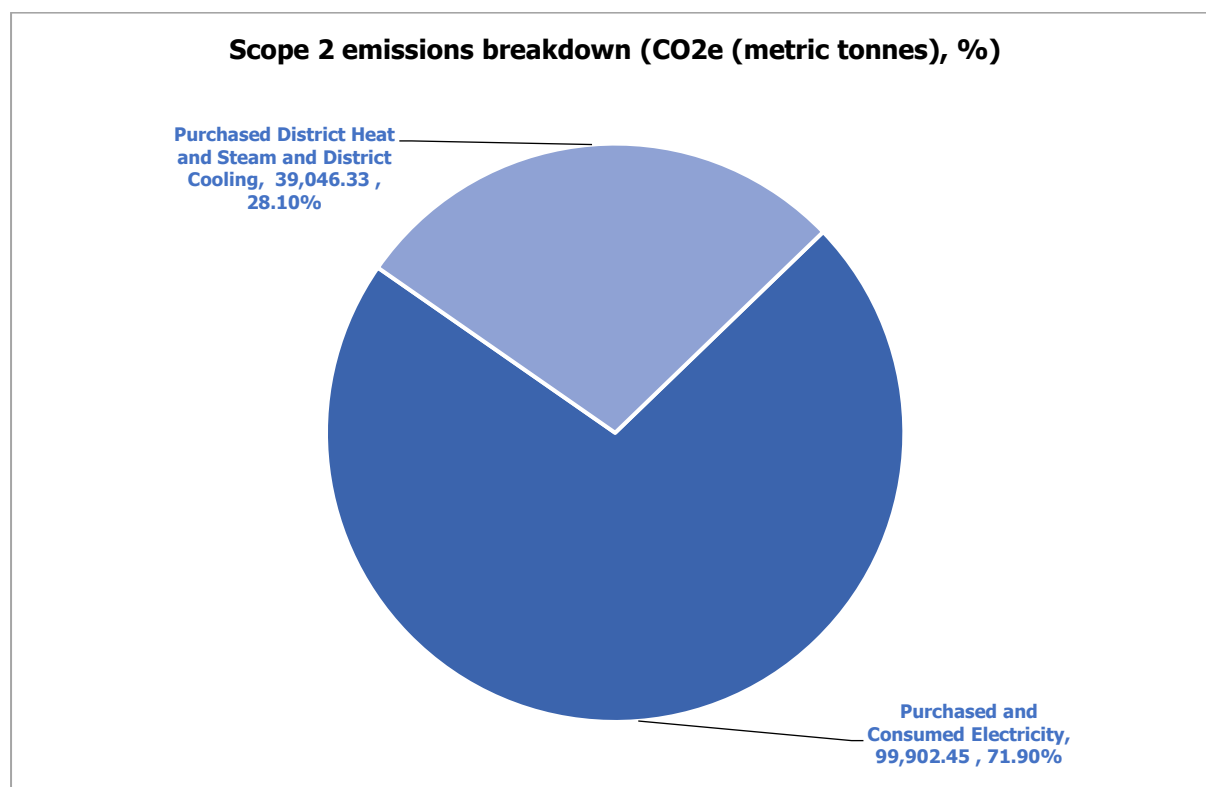
### 2.2.9 Calculation methodology

Scope 2 emissions were calculated using the activity-based approach, whereby electricity consumption data was multiplied by the IEA's electricity emission factor as follows:

$$\begin{aligned}
 & \text{Emissions from electricity consumption (t CO}_2\text{e)} \\
 &= \text{IEA's EF } \left( \frac{\text{kg CO}_2\text{e}}{\text{kWh}} \right) \times \frac{\text{Electricity consumption (kWh)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \\
 & \text{Emissions from district cooling (t CO}_2\text{e)} \\
 &= \text{Heat and steam EF } \left( \frac{\text{kg CO}_2\text{e}}{\text{kWh}} \right) \times \frac{\text{Amount purchased (kWh)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \\
 & \text{Total scope 2 emissions (t CO}_2\text{e)} \\
 &= \text{Emissions from electricity consumption (t CO}_2\text{e)} \\
 &+ \text{Emissions from district cooling (t CO}_2\text{e)}
 \end{aligned}$$

### 2.2.10 Results

| Scope 2 category                                       | Emissions (t CO <sub>2</sub> e) |
|--|---------------------------------|
| Purchased and Consumed Electricity                     | 99,902.45                       |
| Purchased District Heat and Steam and District Cooling | 39,046.33                       |
| <b>Total scope 2</b>                                   | <b>138,948.77</b>               |



## 2.3 Scope 3 emissions

### 2.3.1 Category 1: Purchased goods and services (PG&S)

#### 2.3.1.1 Overview

This category includes all upstream (i.e., cradle-to-gate) emissions from the production of products purchased or acquired by Qatar University in the reporting year. Products include both goods (tangible products) and services (intangible products).

#### 2.3.1.2 Boundaries

No boundaries have been established from Qatar University to calculate this category.

#### 2.3.1.3 Assumptions

No assumptions were made for calculating scope 3 – category 1 emissions.

#### 2.3.1.4 Data Owners

No information on purchased goods and services invoices was provided by the Procurement Team.

#### 2.3.1.5 Exclusions

No activities have been included in the GHG emissions calculations due to data availability constraints.

### 2.3.1.6 Unit of measurement

Scope 3 carbon emissions are reported in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).

### 2.3.1.7 Emission factors

Scope 3 category 1 emission factors were sourced from the [US EPA's Supply Chain Greenhouse Gas Emission Factors v1.3 by NAICS-6](#).

### 2.3.1.8 Calculation methodology

The average spend-based method was used to calculate emissions resulting from Purchased Goods and Services (PG&S) using the US EPA's Supply Chain Greenhouse Gas Emission Factors v1.3 by NAICS-6. The dataset defines emissions produced per commodity per US Dollar (USD).

To calculate emissions from PG&S for Qatar University:

- The emissions can be calculated as per the formula below:

$$\begin{aligned} & \text{Emissions from PG\&S (t CO}_2\text{e)} \\ & = \text{Supply Chain EF with margins } \left( \frac{\text{kg CO}_2\text{e}}{\text{USD}} \right) \times \frac{\text{QU Purchase Amount (USD)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

## 2.3.2 Category 2: Capital goods

### 2.3.2.1 Overview

This category includes all upstream (i.e., cradle-to-gate) emissions from the production of capital good purchased or acquired by Qatar University in the reporting year.

### 2.3.2.2 Boundaries

No boundaries have been established from Qatar University to calculate this category.

### 2.3.2.3 Assumptions

No assumptions were made for calculating scope 3 – category 2 emissions.

### 2.3.2.4 Data Owners

No information on capital goods invoices was provided by the Procurement Team.

### 2.3.2.5 Exclusions

No activities have been included in the GHG emissions calculations due to data availability constraints.

### 2.3.2.6 Unit of measurement

Scope 3 carbon emissions are reported in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).

### 2.3.2.7 Emission factors

Scope 3 category 2 emission factors were sourced from the [US EPA's Supply Chain Greenhouse Gas Emission Factors v1.3 by NAICS-6](#).

### 2.3.2.8 Calculation methodology

The average spend-based method was used to calculate emissions resulting from Capital Goods using the US EPA's Supply Chain Greenhouse Gas Emission Factors v1.3 by NAICS-6. The dataset defines emissions produced per commodity per US Dollar (USD).

To calculate emissions from Capital goods for Qatar University:

- The emissions can be calculated as per the formula below:

$$\begin{aligned} & \text{Emissions from Capital goods (t CO}_2\text{e)} \\ & = \text{Supply Chain EF with margins } \left( \frac{\text{kg CO}_2\text{e}}{\text{USD}} \right) \times \frac{\text{QU Purchase Amount (USD)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

### 2.3.3 Category: 3: Fuel and energy related activities

#### 2.3.3.1 Overview

This category includes emissions related to the production of fuels and energy purchased and consumed by Qatar University in the reporting year that are not included in scope 1 or scope 2.

The emissions subcategories calculated for Qatar University are:

- Upstream emissions of purchased electricity: emissions from the extraction, production, and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling that is consumed by Qatar University.
- Upstream transmission and distribution (T&D): emissions resulting from the transmission and distribution electricity losses.
- Upstream emissions of purchased fuels: emissions from the extraction, production, and transportation of fuels consumed by Qatar University.

#### 2.3.3.2 Boundaries

All offices, facilities, and assets (vehicles, etc.) were considered for the scope 3 emissions related to upstream fuel and energy not captured under scope 1 and 2.

#### 2.3.3.3 Data Owners

All electricity and fuel consumption data were provided by the Facilities Management (Operations) department.

#### 2.3.3.4 Exclusions

There are no exclusions, all consumption activity related to electricity or fuel consumption provided by Qatar University was included in the calculation.

#### 2.3.3.5 Assumptions

To calculate the upstream emissions of purchased fuels for mobile combustion under Scope 3 Category 3, the fuel consumption was estimated in litres based on the distance travelled in kilometres. All vehicle types were assumed to be cars by market segment, due to the availability of relevant data and corresponding emission factors.

### 2.3.3.6 Unit of measurement

Scope 3 carbon emissions are reported in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).

### 2.3.3.7 Emission factors

Scope 3 category 3 emission factors were sourced from the [UK Department for Energy Security and Net Zero](#).

### 2.3.3.8 Calculation methodology

- **Upstream emissions of purchased electricity:** Emissions were calculated by multiplying Qatar University's purchased electricity by the 2023 UK Department for Energy Security and Net Zero WTT Qatar generation EF as follows:

$$\begin{aligned} & \text{Emissions from generation (t CO}_2\text{e)} \\ & = \text{WTT Qatar (generation)} \left( \frac{\text{kg CO}_2\text{e}}{\text{kWh}} \right) \times \frac{\text{QU electricity consumption (kWh)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

- **Upstream transmission and distribution (T&D):** Emissions were calculated by multiplying Qatar University's purchased electricity by the 2023 UK Department for Energy Security and Net Zero WTT Qatar T&D EF as follows:

$$\begin{aligned} & \text{Emissions from T\&D losses (t CO}_2\text{e)} \\ & = \text{WTT Qatar (T\&D)} \left( \frac{\text{kg CO}_2\text{e}}{\text{kWh}} \right) \times \frac{\text{QU electricity consumption (kWh)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

- **Upstream emissions of purchased fuels:** Emissions were calculated by multiplying Qatar University's purchased petrol and diesel quantities by the corresponding 2023 UK Department for Energy Security and Net Zero emission factors for petrol and diesel as follows:

$$\begin{aligned} & \text{Emissions from purchased fuels (t CO}_2\text{e)} \\ & = \text{WTT emission factor} \left( \frac{\text{kg CO}_2\text{e}}{\text{litre of fuel}} \right) \times \frac{\text{QU fuel consumption (litres)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

- Total emissions:

$$\begin{aligned} & \text{Emissions from fuel and energy related activities (t CO}_2\text{e)} \\ & = \text{Emissions from generation (t CO}_2\text{e)} \\ & + \text{Emissions from T\&D losses (t CO}_2\text{e)} \\ & + \text{Emissions from purchased fuels (t CO}_2\text{e)} \end{aligned}$$

## 2.3.4 Category 5: Waste generated in operations

### 2.3.4.1 Overview

This category includes emissions resulting from the third-party treatment or disposal of wastes generated from Qatar University's owned or controlled operations.

#### 2.3.4.2 Boundaries

All offices and facilities were considered for the scope 3 emissions resulting from generated waste.

#### 2.3.4.3 Assumptions

All organic waste that was reported as being given back to staff was classified under the "Re-use" disposal method. In cases where no disposal method was specified, it was assumed that the waste was sent to landfill.

#### 2.3.4.4 Data Owners

All waste data was provided by the Facilities Management (Operations) department.

#### 2.3.4.5 Exclusions

All waste data provided by Qatar University was included in the calculation. Qatar University monitors paper and organic waste generation.

#### 2.3.4.6 Unit of measurement

Scope 3 carbon emissions are reported in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).

#### 2.3.4.7 Emission factors

Scope 3 category 5 emission factors were sourced from the [UK Department for Energy Security and Net Zero](#).

#### 2.3.4.8 Calculation methodology

- **Paper recycling:** Emissions from recycling paper waste were calculated as follows:

$$\begin{aligned} & \text{Emissions from waste (t CO}_2\text{e)} \\ & = \text{Disposal method EF} \left( \frac{\text{kg CO}_2\text{e}}{\text{tonne of waste}} \right) \times \frac{\text{QU waste generated (tonnes)}}{1000 \left( \frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}} \right)} \end{aligned}$$

### 2.3.5 Category 6: Business travel

#### 2.3.5.1 Overview

This category includes emissions resulting from the transportation of employees for business-related activities in vehicles owned or operated by third parties, such as aircraft, trains, buses, and passenger cars.

#### 2.3.5.2 Boundaries

No boundaries have been established from Qatar University to calculate this category.

#### 2.3.5.3 Assumptions

- The distance travelled by air was calculated using airport coordinates sourced from [Datahub Airport codes dataset](#). The specific departure and arrival airports were assumed to be the main ones.

- The emission factors used were derived from UK Department for Energy Security and Net Zero 2023 GHG Conversion factors for international travel as no regional dataset exists.

#### **2.3.5.4 Data owners**

No information on business travel was provided by the Human Resources department.

#### **2.3.5.5 Exclusions**

No activities have been included in the GHG emissions calculations due to data availability constraints.

#### **2.3.5.6 Unit of measurement**

Scope 3 carbon emissions are reported in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).

#### **2.3.5.7 Emissions factors**

Scope 3 category 6 emission factors were sourced from the [UK Department for Energy Security and Net Zero](#).

#### **2.3.5.8 Calculation methodology**

- The flight distance was calculated in kilometres (km) and multiplied by the number of passengers and by the corresponding emission factor. The emissions from business air travel can be calculated as follows:

$$\begin{aligned} & \text{Emissions from air travel (t CO}_2\text{e)} \\ &= \text{number of passengers (passengers)} \times \frac{\text{Flight distance (km)}}{1000 \left(\frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}}\right)} \\ & \times \text{Flight class EF} \left(\frac{\text{kg CO}_2\text{e}}{\text{passenger.km}}\right) \end{aligned}$$

### **2.3.6 Category 9: Downstream transportation and distribution**

#### **2.3.6.1 Overview**

This category includes emissions resulting from the transportation and distribution of products sold by the reporting company in the reporting year between the reporting company's operations and the end consumer (in vehicles and facilities not owned or controlled by the reporting company).

#### **2.3.6.2 Boundaries**

Qatar University has set the boundaries to be as the registered international students at the university in 2023.

#### **2.3.6.3 Assumptions**

- For this category, the activity data is based on international student travel, as recommended in the [Standardised Carbon Emissions Reporting Framework](#) developed by **Environmental Association for Universities and Colleges (EAUC)**.

- Each international student is assumed to take two round-trip flights per year from their home country—one for each regular semester.
- The distance travelled by air was calculated using airport coordinates sourced from [Datahub Airport codes dataset](#). The specific departure and arrival airports were assumed to be the main ones from each student nationality country origin.
- The emission factors used were derived from UK Department for Energy Security and Net Zero 2023 GHG Conversion factors for international travel as no regional dataset exists.
- As Qatar University has control over students’ daily commute and accommodation, emissions from these activities have been accounted for under Scope 1 (Mobile Combustion) and Scope 2 (Electricity), respectively.

**2.3.6.4 Data owners**

All information on registered international student was provided by the Student Affairs department.

**2.3.6.5 Exclusions**

All Qatari students have been excluded from the GHG emissions calculations.

**2.3.6.6 Unit of measurement**

Scope 3 carbon emissions are reported in tonnes of carbon dioxide equivalent (tCO<sub>2</sub>e).

**2.3.6.7 Emissions factors**

Scope 3 category 6 emission factors were sourced from the [UK Department for Energy Security and Net Zero](#).

**2.3.6.8 Calculation methodology**

- The flight distance was calculated in kilometres (km) and multiplied by the number of passengers and by the corresponding emission factor. The emissions from business air travel were calculated as follows:

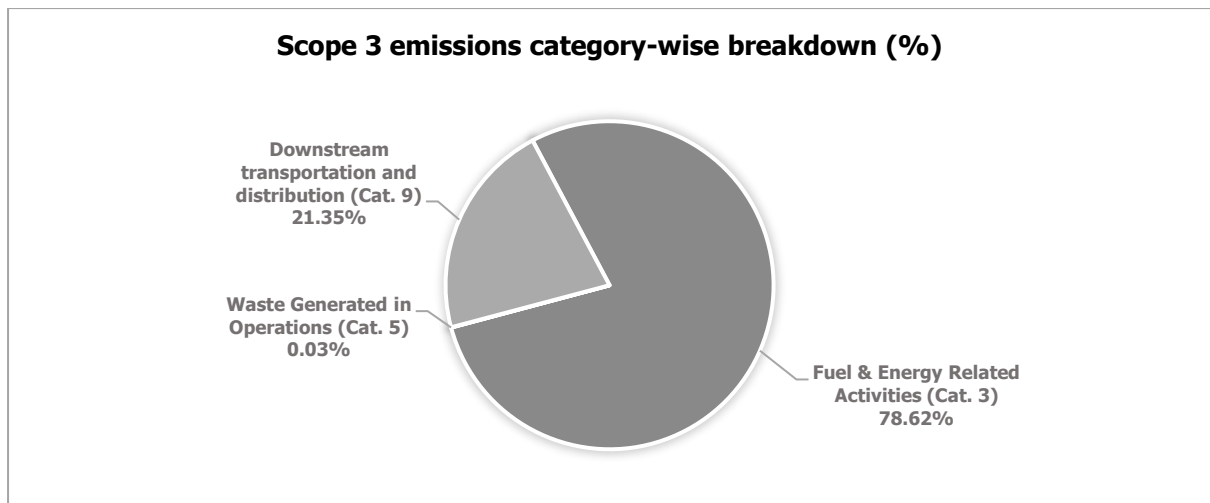
$$\begin{aligned}
 & \text{Emissions from air travel (t CO}_2\text{e)} \\
 &= \text{number of passengers (passengers)} \times \frac{\text{Flight distance (km)}}{1000 \left(\frac{\text{kg CO}_2\text{e}}{\text{t CO}_2\text{e}}\right)} \\
 &\times \text{Flight class EF} \left(\frac{\text{kg CO}_2\text{e}}{\text{passenger.km}}\right)
 \end{aligned}$$

**2.3.7 Results**

| Scope 3 category                           | Emissions (t CO <sub>2</sub> e) |
|--|---------------------------------|
| Purchased goods and services (Category 1)* | -                               |
| Capital goods (Category 2)*                | -                               |

|   |                  |
|---|------------------|
| Fuel & energy related activities (Category 3)           | 34,212.94        |
| Waste generated in operations (Category 5)              | 11.41            |
| Business travel (Category 6)*                           | -                |
| Downstream transportation and distribution (Category 9) | 9,291.69         |
| <b>Total scope 3</b>                                    | <b>43,516.04</b> |

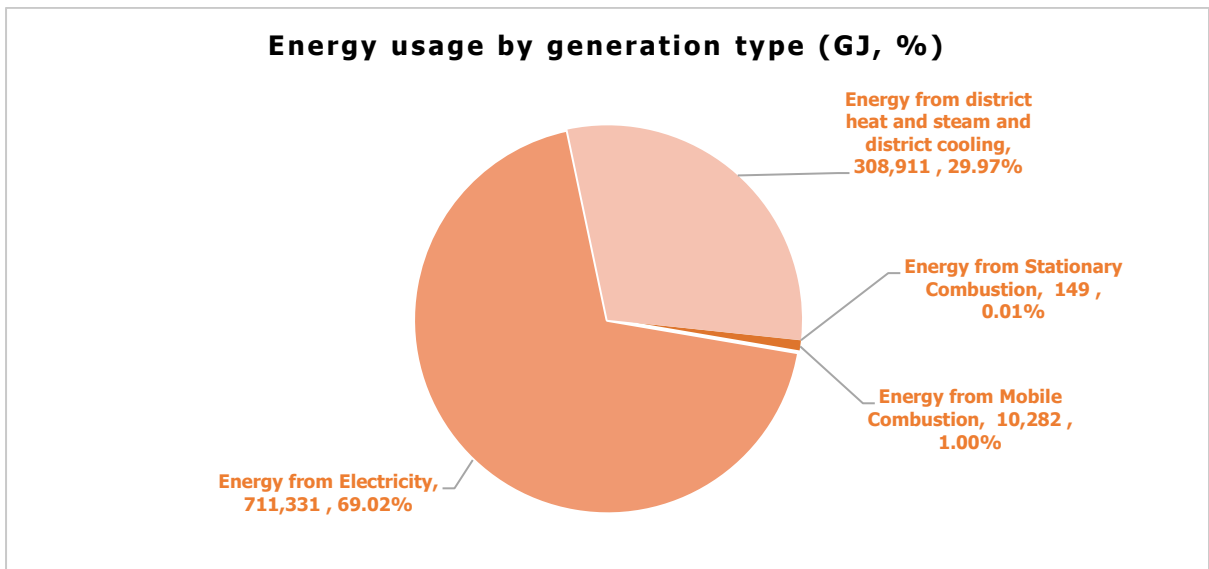
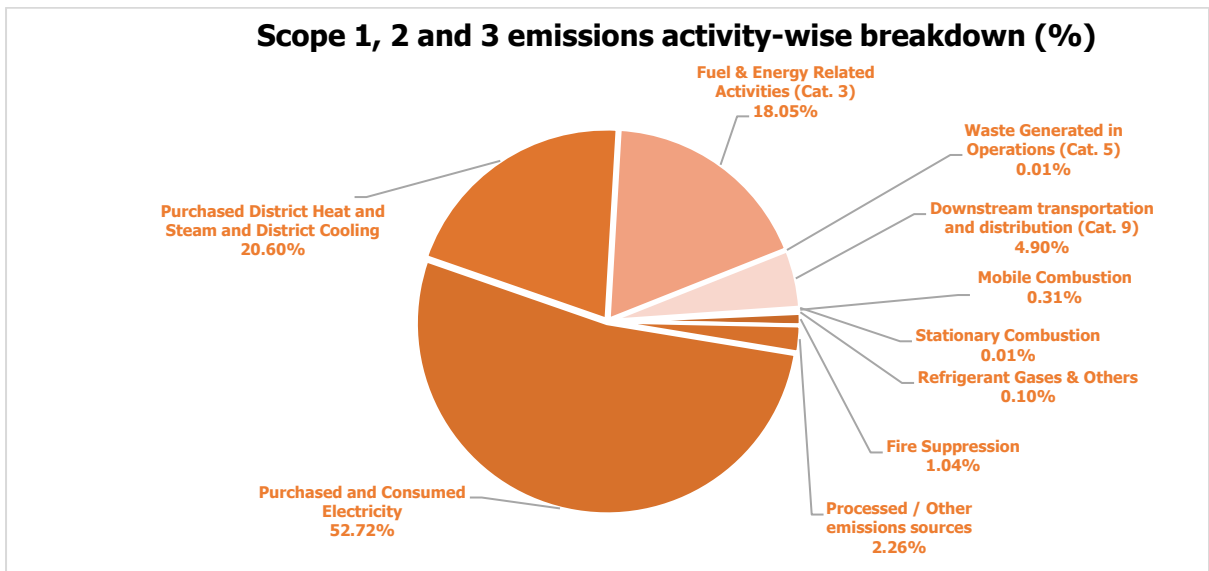
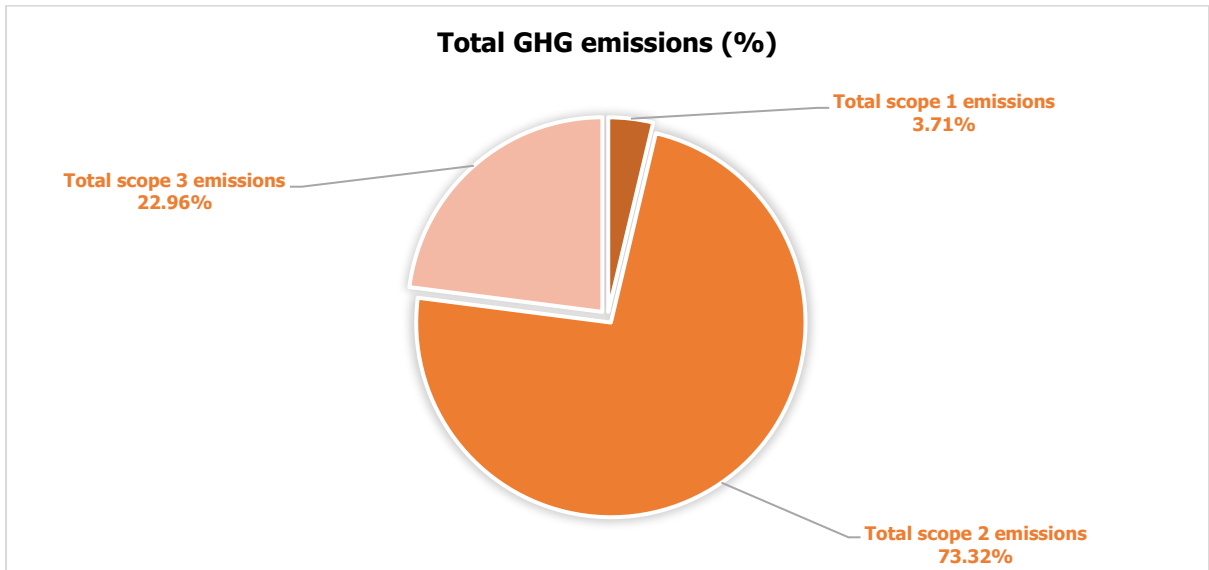
\* The category is applicable to Qatar University; however, it has not been calculated due to insufficient data.



### 3. Results and Insights

Qatar University calculated scope 1, 2 and 3 GHG emissions for 2023. The overall breakdown is as follows:

| Scope  | Emissions (tonnes CO <sub>2</sub> e) |
|--|--------------------------------------|
| Stationary combustion                                  | 10.42                                |
| Mobile combustion                                      | 581.21                               |
| Refrigerant gases & Others                             | 187.68                               |
| Fire suppression                                       | 1,967.03                             |
| Processed/other  | 4,289.63                             |
| <b>Total scope 1</b>                                   | <b>7,035.96</b>                      |
| Purchased and consumed electricity                     | 99,902.45                            |
| Purchased district heat and steam and district Cooling | 39,046.33                            |
| <b>Total scope 2</b>                                   | <b>138,948.77</b>                    |
| Purchased Goods and Services                           | -                                    |
| Capital goods  | -                                    |
| Fuel & energy related activities                       | 34,212.94                            |
| Waste generated in operations                          | 11.41                                |
| Business travel  | -                                    |
| Downstream transportation and distribution             | 9,291.69                             |
| <b>Total scope 3</b>                                   | <b>43,516.04</b>                     |
| <b>Total Scope 1, 2 and 3 Emissions</b>                | <b>189,500.77</b>                    |



## 4. Opportunities and areas of improvement

Overall, the data quality was sufficient for emissions calculations; however, there are opportunities to enhance accuracy through targeted improvements such as:

### 4.1 Scope 1

- **Stationary combustion:** To improve the accuracy of calculations, it is recommended to use actual data from the reporting year rather than relying on proxy data from a different year.
- **Mobile combustion:** To enhance the accuracy and reliability we recommend beginning to monitor fuel consumption in litres for mobile combustion activities, rather than relying solely on distance travelled. This approach will provide more precise emissions data and support more effective emissions management.

### 4.2 Scope 2

- The electricity consumption data provided was sufficient for calculating GHG emissions.
- Cooling units that were excluded due to data limitations can be incorporated in future reporting years.

### 4.3 Scope 3

- **Category 1 (Purchased goods and services):** Collect detailed procurement data (including descriptions, amount spent, quantities, and vendor names) for all goods and services purchased during the reporting year. Examples include raw materials, stationary, food items, IT services, etc. The sources may be via internal data systems, bills of materials and purchasing records.
- **Category 2 (Capital goods):** Collect detailed procurement data (including descriptions, amount spent, quantities, and vendor names) for all capital goods purchased during the reporting year. Examples of capital goods include equipment, machinery, buildings, facilities, and vehicles. The sources may be via internal data systems, bills of materials and purchasing records.
- **Category 6 (Business travel):** Gather comprehensive travel data for all employee business trips, including travel mode, distance, frequency, class, and purpose, supported by travel invoices or booking records.
- **Category 9 (Downstream transportation and distribution):** Conduct a survey of national and international students to better understand their commuting patterns to and from home during semester breaks, enabling more accurate estimation.

## 5. Terminologies and Acronyms

### 5.1 Terminology and Definition

| Term                  | Definition   |
|-----------------------|--|
| Anthropogenic sources | Emissions of greenhouse gases (GHGs) and aerosols caused by human activities such as carbon dioxide, methane, nitrous oxide,   |
| Scope 1               | Direct (GHG) emissions that occur from sources that are controlled or owned by an organization   |
| Scope 2               | Indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling  |
| Scope 3               | Indirect greenhouse gas emissions resulting from activities associated with an organization but occurring from sources not owned or controlled by that organization. |

### 5.2 Acronyms

| Acronym | Full form                                     |
|---------|---|
| BEIS    | Business, Energy and Industrial Strategy      |
| CO2     | Carbon dioxide                                |
| EF      | Emission factor                               |
| EPA     | Environmental Protection Agency               |
| GHG     | Greenhouse gas                                |
| GWP     | Global warming potential                      |
| IEA     | International Energy Agency                   |
| IPCC    | Intergovernmental Panel on Climate Change     |
| Kg      | Kilogram                                      |
| kWh     | Kilowatt hour                                 |
| NAICS   | North American Industry Classification System |
| tCO2e   | Metric tonnes of carbon dioxide equivalent    |

| Acronym     | Full form                                     |
|-------------|---|
| tonnes or t | Metric tonnes                                 |
| US EPA      | United States Environmental Protection Agency |
| WTT         | Well-to-tank                                  |

## 6. References

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