Greenhouse gas (GHG) accounting report

American University of Sharjah

Zurich, 25 April 2022

south pole

South Pole
South Pole Carbon Asset Management Ltd. · Technoparkstrasse 1 · 8005 Zurich · Switzerland
+41 43 501 35 50 · info@southpole.com · southpole.com

Details

Prepared for:

Georgios Chamilothoris
American University of Sharjah (AUS)
PO Box 26666, Sharjah, United Arab Emirates
+(971) (06) 515 2221 · gchamilothoris@aus.edu· http://www.aus.edu

Prepared by:

South Pole Carbon Asset Management Ltd. (South Pole)
Technoparkstrasse 1 · 8005 Zurich · Switzerland
southpole.com

Project Manager:

Rhiannon Tomlin
Managing Consultant, Climate Strategies
r.tomlin@southpole.com

Project Leader:

Matthew Sprague
Associate Director, Climate Strategies
m.sprague@southpole.com

Contact person:

Chris Wei
Business Development Associate
z.wei@southpole.com

Table of contents

List of tables

Table of figures

Acronyms and abbreviations

AR4	'Fourth Assessment Report'
AUS	American University of Sharjah
BAU	business as usual
BEIS	Department for Business, Energy, and Industrial Strategy
BSI	British Standards Institute
CEDA	Centre for Environmental Data Analysis
CH_4	methane
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
EAC	Energy Attribute Certificate
EV	electric vehicles
GHG	greenhouse gases
GJ	gigajoule
GRI	Global Reporting Initiative
GWP	global warming potential
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
kg	kilogram
km	kilometre
LPG	liquefied petroleum gas
m^2	square metres
m^3	cubic metres
MW	megawatt
MWh	megawatt-hour
pkm	passenger-kilometre
PV	photovoltaic
SBT	science-based target
SBTi	Science-Based Target initiative
t	metric tonne
tkm	tonne-kilometre
T&D	transmission and distribution
UAE	United Arab Emirates
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

Executive summary

This report provides a summary of the greenhouse gas (GHG) emissions produced by American University of Sharjah (AUS) operations from 1 June 2018 to 31 May 2019. This reporting period was chosen by AUS as it is the last reporting period before the onset of the COVID-19 pandemic. AUS is a private university in the United Arab Emirates (UAE). AUS was founded in 1997 by His Highness Sheikh Dr Sultan bin Muhammad Al-Qasimi, Supreme Council Member and Ruler of Sharjah. The university has over 6,000 stakeholders, including teaching staff, faculty, and students. With this GHG account, AUS aimed to gain insights into the quantity of GHG emissions caused by its operations and to identify emission reduction targets and possible reduction measures.

The GHG accounting for the reporting period 2018–2019 showed that the majority of AUS' GHG emissions were caused by scope 2 purchased electricity. Table 1 and Table 2 provide an overview of key figures for AUS.

Table 1: Summary of key performance indicators

Number of employees and students	6,161	**tCO_2e/employee and students**	7.2
Weighted campus users[1]	5,950	**tCO_2e/per weighted campus user**	7.4
Premises area (m^2)	363,789.27	**tCO_2e/m^2**	0.12

(Source: South Pole, based on AUS, 2022)

Table 2: Greenhouse gas emissions by source

Scope	Emissions (tCO_2e)	% of total
Scope 1: direct GHG emissions	632.6	1.4
Scope 2: indirect GHG emissions from purchased electricity	30,371.8	68.8
Gross emissions without contractual instruments	30,371.8	68.8
Avoided emissions from contractual instruments[2]	0.0	0.0
Scope 3: other indirect GHG emissions	13,122.3	29.7
Total GHG emissions	**44,126.6**	**100.0**

(Source: South Pole, based on AUS, 2022)

In Figure 1, the percentage shares of all included categories can be seen. Purchased electricity was responsible for the majority of all GHG emissions produced by AUS' operations in 2019, accounting for 68.8% of total emissions. Figure 2 shows that purchased electricity contributed

[1] 'Weighted campus user' was calculated using a formula developed by the Asssoication for the Advancement of Sustainability in Higher Education ". It is used as a measurement of an institution's population that is adjusted to accommodate how intensively certain community members use the campus. The Sustainability Tracking, Assessment & Rating Sytem, Technical Manual, V2.1, 2017.

[2] 'Contractual instruments' refer to renewable energy purchase instruments and contracts, such as renewable energy certificates, renewable power contracts, power purchase agreements and GoldPower offsets.

30,371.8 metric tonnes of carbon dioxide equivalent (tCO_2e) to AUS' total footprint of 44,126.6 tCO_2e for this period.

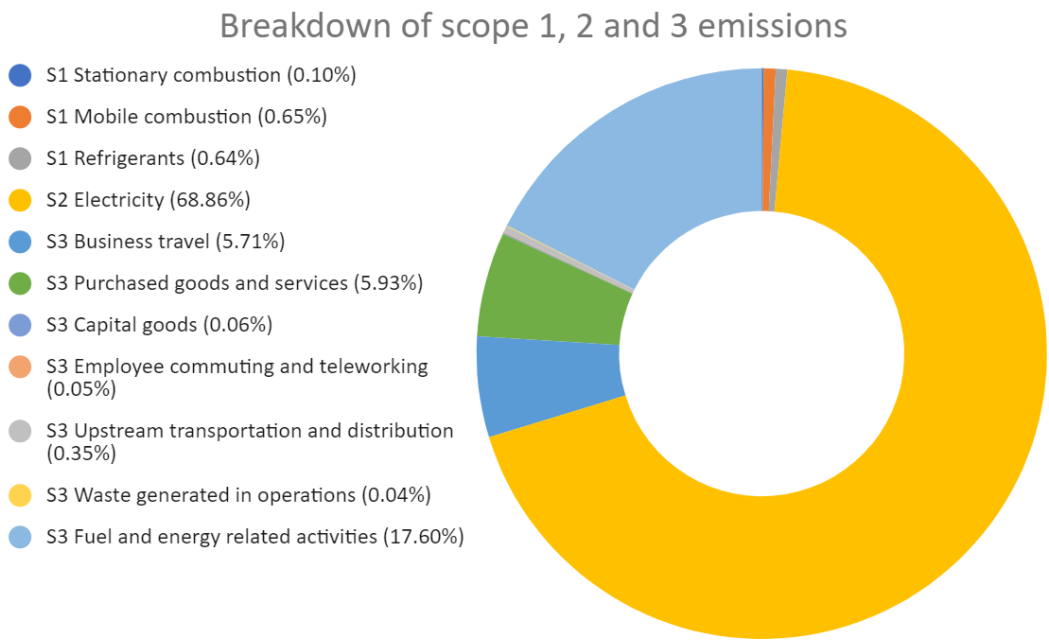

Figure 1: Scope 1, 2 and 3 emissions by source (%) in 2018–2019

(Source: South Pole, based on AUS, 2022)

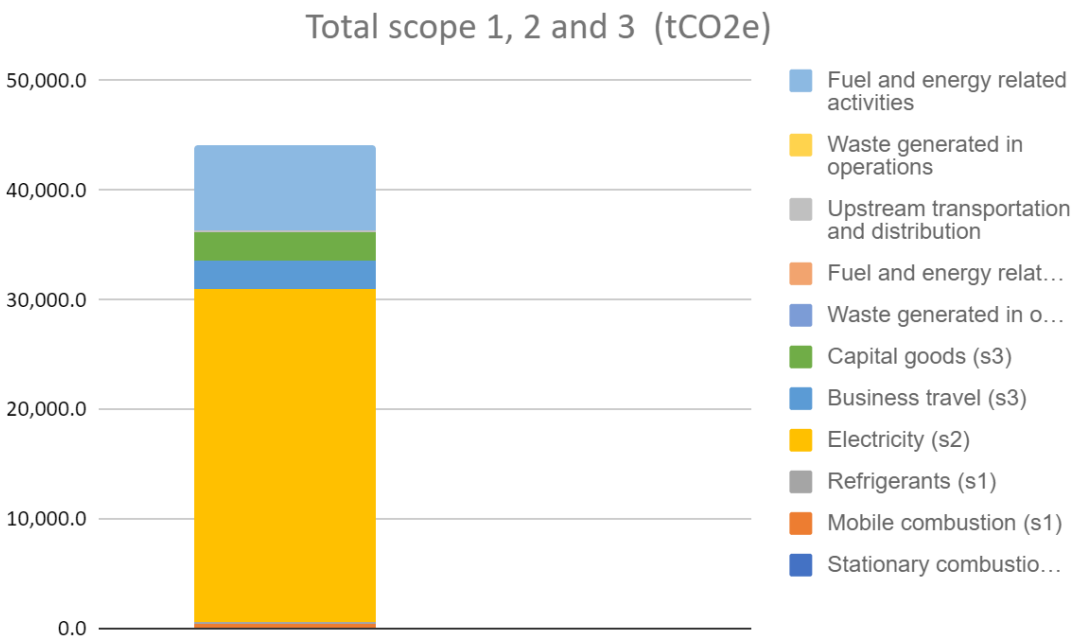

Figure 2: Total scope 1, 2 and 3 emissions by source (tCO_2e) in 2018–2019

(Source: South Pole, based on AUS, 2022)

Figure 3 further demonstrates this breakdown by emission scope, indicating that scope 2 emissions are the major emissions source for AUS.

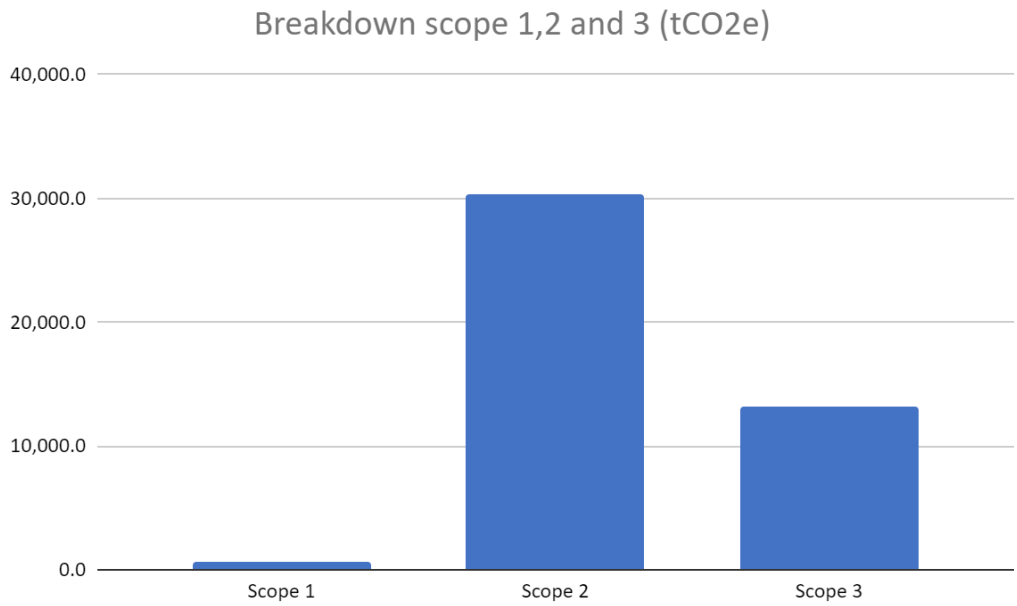

Figure 3: Greenhouse gas emissions (tCO_2e) by scope in 2018–2019

(Source: South Pole, based on AUS, 2022)

After conducting the GHG assessment, South Pole used the Science Based Target initiative's (SBTi) Target Setting Tool to develop a scope 1 and 2 target for AUS, using the absolute contraction approach aligned with a 1.5°C target. 2030 was selected as a target year, and South Pole identified and evaluated potential reduction measures to assist AUS in not only meeting this target, but also going beyond it. An annual growth rate of 4.8% was applied to the base year to account for growth in business as usual (BAU) emissions. A summary of the target is provided in Table 3.

Table 3: Target setting summary

Scope 1 and 2 base year emissions (tCO_2e)	31,004
Scope 1 and 2 emissions in 2030 (tCO_2e)	51,928
% reduction target	46.2
Target emissions in 2030 (tCO_2e)	16,681
Annual emission reduction by 2030 (tCO_2e)	14,324

(Source: South Pole, based on AUS, 2022)

The most appropriate reduction measures are summarised in Table 4. Through the identification of emission reduction measures, it was found that AUS could surpass its science-based target (SBT) by moving to 100% renewable energy for its scope 2 electricity, as the majority of AUS' footprint is attributed to scope 2 electricity. Switching to 100% renewable energy would result in emission reductions of over 68.83% for AUS, based on its 2019 consumption levels. It was determined that acquiring energy attribute certificates (EACs) would be the quickest and simplest way for AUS to acquire renewable energy. An alternative option of installing a 50MW solar PV plant was also considered.

Both options would deliver the same impact i.e. 100% renewable energy, however the business cases should be considered before a decision on the preferred approach is taken. AUS may consider purchasing EACs in the period before the solar plant is commercially operational to provide emission reductions in the near-term.

Table 4: Greenhouse gas reduction measures

GHG scope	Measure	Emission reductions (tCO_2e)
Scope 1		
Mobile combustion	Switching 35% of vehicles to electric vehicles (EVs)	108
Scope 2		
Electricity	Existing energy efficiency upgrades, e.g. chiller and LED lighting upgrades	6,074
Electricity	Further energy efficiency upgrades, including thermal insulation, pump upgrades and improved sensing and monitoring	5,913
Electricity	Installing a 7 MW on-site solar photovoltaic (PV) system	7,483
Electricity (option a)	Installing a 50 MW solar PV system	53,450[3]
Electricity (option b)	Renewable energy procurement, e.g. acquiring EACs	31,398
Total		**50,976**

(Source: South Pole, based on AUS, 2022)

The target setting and emission reduction assessment is summarised in Figure 4, showing that AUS can surpass its target by procuring renewable energy.

[3] It should be noted that the estimated system size is not confirmed. As shown, a 50MW system exceeds AUS's requirements based on South Pole's electricity consumption estimated. A detailed feasibility study should be undertaken to confirm the final system size to meet AUS' current and future demands.

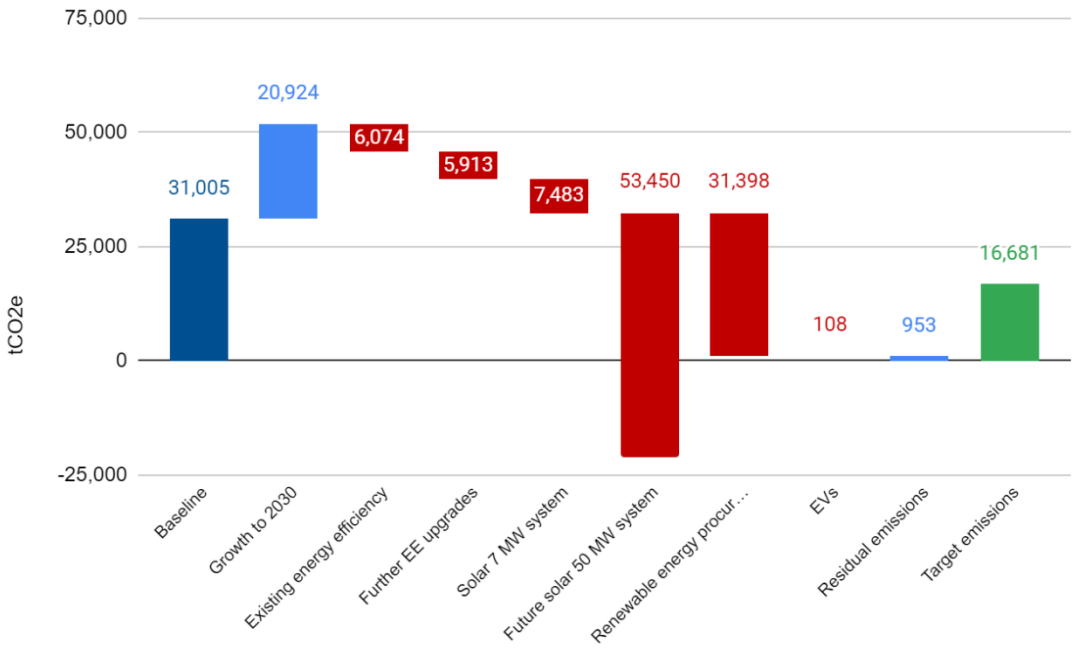

Figure 4: Final emission reduction and target setting results

(Source: South Pole, based on AUS, 2022)

1 Introduction

This report provides a summary of the GHG emissions produced by AUS' operations from 1 June 2018 to 31 May 2019. This reporting period was chosen by AUS as it is the last reporting period before the onset of the COVID-19 pandemic and is considered a more accurate representation of BAU for the university compared to 2020 as a base year.

AUS was founded in 1997 by His Highness Sheikh Dr Sultan Bin Muhammad Al Qasimi, Member of the Supreme Council of the UAE, and Ruler of Sharjah. Sheikh Sultan articulated his vision of a distinctive institution against the backdrop of Islamic history and in the context of the aspirations and needs of contemporary society in the UAE and the Gulf region.[4] The university has over 6,000 stakeholders, including teaching staff, faculty and students. With this GHG accounting report, AUS would like to gain insights into the quantity of GHG emissions caused by its operations. Based on the results, emission reduction targets will be set, and emission reduction measures put in place.

Company information and the reporting period are presented in Table 5.

Table 5: Company information

Company information	
Website	www.aus.edu
Business area	Private University, Education
Reporting period	01/06/2018–31/05/2019

(Source: South Pole, based on AUS, 2022)

1.1 Methodology

The GHG accounting and reporting procedure is based on the 'The Greenhouse Gas Protocol: GHG Protocol: A Corporate Accounting and Reporting Standard – Revised Edition' (the 'GHG Protocol') and the complementary 'Corporate Value Chain (Scope 3) Accounting and Reporting Standard', the most widely used international accounting tools for government and business leaders to understand, quantify and manage GHG emissions. The standards were developed in a collaboration between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).

The accounting was based on the following principles of the 'GHG Protocol':

- **Relevance:** establishing an appropriate inventory boundary that reflects the GHG emissions of the company and serves the decision-making needs of users;
- **Completeness:** implementing accounting which includes all emission sources within the chosen inventory boundary. Any specific exclusion is disclosed and specified;
- **Consistency:** ensuring the meaningful comparison of information over time and transparently documenting any changes to the data;
- **Transparency:** guaranteeing data inventory sufficiency and clarity, whereby relevant issues are addressed in a coherent manner; and
- **Accuracy:** minimising uncertainty and avoiding the systematic over- or under-quantification of GHG emissions.

[4] American University of Sharjah, 2022.

1.2 System boundaries

1.2.1 Organisational boundaries

System boundaries were defined by the control approach, i.e. covering all entities where AUS has operational control. Table 6 shows the key figures for AUS.

Table 6: Key figures

Region	No. of facilities	Status	Area (m^2)	Headcount
UAE	1	Owned	363,789.27	6,161
Total			**363,789.27**	**6,161**

(Source: South Pole, based on AUS, 2022)

1.2.2 Operational boundaries

Under the 'GHG Protocol,' emissions are divided into direct and indirect emissions. Direct emissions are those originating from sources either owned or controlled by the reporting entity, while indirect emissions are those generated by the reporting entity's activities, but which occur at sources owned or controlled by another entity. Each emissions type is divided into three scopes, as found below.

Scope 1

Scope 1 includes all carbon emissions that can be directly managed by the organisation (i.e. direct GHG emissions). This includes emissions from the combustion of fossil fuels in mobile and stationary sources (e.g. owned or controlled boilers, power generators and vehicles), carbon emissions generated by chemical and physical processes and fugitive emissions from the use of cooling and air conditioning equipment. Table 7 gives an overview of the emission sources considered in scope 1, based on the information provided by AUS.

Table 7: Overview of scope 1 emission sources for 2018–2019

Category	Emission sources	Boundary
Stationary combustion	Generation of electricity and heat	Included
Mobile combustion	Company-owned or leased vehicles	Included
Physical or chemical processing	Manufacture or processing of chemicals and materials	Not applicable
Fugitive emissions	Emissions from the use of cooling systems and air conditioning equipment, leakage from CO_2 tanks or methane (CH_4) tubes	Included

(Source: South Pole, based on AUS, 2022)

Scope 2

Scope 2 includes indirect GHG emissions from the generation of electricity, steam, heat, or cooling purchased by the organisation from external energy providers. Table 8 gives an overview of the emission sources considered in scope 2.

Table 8: Overview of scope 2 emission sources for 2018–2019

Category	Emission sources	Boundary
Electricity	Purchased electricity	Included
Steam	Purchased steam	Not applicable
District heating	Purchased district heating	Not applicable
District cooling	Purchased district cooling	Not applicable

(Source: South Pole, based on AUS, 2022)

Scope 3

Scope 3 includes other indirect emissions, such as emissions from the extraction and production of purchased materials and services, vehicles not owned or controlled by the reporting entity, outsourced activities, and waste disposal, among others.

According to the 'GHG Protocol,' companies shall separately account for and report on emissions from scopes 1 and 2. Scope 3 is an optional reporting category, but as it is often the most important scope for many organisations, companies are expected to at least assess the relevant categories.

Table 9 gives an overview of the emission sources considered in scope 3.

Table 9: Overview of scope 3 emission sources for 2018–2019

Category	Emission sources	Boundary
Purchased goods and services	Purchased goods (raw materials) and services	Included
Capital goods	Production of capital goods (e.g. machinery and IT equipment)	Included
Fuel- and energy-related activities	Upstream life cycle emissions from fuel and electricity generation, including transmission and distribution (T&D) losses	Included
Upstream T&D	T&D of goods and services to the company	Included
Waste generated in operations	Waste management of operational waste (landfilling, recycling, etc.)	Included
Business travel	Travel and accommodation of employees/contractors	Included
Employee commuting	Employee travel between home and work	Included
Upstream leased assets	Operation of assets leased by the organisation (lessee) in the reporting year and not included in scopes 1 or 2	Not applicable
Downstream T&D	T&D of products sold by the organisation	Not applicable
Processing of sold products	Processing of intermediate products sold by the organisation	Not applicable
Use of sold products	Use of sold goods that require energy to operate	Not applicable
End-of-life treatment of sold products	Waste disposal and treatment of sold products	Not applicable

Category	Emission sources	Boundary
Downstream leased assets	Operation of assets owned by the company (lessor), leased to other entities, and not included in scopes 1 or 2	Not applicable
Franchises	Operation of franchises not included in scopes 1 or 2	Not applicable
Investments	Operation of investments not included in scopes 1 or 2	Not applicable

(Source: South Pole, based on AUS, 2022)

1.3 Data inventory and assumptions

Overall, the data inventory, emission factors and assumptions are based on the 'GHG Protocol'. The assumptions and emission factors were selected using a conservative approach. Unless otherwise specified, all emission values in this report are given in tCO_2e.

AUS provided primary data on fuel, refrigerants and electricity consumption for the university campus, flight-related business travel, purchased goods and services (such as paper, furniture, and other materials), water supply and consumables (such as IT devices and waste related to paper, cardboard, plastic, and hazardous waste).

Where activity data of the inventory was lacking, extrapolations and estimations were made for the following categories:

- **Mobile combustion (land transport):** AUS was able to provide spend-based data for this category. Aside from a general description for this category (i.e. rental car and rental car expenses), no other information regarding the breakdown of spend data was provided. As such, a Centre for Environmental Data Analysis (CEDA) cost-based emission factor was used to determine the tCO_2e for this category.
- **Freight:** origin and destination information was limited to the name of the origin and destination city. South Pole assumed the origin was the Sharjah University campus or another city centre and the destination was assumed to be the centre of the destination city. Where air/sea freight was used, it was assumed the first and last legs were completed by truck to and from the port.
- **Accommodation:** AUS was unable to provide information regarding accommodation. To obtain an estimate, an assumption was made using the data for flight-related business travel. It was assumed that medium-haul flights required an overnight stay and long-haul flights required an accommodation stay of three nights. A three-star accommodation rating was also assumed.
- **Food and beverages:** AUS was able to provide revenue data from campus food and catering vendors for this category. However, a more detailed breakdown of food and beverages was not provided. Therefore, a CEDA cost-based emission factor was used to determine the tCO_2e for this category. As revenue data was used instead of spend data, the tCO_2e totals reported can be assumed to be overestimated due to the profit margin of the vendors.
- **Employee commuting:** AUS chose to use 2018–2019 as the reporting period. As it is not possible to conduct a survey requesting responses for commuting habits from two years ago, AUS provided South Pole with the results of a commuter survey completed in 2017. South Pole extrapolated this data to estimate the number of commuters and modes of transport used in the 2018–2019 reporting period. Therefore, South Pole made assumptions on the most likely mode of transport that would be used based on the number of kilometres (km) travelled to determine the tCO_2e.
- **Cloud services:** no information was provided for the number of cloud service uses. South Pole estimated the number of cloud service users on campus based on the number of employees and students present during the reporting period.
- **Waste (small electrical items):** AUS provided a general description for this category, including cords, computer mice and keyboards. However, no information on weight was

provided. Consequently, South Pole made assumptions on the breakdown of waste using weight averages for computer cords, computer mice and keyboards.

A complete overview of activity data, extrapolations, estimations, and recommendations for improving data collection in the future are summarised in Annex II.

1.4 Global warming potentials

Global warming potential (GWP) is a measure of the climate impact of a GHG compared to CO_2 over a time horizon. GHG emissions have different GWP values depending on their efficiency in absorbing longwave radiation and the atmospheric lifetime of the gas. The GWP values used in GHG accounting include the six GHGs covered by the United Nations Framework Convention on Climate Change and the Kyoto Protocol and combinations of these, as outlined in Table 10. These are also the GWP values used by the UK's Department for Business, Energy, and Industrial Strategy (BEIS) and based on the Intergovernmental Panel on Climate Change's (IPCC) 'Fourth Assessment Report' (AR4). Although the 'Fifth Assessment Report' is more recent, it has not been accepted internationally by all stakeholders.

Table 10: Applied global warming potentials

GHG	GWP (100 years)
Carbon dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous oxide (N_2O)	298
Hydrofluorocarbons (HFCs)	See IPCC AR4 – Table 2.14
Perfluorocarbons (PFCs)	See IPCC AR4 – Table 2.14
Sulphur hexafluoride (SF_6)	22,800

(Source: IPCC AR4, 2007)

2 Results

'Total emissions' in this report refers to the emission sources covered, as described in section 1.2. Please note that, due to the rounding of numbers, the figures may not add up exactly to the total provided, as seen in Table 11. (Source: Global Reporting Initiative [GRI], G4 to pkm Standard, 2017)

Table 12 provides the breakdown of GHG emissions by source.

Table 11: Key figures according to the Global Reporting Initative

GRI G4	GRI standards	Topic	Quantity	Unit
G4-EN3	302-1	Direct energy consumption by primary source: diesel petrol propane or liquefied petroleum gas (LPG)	 220.1 300.6 544.1	 GJ GJ GJ
G4-EN3	302-1	Indirect energy consumption by primary source: grid electricity	 216,468.8	 GJ
G4-EN15	305-1	Direct GHG emissions (scope 1)	632.6	tCO_2e
G4-EN16	305-2	Energy indirect GHG emissions (scope 2)	30,371.8	tCO_2e
G4-EN17	305-3	Other indirect GHG emissions (scope 3)	13,122.3	tCO_2e
G4-EN18	305-4	GHG emissions per employee	7.2	tCO_2e per employee

(Source: Global Reporting Initiative [GRI], G4 to pkm Standard, 2017)

Table 12: Greenhouse gas emissions by scope and activity for 2018–2019

Activity	Consumption	Unit	Emissions (tCO_2e)	Percentage of total (%)
Scope 1: direct GHG emissions			**632.6**	**1.43**
Stationary combustion	**24.7**	**m^3**	**42.5**	**0.10**
Propane or LPG	20.9	m^3	32.3	0.07
Diesel/heating oil	3.8	m^3	10.2	0.02
Mobile combustion	**130.2**	**m^3**	**305.9**	**0.69**
Diesel	1.9	m^3	5.3	0.01
Petrol	128.5	m^3	300.6	0.68
Refrigerant leakage	**157**	**kg**	**284.2**	**0.64**
Scope 2: indirect GHG emissions from purchased electricity, heating, and cooling			**30,371.8**	**68.83**
Electricity	**60,130.2**	**MWh**	**30,371.8**	**68.83**

Activity	Consumption	Unit	Emissions (tCO_2e)	Percentage of total (%)
Grid	60,130.2	MWh	30,371.8	68.83
Scope 3: other indirect GHG emissions			**13,122.4**	**29.74**
Business travel			**2,520.7**	**5.71**
Flights	8,448,649.4	pkm	1,855.1	4.20
<463 km	33,882.3	pkm	9.2	0.02
463–3,700 km	1,354,275.5	pkm	234.1	0.53
>3,700 km	7,060,491.6	pkm	1,611.8	3.65
Rented vehicles	303,171.2	USD	661.2	1.50
Accommodation	975	guest-nights	4.3	0.01
Purchased goods and services			**2,615.8**	**5.93**
Water	358,575.3	m^3	53.4	0.12
Supply	358,575.3	m^3	53.4	0.12
Paper	30.99	t	23.5	0.05
Unspecified	3.1	t	2.9	0.01
Recycled	27.9	t	20.6	0.05
Food and beverages	3,795,236.2	USD	1,507.9	3.42
Food and beverages/catering	3,795,236.2	USD	1,507.9	3.42
Cloud services	30.8	MWh	25.8	0.06
Furniture and other materials	3,197,908	EUR	1,005.2	2.28
Capital goods			**28.4**	**0.06**
IT equipment	438	No. of devices	28.4	0.06
Mobile devices	9	No. of devices	0.2	0.00
Laptops	126	No. of devices	7.1	0.02
Printers	23	No. of devices	2.2	0.01
Desktop computer	244	No. of devices	15.4	0.03
Monitor or computer screen	21	No. of devices	1.2	0.00
Projector	2	No. of devices	0.0	0.00
Server	13	No. of devices	2.1	0.00
Employee commuting			**22.3**	**0.05**
Bus	41,949.6	pkm	4.3	0.01

Activity	Consumption	Unit	Emissions (tCO_2e)	Percentage of total (%)
Motorcycle	118.8	km	0.0	0.00
Car	103,388.4	km	18.02	0.04
Upstream transportation and distribution			**154.2**	**0.35**
Freight	937,610.1	tkm	154.2	0.35
Air	129,229.9	tkm	135.4	0.31
Road	648.5	tkm	5.8	0.01
Sea	807,731.7	tkm	13.0	0.03
Waste generated in operations	**43.8**	**t**	**17.4**	**0.04**
General waste	3.3	t	1.3	0.00
Paper and cardboard	40.5	t	16.1	0.04
Fuel- and energy-related activities			**7,763.5**	**17.59**
Well-to-tank			7,763.5	17.59
Propane or LPG (stationary)	20.9	m^3	3.8	0.01
Diesel (stationary)	3.8	m^3	10.1	0.02
Diesel (mobile)	1.9	m^3	0.0	0.00
Petrol or gasoline (mobile)	128.5	m^3	0.1	0.00
Electricity	60,130.2	MWh	7,749.6	17.56
Total GHG emissions			**44,126.6**	**100**

(Source: South Pole, based on AUS, 2022)

Figure 5 shows that AUS' major emission sources are scope 2 electricity and scope 3 fuel- and energy-related activities linked to the extraction, production and transportation of fuels consumed in the generation of electricity, steam, heating, and cooling for the reporting company. Examples of these activities include coal mining, fuel refinement and natural gas extraction.[5] For AUS, these are emissions associated with the generation and transmission of purchased electricity.

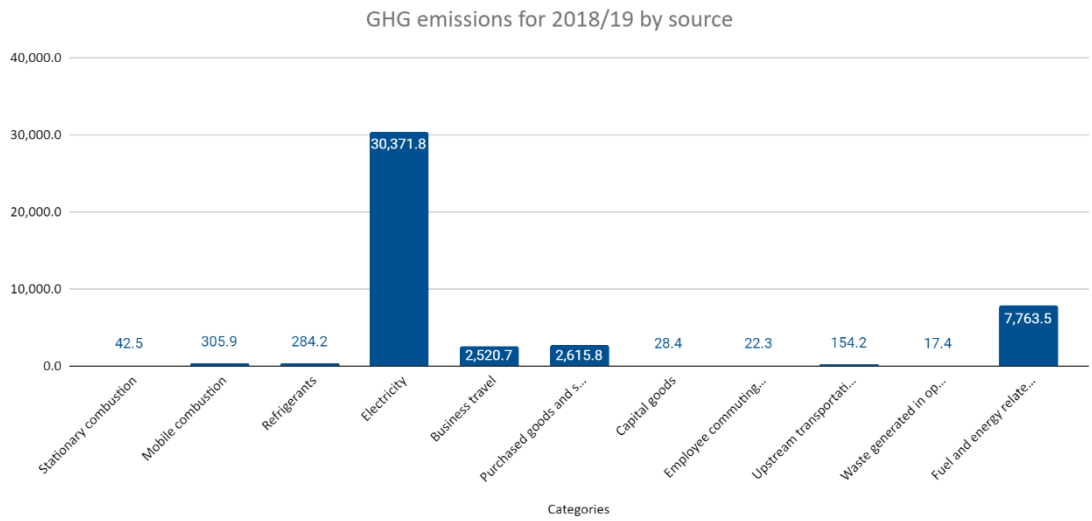

Figure 5: Greenhouse gas emissions by source for 2018–2019

(Source: American University of Sharjah, 2019)

[5] Category 3, Fuel- and Energy-Related Activities Not Included in Scope 1 or Scope 2, 2004.

3 American University of Sharjah's emission reduction plan and targets

3.1 Target setting

To propose an optimal reduction plan for AUS, the emissions data for scopes 1 and 2 was modelled with the Target Setting Tool, version 2.0 (SBTi, 2022). The absolute contraction approach was used as a target-setting method, as no other target options are available for tertiary education providers. The absolute contraction approach is considered the most environmentally robust method and demonstrates a strong ambition in communicating targets. Figure 6 shows the input data used in the modelling.

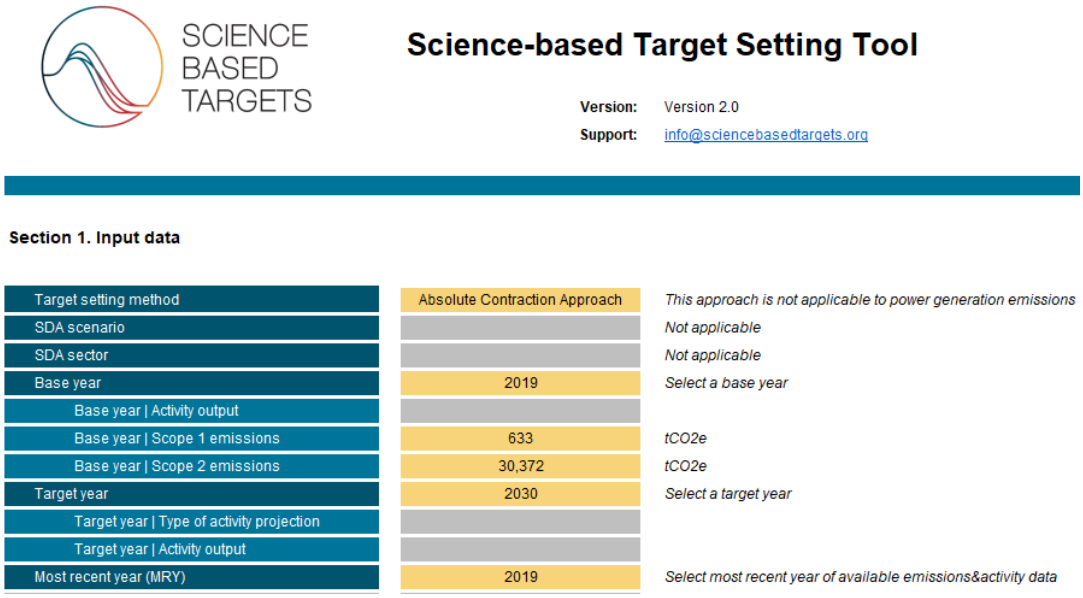

Figure 6: Screenshot of the Target Setting Tool

(Source: Science-based Target Setting Tool V2.0, 2022)

The results were used to set a 2030 reduction target for AUS, with the baseline year being 2018–2019. The results show that AUS would have to lower its scope 1 and 2 emissions by 46.2% or 14,324 tCO_2e compared to the 2018–2019 baseline, as shown in Figure 7. This means that AUS must reduce its emissions to 16,681 tCO_2e by 2030.

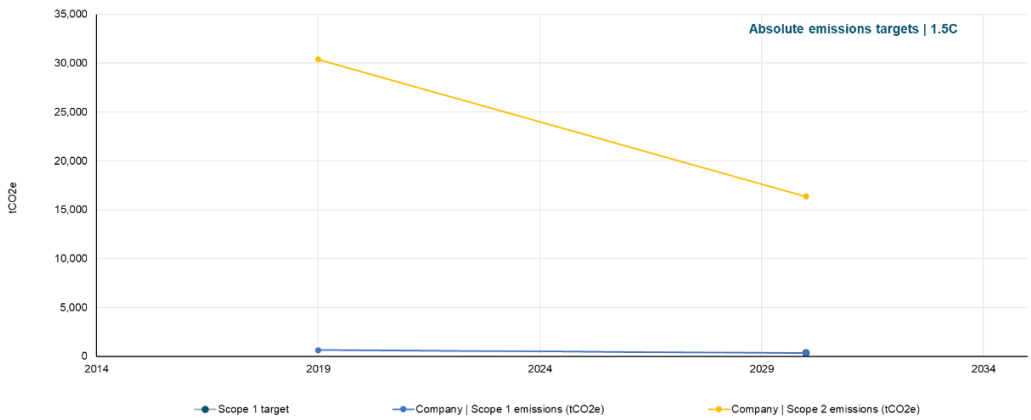

Figure 7: Reduction needed in scope 1 and 2 emissions to reach the 2030 target

(Source: Science-based Target Setting Tool, 2022)

3.2 Emission reduction interventions

Reduction opportunities were identified during discussions between South Pole and AUS designed to capture any existing emission reduction measures adopted by AUS and review the emission hotspots identified in the GHG analysis. These opportunities were then modelled, and an emission reduction value calculated by determining the potential uptake and impact of reductions.

To obtain a holistic view of the overall emissions and interventions needed to meet AUS' target, South Pole modelled the baseline emissions from the reporting year 2019, the estimated emissions from the BAU, each of the recommended emission reduction measures, the gap to reach the target and the residual emissions (i.e. the emissions remaining after the implementation of reduction methods). Results are shown in Table 13. The following methods were used to calculate the BAU, the residual emissions and the gap to target:

- **BAU:** South Pole estimated that AUS would have an annual baseline growth of 4.8%, based on the industry averages for the university sector.[6]
- **Residual emissions:** South Pole calculated the residual emissions by subtracting the emission reduction measures from the baseline and the BAU growth.
- **Gap to target:** South Pole calculated the gap to target by subtracting the residual emissions from the target.

Please see Table 16 in Annex III for the waterfall chart data.

As shown in Table 13 and Figure 8, two options for AUS to increase the use of renewable energy have been considered, namely installing a 50 MW solar PV system and renewable energy procurement. Both options would deliver the same impact i.e. 100% renewable energy, however the business cases should be considered before a decision on the preferred approach is taken. AUS may consider purchasing EACs in the period before the solar plant is commercially operational to provide emission reductions in the near-term.

Table 13: Emission reduction measures

GHG scope	Measure	Explanation	Project status	Emission reduction (tCO_2e)
Scope 1				
Mobile combustion	Switching 35% of vehicles to EVs	Switching 35% of AUS' vehicles would result in a reduction of 108 tCO_2e per year. Although this reduction is small relative to the other measures, this could be used as a positive story for the university to share through its initiatives reporting on climate action.	Preliminary studies	108
Scope 2				
Electricity	Existing energy efficiency upgrades, e.g. chiller and LED lighting upgrades	AUS has replaced the entire university lighting with LEDs in all new renovations. In addition, all cooling plants have been upgraded with state-of-the-art consumption chillers. These upgrades have had an estimated reduction impact on scope 2 electricity of 20%.	Completed	6,074
Electricity	Further energy efficiency upgrades.	Applying new technologies to further improve energy efficiency, such as thermal insulation, pump upgrades and improved sensing and monitoring, could	Preliminary studies	5,913

[6] IBL News, 2019.

GHG scope	Measure	Explanation	Project status	Emission reduction (tCO_2e)
		result in energy efficiency improvements of up to 13%.		
Electricity	Installing a 7 MW on-site solar PV system	Installing a 7 MW PV system on site with a 96% inverter efficiency would produce an estimated 14,815 MWh per year, based on UAE peak solar hours of 6.04 hours/day.	Planning	7,483
Electricity (option a)	Installing a 50 MW solar PV system	Installing a 50 MW PV system with a 96% inverter efficiency would produce an estimated 105,821 MWh per year, based on UAE peak solar hours of 6.04 hours/day.	Preliminary studies	53,450[7]
Electricity (option b)	Renewable energy procurement	Acquiring 62,162 MWh of EACs.	Preliminary studies	31,398
BAU emissions in 2030				**51,929**
Total potential GHG reductions				**50,976 – 73,028**
Residual emissions				**953**
Target emissions				**16,681**

(Source: South Pole, based on AUS, 2022)

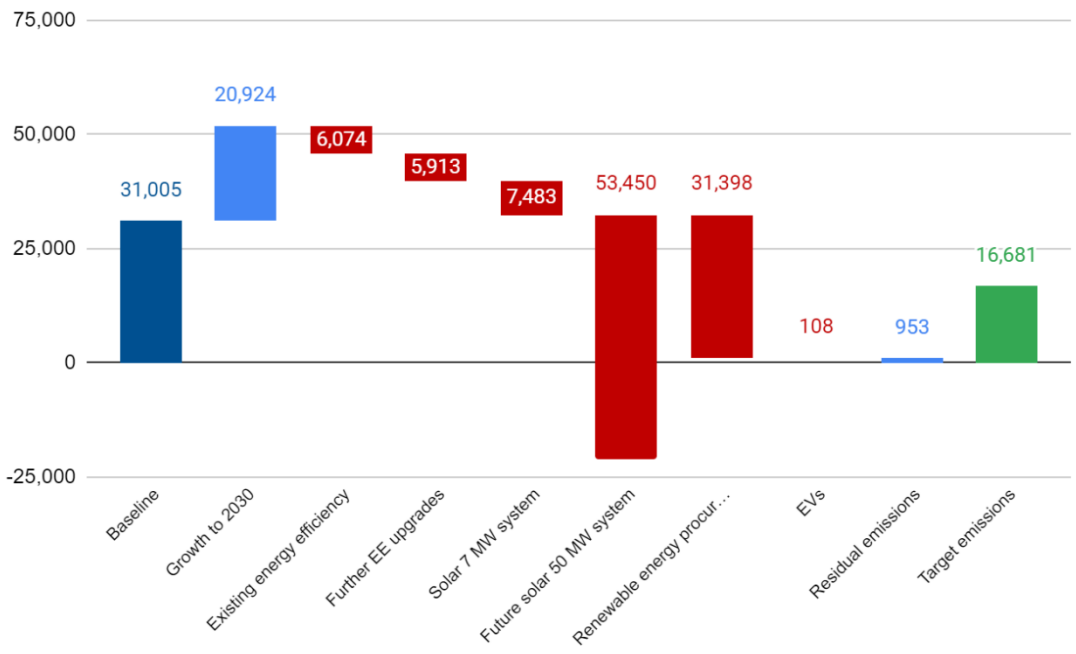

Figure 8: Reductions per implemented measure

(Source: South Pole, based on AUS, 2022)

[7] It should be noted that the estimated system size is not confirmed. As shown, a 50MW system exceeds AUS's requirements based on South Pole's electricity consumption estimated. A detailed feasibility study should be undertaken to confirm the final system size to meet AUS' current and future demands.

As shown in Figure 8, AUS could easily achieve emission reductions beyond its SBT by moving to 100% renewable energy for its scope 2 electricity. As the majority of AUS' footprint is attributed to scope 2 electricity, switching to renewable energy would result in significant emission reductions of 68.83%, based on 2019 consumption levels. This would reduce scope 2 emissions to 0.00 tCO_2e.

4 South Pole's 'Climate Neutrality' labels

4.1 Approach and guiding principles

South Pole offers 'Climate Neutrality' labels for companies, products, and events. The South Pole 'Climate Neutrality' labels are closely aligned with international standards, such as PAS 2060,[8] the leading international standard for demonstrating carbon neutrality developed by the British Standards Institution (BSI) in 2014. The underlying GHG accounting must follow recognised international standards, such as the 'GHG Protocol'[9] or International Organization for Standardization (ISO) 14064-1.[10]

The 'GHG Protocol' principles of relevance, completeness, consistency, transparency, and accuracy provide the basis for achieving the 'Climate Neutrality' labels. In addition, and in reflection of South Pole's commitment to long-lasting impact, the South Pole labels include the principles of conservativeness and continuity.

South Pole has outlined five steps to achieving the 'Climate Neutrality' labels, as presented in Figure 9. A detailed description of these steps and the aforementioned principles is provided in the Technical Guidance for South Pole Climate Neutrality and Renewable Electricity Labels, available online.

Figure 9: Five steps to being awarded South Pole's 'Climate Neutrality' label

(Source: South Pole, 2022)

[8] PAS 2060 Standard for Carbon Neutrality (2014) British Standards Institution, published by BSI Standards Limited.
[9] 'GHG Protocol': a corporate reporting and accounting standard developed by the WBCSD, Geneva, Switzerland and the WRI, Washington D.C., 2004.
[10] ISO 14064-1 International Standard for GHG Emissions Inventories and Verification (2006) ISO, Geneva, Switzerland.

Annex I

Emission factors

Table 14: Emission factors

Activity	Emission factor reference[11]
Fuel and electricity	• BEIS, 2021[12] (Global emissions factor used for stationary and mobile fuel activity. UAE location-based emissions factor used for purchased electricity).
Business travel	• BEIS, 2021 (emissions factors for short, medium, and long-haul flights were used for business air travel). • CEDA[13], 2019 (UAE emissions factor applied for rental car electricity).
Accommodation	• CHSB Index 2019[14], Cornell Hotel Sustainability Benchmarking 2019 (country mean value emissions factor applied Per Occupied Room).
Purchased goods and services	• BEIS, 2021 (Global emissions factor for recycled and primary martial used for paper purchases, global emissions factor used for water supply). • CEDA, 2019 (UAE emissions factor used for furniture, food, and beverage purchases). • Technology-specific Cost and Performance Parameters, 2014 (used to determine the user emissions factor for cloud services)
Capital goods	• Dell, 2011; Dell, 2018; • Lenovo, 2016–2019; • Apple, 2015–2020; • HP, 2017–2020; • LCA by Bhakar, V., Digalwar, A., Sangwan K. S., 2015–2020; • LCA by Casio, 2006; • Ecoinvent v.3.3.7.1, 2020; • Konica Minolta, 2018; • Teehan, 2013; • Fujitsu, 2010; • Microsoft, 2019; • Huawei, 2019
Employee commuting	• BEIS, 2021 (Global emissions factor for average motorbike, car, and buses were used).
Freight	• BEIS, 2021 (emissions factor for average cargo container ship used. Emissions factors for short, medium, and long-haul flights were used for air freight, emissions factor for average cargo truck up to 3.5 tonnes used for road freight component).
Waste	• World Bank waste statistics, BEIS and Ecoinvent (average waste emissions factor for UAE used)

(Source: South Pole, 2022)

[11] South Pole derives its emission factors from reliable and credible sources. South Pole is not responsible for inaccuracies in emission factors provided by third parties.

[12] BEIS Emission Factors, 2021

[13] CEDA Country specific emission factor, Purchaser Price, 2019

[14] CHSB Index, 2019

Annex II

Data assumptions, extrapolations, identified gaps and recommendations for the data collection process

Table 15: Data assumption, extrapolations and recommendations for future reporting

Category	Assumption(s)	Recommendations for future reporting
Scope 1		
Mobile combustion (land transport)	AUS was able to provide spend-based data for this category. Other than a general description (i.e. rental car and rental car expenses), no other information regarding the breakdown of spend data was provided. South Pole used a general cost-based emission factor from the CEDA database to determine the tCO_2e for this category.	It is recommended that AUS work with its procurement team to source more granular data for this category, ideally obtaining data on km travelled or litres of fuel used. A clearer breakdown of this category would allow for better-tailored emission factors to be applied and the accuracy of reported tCO_2e to be improved for future reporting periods.
Scope 3		
Freight	Origin and destination information was limited to the name of the origin and destination city. South Pole assumed the origin was the Sharjah University campus or another city centre and the destination was assumed to be the centre of the destination city. Where air/sea freight was used, it was assumed the first and last legs were completed by truck. South Pole used internal data sources to estimate emissions and improve the completeness of each freight journey.	For future reporting, it is recommended that AUS work with its logistics team to comprehensively track the entire freight journey so that accurate origin and destination data can be used to calculate the tCO_2e for this category.
Accommodation	AUS was unable to provide any information regarding accommodation. To obtain an estimate, an assumption was made using the data on flight-related business travel. It was assumed that medium-haul flights required an overnight stay and long-haul flights required an accommodation stay of three nights. A three-star accommodation rating was also assumed. South Pole used internal data sources to estimate the emissions from accommodations.	AUS should collect employee travel data for accommodation stays. This data could be tracked with a business travel booking portal.

Category	Assumption(s)	Recommendations for future reporting
Food and beverages	AUS was able to provide revenue data from vendors for this category. However, no other information on the breakdown of food and beverages was provided. Therefore, a CEDA cost-based emission factor was used to determine the tCO_2e for this category. It is important to note that, as revenue data was used instead of spend data, the tCO_2e totals reported can be assumed to be an overestimation due to inflation.	AUS should try to obtain procurement spend and/or food/beverage volumes from the vendors would improve the accuracy of the reported emissions, A clearer breakdown of this category would allow for better-tailored emission factors to be applied and the accuracy of reported tCO_2e to be improved for future reporting periods.
Employee commuting	AUS chose to use 2018–2019 as the reporting period. As it is difficult to conduct a survey requesting responses for commuting habits from two years ago, AUS provided South Pole with the results of a commuter survey completed in 2017. South Pole extrapolated this data to estimate the number of commuters and modes of transport used in the 2018–2019 reporting period. The mode of transport and the distances travelled by each respondent were not linked, meaning that South Pole had to make assumptions on the most likely mode of transport that would be used, based on the number of km travelled, to determine the tCO_2e.	AUS should capture commuter data through a survey linking the mode of transport with the number of km travelled and the number of commuting days.
Cloud services	No information was provided on the number of cloud service uses. AUS confirmed the software used on campus is the Google Suite. To estimate the number of cloud service users on campus, South Pole used the number of employees and students on campus during the reporting period.	AUS should work with their IT department to record the number of software licences it has, allowing for more granular reporting of associated emissions.
Waste (small electrical items)	AUS provided a general description for this category, including the number of computer cords, computer mice and keyboards disposed of. As no other breakdown was provided, South Pole made assumptions for waste based on weight averages for computer cords, computer mice and keyboards.	AUS should work with its waste contractors to obtain small electrical waste volumes if possible. Looking at waste more generally, AUS is encouraged to work with waste contractors and/or food vendors to collect information regarding the amount of food waste on campus. Which could be included to provide a more holistic emission value for the waste category.

(Source: South Pole, based on AUS, 2022)

Annex III

Data quality guidance

Table 16: Data quality guidance examples

Data Quality	Emission sources			
	Electricity	Freight	Corporate travel (road)	Business travel (air)
Maximum	Total energy consumption in kWh or MWh for the reporting period, per office / site	Mode of transport (e.g. air, road, rail, sea), distance of the shipment in kilometres or amount spent and weight of cargo	Vehicle model or type (e.g., large car, minivan, small car, etc.), fuel use in litres or number of kilometres travelled. For taxis and staff cars reimbursement the amount spent/reimbursed (e.g. in EUR) may be provided instead of fuel consumption or distance travelled	Flight data indicating departure and arrival airports in IATA airport codes (3 letter codes), seating class, number of passengers and if trip is one-way or return
Satisfactory	Total energy consumption in GJ or another energy unit for the reporting period, per office / site	Mode of transport (e.g. air, road, rail, sea), place of origin and destination of the shipment, and weight of cargo	Fuel use in litres or number of kilometres travelled or amount spent/reimbursed, with no details of the vehicle (in this case South Pole will make an assumption)	Flight data from a travel agent, indicating all the details indicated above, but in a different template (e.g., spreadsheet report from travel agent)
Minimum	If energy data is not available, provide area of the office / site. South Pole will make an assumption and estimate energy consumption based on the area of the office or site	Mode of transport (e.g. air, road, rail, sea), place of origin and destination of the shipment, and volume of cargo	Location of departure and arrival. South Pole will estimate the approximate distance travelled	Flight data indicating departure and arrival airports or regions and if trip is one-way or return and the number of passengers

(Source: South Pole, 2022)

Annex IV

Waterfall chart data

Table 17 shows the data used to calculate the emission reduction measures. South Pole assumed that all reduction measures have an uptake of 100% except for EVs. For EVs, South Pole assumed an uptake of 35%, as AUS confirmed it would be interested in replacing some of its vehicle fleet. South Pole estimated the impact percentage for each reduction measure based on the International Energy Agency's report 'Energy Efficiency 2019: The authoritative tracker of global energy efficiency trends'.[15]

Table 17: Waterfall chart data

Waterfall chart data								
	Baseline	Unit	Uptake (%)	Impact (%)	Impact	Unit	Impact	Unit
Baseline	31,005	tCO_2e	-	-	-	tCO_2e	31,005	tCO_2e
BAU growth	20,924	tCO_2e	-	-	-	tCO_2e	20,924	tCO_2e
Existing energy efficiency	60,130	MWh	100	20	12,026	MWh	-6,074	tCO_2e
Further energy efficiency upgrades	88,683	MWh	100	13	11,706	MWh	-5,913	tCO_2e
Solar	76,977	MWh	100	19	14,815	MWh	-7,483	tCO_2e
Future 50MW solar	62,162	MWh	100	170%	105,821	MWh	-53,450	tCO_2e
Renewable energy procurement	62,162	MWh	100	100	62,162	MWh	-31,398	tCO_2e
EVs	512	tCO_2e	35	60	108	tCO_2e	-108	tCO_2e
Residual emissions							**953**	**tCO_2e**
Gap to target							**-15,728**	**tCO_2e**

(Source: South Pole, 2022)

[15] Energy Efficiency, 2019.


south pole