



Greenhouse Gas (GHG) Accounting

January–December 2024 (FY2024)

Executive Summary

This report provides a summary of the greenhouse gas (GHG) emissions produced by American University of Sharjah (AUS) operations from January 1 to December 31, 2024 (FY2024). AUS is a private university in the United Arab Emirates (UAE), founded in 1997 by His Highness Sheikh Dr. Sultan bin Mohammed Al Qasimi, Member of the Supreme Council of the United Arab Emirates and Ruler of Sharjah. The university has over 8,000 stakeholders, including students, staff, faculty and their dependents residing on campus.

As part of the initial launch of its Climate Action Plan in 2022, AUS worked with South Pole, a third-party service provider, to conduct an initial GHG study baselining AUS' annual emissions and setting Science Based Targets Initiative (SBTi)-aligned reduction targets. After the first reporting cycle, it became apparent that further efforts had to be made on closing existing data gaps and improving data quality. The AUS Office of Sustainability has been working with internal stakeholders to continuously improve data collection for the annual AUS GHG report.

Since 2023, AUS has been using the reporting tool eMission by the UAE Alliance for Climate Action (UACA) to track and report its annual GHG emissions across all three scopes to better align with UAE reporting standards. A summary of key performance indicators for 2024 and 2023 is presented in Table 1.

Table 1: Summary of key performance indicators

Academic Year	FY2024 (January 1–December 31)	FY2023 (January 1–December 31)
Number of stakeholders	8,264	7,957
Premises area (m ²)	363,728.27	363,728.27
Total Emissions (tCO ₂ e)	57,387	54,729
tCO ₂ e/stakeholders	6.94	6.88
tCO ₂ e/m ²	0.16	0.15

tCO₂e: Tonnes of Carbon Dioxide Equivalent

Table 2 shows the GHG emissions by source for 2024.

Table 2: GHG emissions for 2024

Scope	Emissions (tCO ₂ e)
Scope 1: Direct GHG emissions	2,300
Scope 2: Indirect GHG emissions from purchased electricity	22,024
Scope 3: Other indirect GHG emissions	33,063
Total GHG emissions	57,387

In Figure 1, the percentage shares of the scopes can be seen. Scope 3 contributed the majority of GHG emissions from AUS operations in FY2024, accounting for 58 percent.

Figure 2 shows that most of the emissions are from Scope 2 purchased electricity (22,024 tCO₂e) and fuel energy production in Scope 3 (20,509.5 tCO₂e).

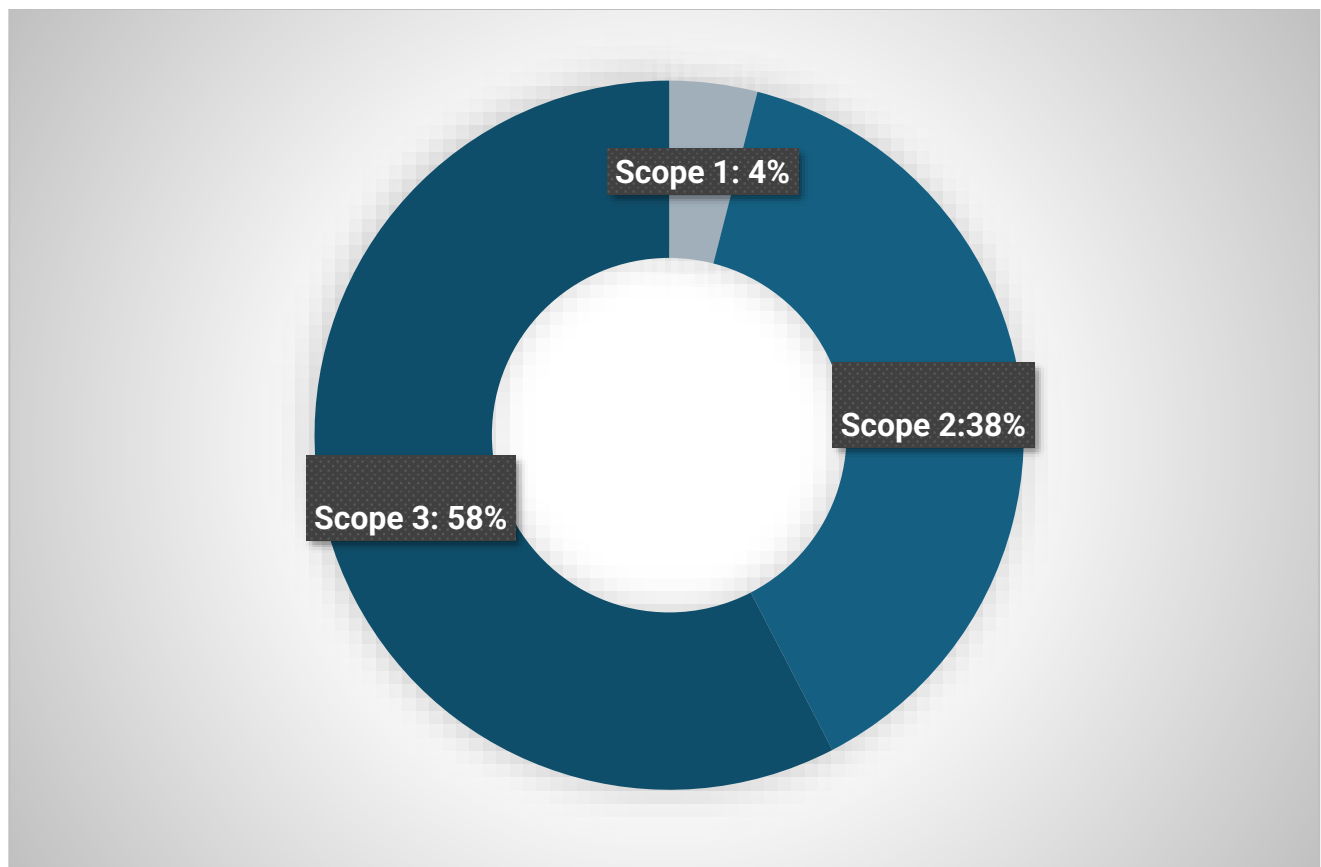
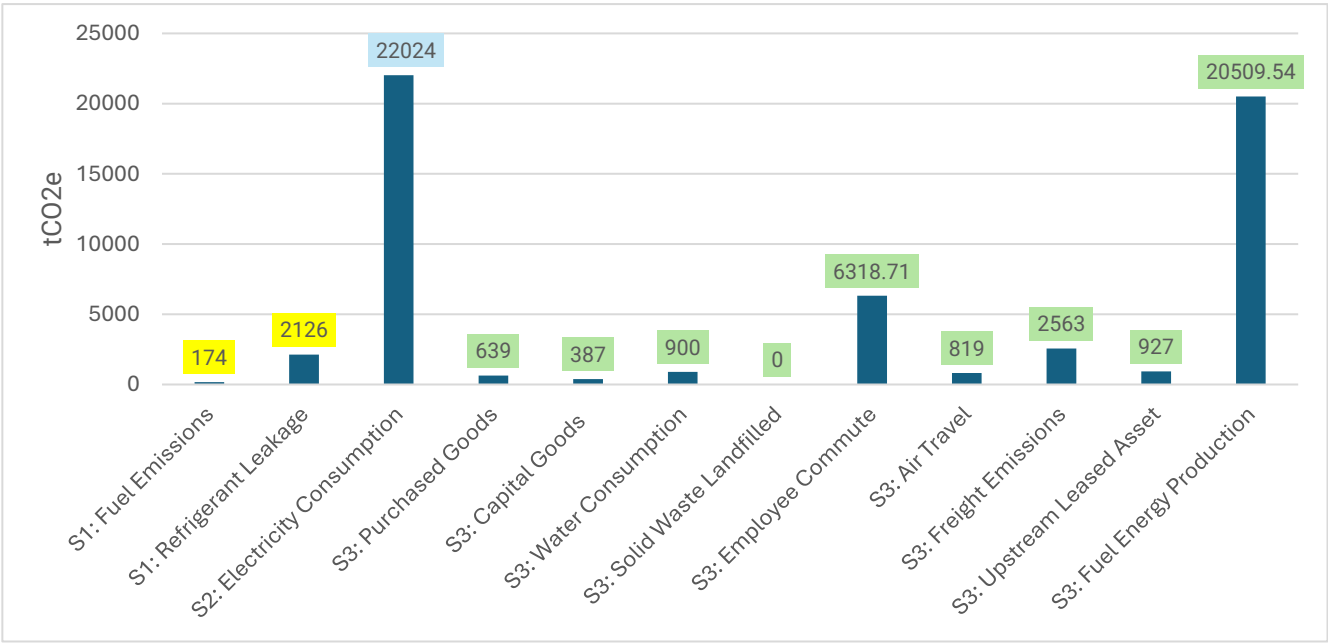


Figure 1: Scope 1, 2 and 3 emissions by percentage of total emissions in FY2024

Figure 2: Scope 1, 2 and 3 emissions by category in FY2024



Introduction

This report provides a summary of the greenhouse gas (GHG) emissions produced by American University of Sharjah (AUS) operations from January 1 to December 31, 2024. AUS was founded in 1997 by His Highness Sheikh Dr. Sultan bin Mohammed Al Qasimi, Member of the Supreme Council of the United Arab Emirates (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. The university has over 8,000 stakeholders, including students, staff, faculty and their dependents residing on campus. With this GHG accounting report, AUS aims to gain insights into the quantity of GHG emissions caused by its operations. This is the fifth report of GHG calculations. Like the 2023 report, this is also based on the eMission platform created by UACA.

Table 3: University information

Website	www.aus.edu
Business area	Private University, Education
Reporting period	January 1, 2024–December 31, 2024

Methodology

The GHG accounting and reporting procedure is based on the *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard–Revised Edition* (the GHG Protocol) and the complementary *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*, which are 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 partnership between the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).

System Boundaries

Organizational Boundaries

The system boundaries for the GHG accounting procedure were defined by the control approach, i.e., covering all entities where AUS has operational control. Table 4 shows the key figures relevant for the performance indicator of AUS.

Table 4: Key figures for performance indicators at AUS

Region	UAE
Number of facilities	1
Status	Owned
Area (m²)	363,728.27
Head count (includes students, faculty, staff and their dependents residing on campus)	8,264

Operational Boundaries

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

Scope 1

Scope 1 includes all carbon emissions that can be directly managed by the organization (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 5 gives an overview of the emission sources considered in Scope 1.

Table 5: Overview of the emission sources for Scope 1

Category	Emission Sources	Boundary
Emissions from stationary combustion	Generation of electricity and heat	Included and is under fuel emissions but LPG is not included (NA on eMission)
Emissions from mobile combustion	Company-owned vehicles	Included and is under fuel emissions (eMission considers only vehicles which are owned by the company to be under Scope 1. Any leased

		vehicles are under Scope 3.
Process emissions	Manufacture or processing of chemicals and materials	Not applicable
Fugitive emissions	Emissions from the use of cooling systems and air conditioning equipment, leakage from CO2 tanks or methane tubes	Included under refrigerant leakage (the refrigerants R134A, R407C and R32 were used by AUS but were not accounted for in this report as they are NA on eMission)

Scope 2

Scope 2 includes indirect GHG emissions from the generation of electricity, steam, heat or cooling purchased by the organization from external energy providers. Table 6 gives an overview of the emission sources considered in Scope 2.

Table 6: Overview of the emission sources for Scope 2

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

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 organizations, companies are expected to at least assess the relevant categories. Table 7 gives an overview of the emission sources considered in Scope 3.

Table 7: Overview of the emission sources for Scope 3

Category	Emission Sources	Boundary
Purchased goods and services	Purchased goods (raw materials) and services	Included (similar to the 2023 report water consumption is considered as a separate category)
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 losses	Included under fuel energy production
Upstream transportation and distribution	Transportation and distribution of goods and services to the company	Included under freight emissions
Waste generated in operations	Waste management of operational waste (landfilling, recycling, etc.)	Included but eMission only looks at landfilling and so emissions from recycling are not included in this report
Business travel	Travel and accommodation of employees	Included (Rented vehicles are now under upstream leased assets as opposed to business travel (2019-2022 South Pole reports) or downstream leased assets (2023 report) as these vehicles are not owned by AUS). Accommodation (hotel

		costs) are also under Purchased goods and services
Stakeholder commuting	Stakeholders travel between home and work	Included under employee commute
Upstream leased assets	Operation of assets leased by the organization (lessee) in the reporting year and not included in Scopes 1 or 2	Applicable
Downstream transportation and distribution	Transportation and distribution of products sold by the organization	Not applicable
Processing of sold products	Processing of intermediate products sold by the organization	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
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	Applicable (All food outlets at AUS would be under this category)
Investments	Operation of investments not included in Scopes 1 or 2	Not applicable

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 (appendices 1 and 2). Unless otherwise specified, all emission values in this report are given in tCO₂e.

Global Warming Potential

Global warming potential (GWP) is a measure of the climate impact of a GHG compared to carbon dioxide over a time horizon. GHG emissions have different GWP values depending on their efficiency of absorbing long-wave 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 Kyoto Protocol, and blends from these. These are the GWP values used by the Department for Business, Energy and Industrial Strategy (BEIS) of the United Kingdom and are based on the Intergovernmental Panel on Climate Change's (IPCC's) *Fourth Assessment Report (AR4)* and *Fifth Assessment Report (AR5)*. The GHG Protocol recommends the use of AR5 but does not prohibit the use of previous assessment reports. The table below shows the GWP used in this report.

Table 8: GWP used in GHG assessment

Category	AR4 GWP (100 years)	AR5 GWP (100 years)
Carbon dioxide (CO ₂)	1	1
R407A (refrigerant)	-	1,923
R410A (refrigerant)	-	1,924
R22 (refrigerant)	-	1,760

(Source: GHG Protocol, 2013)

Results

Overall Results

Total emissions in this report refers to the emissions sources covered, as described in the system boundaries section. *Please note that due to rounding of numbers, the figures may not add up exactly to the total provided.*

The table below provides a breakdown of GHG emissions by scope and source. It describes the consumption and emissions in FY2024.

Table 9: GHG emissions by scope and activity for FY 2024

Activity	Consumption 2024	Unit	Emissions 2024 (tCO ₂ e)
Scope 1: Direct GHG emissions			2,300
<i>Fuel emission</i>			174.3
Diesel consumption	2,225	L	5.9 (all mobile combustion; no stationary combustion as no fuel was purchased and LPG was negligible and NA on eMission)
Petrol consumption	70,165	L	
<i>Refrigerant leakage</i>	1,184	Kg	2,126
Scope 2: Indirect GHG emissions from purchased electricity			22,024
Electricity consumption	54,501,496	Kwh	
Scope 3: Other indirect GHG emissions			
<i>Category 1: Purchased goods and services</i>			639
Food and beverage	979,270	AED	71.1
Paper products	1,104	AED	0.13

Print media and printing support	404,019.7	AED	24.7
Lights and light fixtures, switch boards, transformers and home appliances	287,400	AED	11.3
On-road vehicles (excluding motorcycles) and accompanying parts	306,115	AED	16.2
Furniture and shelving	1,464,142	AED	45.5
Medical supplies, entertainment and sporting goods, fashion goods, advertising products	300,000	AED	7.2
Data processing, internet publishing and other information services	16,696,651	AED	365
Hotels and campgrounds	17,171	AED	0.7
Food and beverage stores	1,703,757	AED	97
<i>Category 2: Capital goods</i>			387
Construction	6,024,735	AED	385.5
Computer and electronic products	133,447	AED	1.4
<i>Category 3: Water consumption</i>	72,918,998	IG	900
<i>Category 4: Solid waste landfilled</i>	0	kg	0

<i>Category 5: Employee/stakeholder commute</i>			6,319
Car petrol	25,094,478	km	4352
Public bus (this only includes Metro Shuttle)	54,627	km	1967
<i>Category 6: Air Travel</i>			819
Short haul (< 500 kilometers)	2468	km	
Medium haul (>= 500 kilometers, < 3700 kilometers)	435,337	Km	
Long haul (>= 3700 kilometers)	5,087,870	Km	
<i>Category 7: Freight emissions</i>			2,563
Air			1.3
Sea freight			0.02
Road freight emissions			2562
<i>Category 8: Upstream leased asset</i>	351,116	L	927

<i>Category 9: Fuel energy production</i>			20,509.5
Fuel consumption	23,980,658	AED	
Electricity consumption	176,959	AED	
Total Emissions (Scope 1, 2 and 3)			57,387

Text in bold indicates the areas reported on in this category.

AUS's major emission sources are Scope 2 purchased electricity (22,024tCO₂e), Scope 3 fuel-and energy-related activities (20,509.5tCO₂e), and Scope 3 employee commuting (6,319 tCO₂ e).

Comparisons of FY2019, FY2022, FY2023 and FY2024 GHG Emissions

When comparing between emissions for each scope in the different reporting periods, we see that the last four reports have been relatively consistent. As was mentioned in the 2023 report, there was a significant drop in Scope 2 emissions because we switched to the DEWA emissions factor as opposed to using an international emissions factor.

In 2024, emissions from purchased electricity decreased further, due to the ongoing energy efficiency initiatives at AUS. However, Scope 3 emissions increased due to better quality of data specifically for food outlets, IT purchases and advertising costs. In addition, fuel energy production emissions increased because we started to use the actual electricity tariff from SEWA instead of estimates.

Table 10 and figure 3 provide an overview of emissions over the years. Table 11 is a more detailed breakdown and comparison between the FY2023 and FY2024.

Table 10: Comparisons of scope emissions for FY2019, FY2022, FY2023 and FY2024

	South Pole	South Pole	South Pole	eMission	eMission
	June 1, 2018–May 31, 2019	June 1, 2021–May 31, 2022	June 1, 2022–May 31, 2023	January 1, 2023–December 31, 2023	January 1, 2024–December 31, 2024
Scope 1	633	2,150	2,357	2,467	2,300
Scope 2	30,372	34,189	34,082	28,598	22,024
Scope 3	13,122	22,280	23,986	23,664	33,063

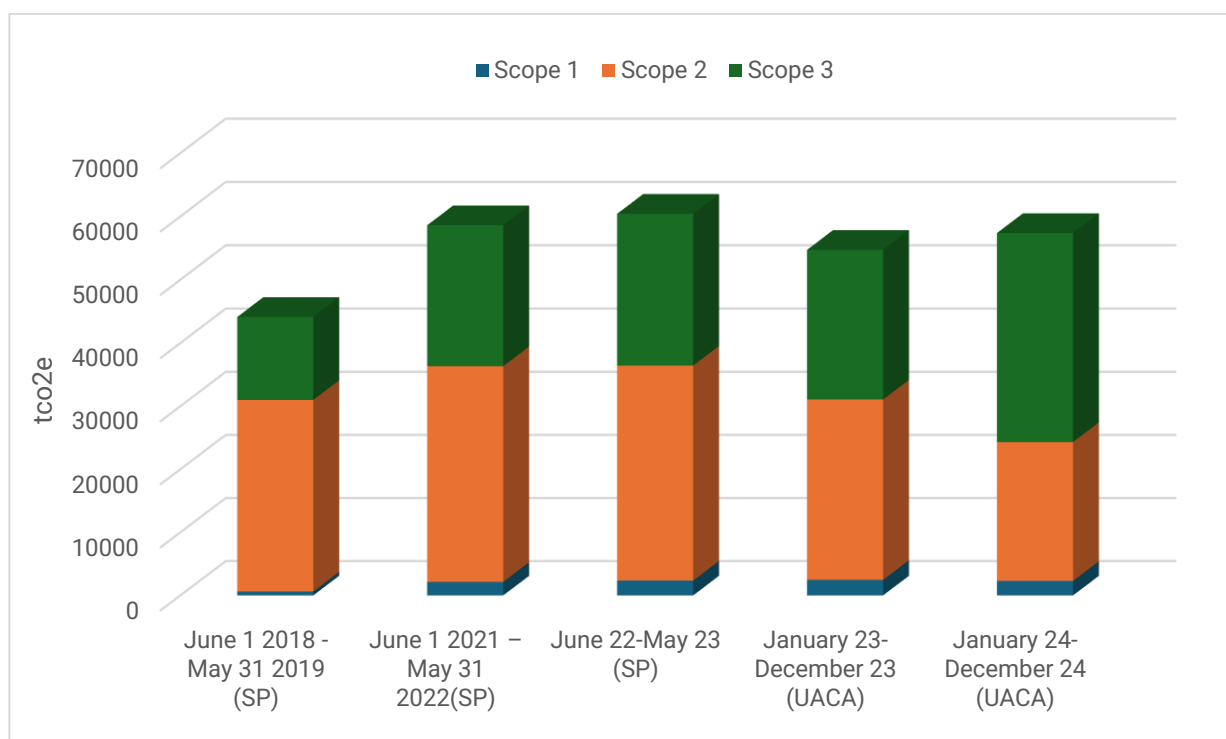


Figure 3: Emissions over the years (change from 2018 to 2024)

Table 11: Comparisons between emissions(tco2e) for FY2024 and FY2023

Activity	Emissions 2023 (tCO2e)	Emissions 2024 (tCO2e)	Comment
Scope 1: Direct GHG emissions	2,467	2,300	
Fuel emission	80	174.3	
-Diesel consumption	4.7	5.9	2024 values are higher because actual ADNOC invoices were used for fuel consumption (petrol and diesel). Last year, assumptions were used to calculate liters consumed.
-Petrol consumption	75.6	168	
Refrigerant leakage	2,387	2,126	Close value as there was a similar consumption of refrigerants
Scope 2: Indirect GHG emissions from purchased electricity	28,598	22,024	Consumption decreased and this is assumed to be due to the energy saving practices at AUS; however, electricity in housing values were assumed to be the same as those in 2022.
Electricity consumption			
Scope 3: Other indirect GHG emissions	23,664	33,063	
Category 1: Purchased goods and services	362	639	

Food and beverage	93.6	71.1	
Paper products	1.7	0.13	
Print media and printing support	23.5	24.7	
Lights and light fixtures, switch boards, transformers and home appliances	8.2	11.3	
On-road vehicles (excluding motorcycles) and accompanying parts	0.3	16.2	Last year only maintenance was accounted for; this year, cost of new vehicles is also included.
Furniture and shelving	34.4	45.5	
Medical supplies, entertainment and sporting goods, fashion goods, advertising products	3.8	7.2	2023 advertising value was estimated; however, for 2024 a detailed breakdown for advertising budget was provided, thus higher emissions
Media, literature and software	8.6	NA	Value for 2024 is part of the print media and printing support category

Data processing, internet publishing and other information services	186.4	365	Much more detailed reports provided by the IT department leading to higher emissions
Hotels and campgrounds	1.8	0.7	
Food and beverage stores	NA	97	Student Center and all its restaurants and shops reopened (value was NA in 2023)
Category 2: Capital goods	763	387	
Construction	627.4	385.5	More construction in 2023
Computer and electronic products	135.3	1.4	More purchases in 2023
Category 3: Water consumption	747	900	Consumption in 2024 increased; could be due to errors in the meters
Category 4: Solid waste landfilled	0	0	
Category 5: Employee/stakeholder commute	5,922	6,319	
Metro	13.6	NA	We now only consider emissions from the AUS-Metro Shuttle bus

Car petrol	5,285.3	4,352	Slight change due to variations in Sustainability Survey results and assumptions made
Public bus	622.6	1967	2024 value only includes emissions for the metro shuttle; however, it is still higher as there were more ticket sales
Category 6: Air Travel	454	819	More flights recorded in 2024
Short haul (< 500 kilometers)			
Medium haul (>= 500 kilometers, < 3700 kilometers)			
Long haul (>= 3700 kilometers)			
Category 7: Freight emissions	1,721	2,563	Higher for 2024 because for road freight the distance travelled was greater
Air	3.3	1.3	
Sea freight	0.2	0.02	
Road freight emissions	1717.7	2562	

Category 8: Upstream leased asset	510	927	In previous report (FY2023), this was reported as downstream leased assets, but this was modified in 2024 as leased vehicles are not owned by AUS. The reason for the increase is that more bus rentals were recorded in 2024.
Category 9: Fuel energy production	13,185	20,509.5	In 2024, fuel consumption data was based on ADNOC bills and not estimations; actual tariffs were used (0.44 AED/kwh as opposed to the estimate of 0.2 AED/kwh).
Fuel consumption			
Electricity consumption			
Total Emissions (Scope 1, 2 and 3)	54,729	57,387	

Text in bold indicates the areas reported on in this category.

Conclusions

Since the launch of AUS' Climate Action Plan in 2022, AUS has reported its GHG emission annually. The reported data quality and quantity has improved significantly over the years; however, there are still a few remaining data gaps that need to be addressed in collaboration with internal and external stakeholders.

The improvements in data quality and quantity initially lead to an increase in emissions across all three scopes but eventually plateaued for Scopes 1 and 2.

In 2024, we see a significant drop in our Scope 2 emissions due to energy efficiency retrofits at AUS, specifically in academic buildings. Figure 4 shows a comparison of electricity consumption in academic buildings between 2023 and 2024.

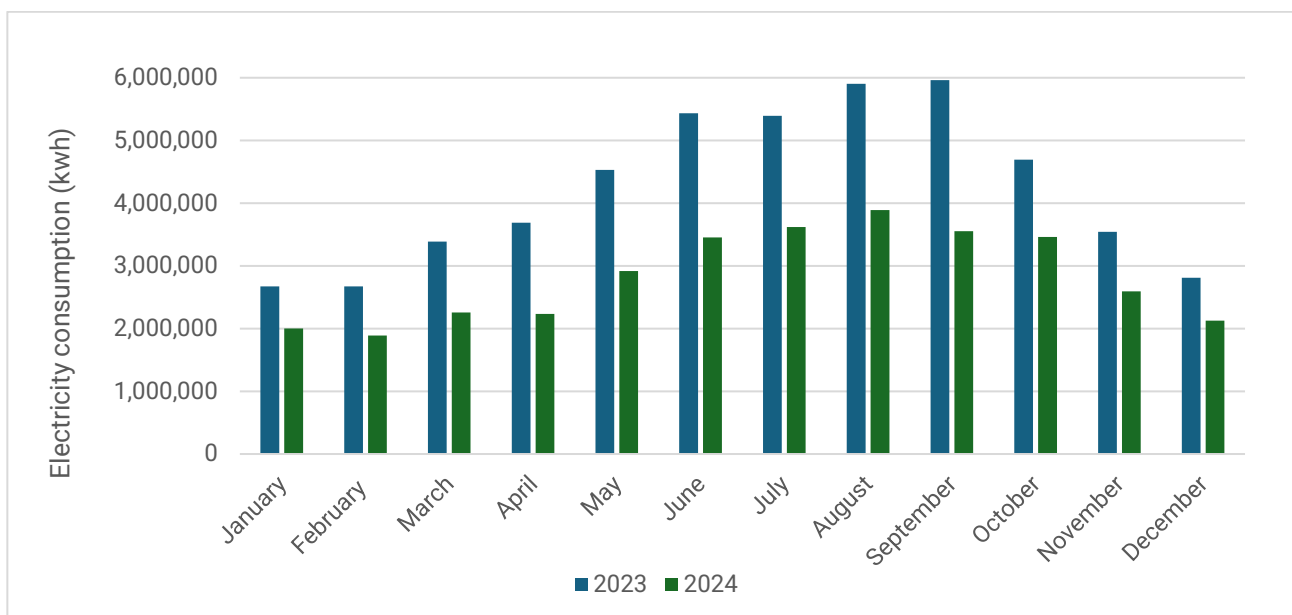


Figure 4: Comparison of total academic buildings electricity consumption for 2023 and 2024

One of the biggest challenges that remains is the calculation of commuting data for stakeholders. This year, we have much more comprehensive data for the student body but need to focus on more detailed data sets for staff/faculty who do not reside on campus. We have noticed that there has been a significant increase of electric vehicles on campus; however, we need to work on recording reliable data points on this.

Appendix 1 – Assumptions

Solid waste landfilled: In Sharjah, the waste is incinerated or recycled (UACA doesn't have this option on the platform) therefore the value for waste landfilled is 0 kg for this report.

Road freight emissions: Any road freights whereby distance was reported as Sharjah to Sharjah. The distance was assumed to be from Sharjah to American university of Sharjah (using Google Maps). Additionally, it was assumed that the vehicles were heavy good vehicles (HGV) Rigid (>3.5 - 7.5 tonnes).

Fuel and energy production: The rate used to convert electricity into monetary terms is 0.44 AED/kwh.

Electricity consumption: The readings for faculty housing for March 2023 to December 2023 were unavailable and therefore the values for March 2022 to December 2022 were used instead.

Water consumption: We have reason to believe that the data for water consumption is not sufficiently accurate and current water readings for the School of Business Administration and the library and are not included in the calculations above.

Refrigerants: Only R-410A and R-22 were accounted for, as they are the refrigerants available on the UACA platform. The refrigerants R134A, R407C and R32 were used by AUS but were not accounted for in this report

Air travel: To calculate distance in miles, www.airmilescalculator.com was used.

Hotels and campgrounds (purchased goods and services): The cost of accommodation was estimated based on average hotel costs in the specific timeframes but in 2025 instead of 2024.

Stakeholder commute: The results were based on the 2024 Sustainability Survey as well as some data obtained from the Transportation and Security departments at AUS. This report only looks at cars (based on the registered student car stickers) and the tickets sold to students for the shuttle buses that go to and from Rashidiya Metro station in Dubai. For students with car stickers from Abu Dhabi, it was assumed they commute to AUS and then back to AD once a week. Other destinations were assumed to commute to AUS and then back to their indicated emirates daily four times a week. The percentage of cars which were petrol based was extrapolated from the 2024 Sustainability Survey. With regards to faculty and staff, the Sustainability Survey did not provide sufficient information/travelling distances, and so it was assumed that the majority of faculty and staff have zero emissions as they either live close by or reside on campus. The number of responses used from the survey was 157. The number of registered student car stickers received from the security office was 1673. The number of students who bought tickets for the metro shuttle bus received from the transportation office was 1573.

Purchased goods: Due to changes in the AUS Banner system, there is no purchasing data available for June, July and August 2024 so these were assumed to be zero. However, this is not a major concern since historically these values are relatively low in the summer.

Appendix 2 – Emission Factors used by eMission

Category	Factor used in eMission	Source
Fuel emission	Petrol/ gasoline: 0.0024 tCO ₂ e/ liter Diesel: 0.00264 tCO ₂ e/ liter	IPCC 2006 default values (this also applies to downstream leased asset)
Refrigerant leakage	N/A	N/A
Electricity consumption	0.4041 tco ₂ e/ MWh	DEWA - Grid Emission Factor 2023
Purchased goods	Based on spend value	N/A
Capital goods	Based on spend value	N/A
Water consumption	Desalinated Water Consumption: 0.0027tCO ₂ e/M3	UAE specific emission factor - Jiahong Liu, Silan Chen, Hao Wang, Xiangdong Chen, “Calculation of carbon footprints for water diversion and desalination projects.” The Seventh International Conference on Applied Energy – ICAE2015, <i>Energy Procedia</i> 75 (2015) 2483–2494, Elsevier

Solid waste	Solid Waste Discharges to Landfill: 0.000467tCO ₂ e/kg	Department for Environment, Food and Rural Affairs (UK Government Department) - Adapted from within UK
Employee commute	Car petrol: 0.000173 tCO ₂ e/ Km Car diesel: 0.00014 tCO ₂ e/ Km Rail: 0.08 tCO ₂ e/ Km Bus: 00.036 tCO ₂ e/ Km	N/A
Air travel	Short haul economy class: 0.000246 tCO ₂ e/ M3 Medium haul economy class: 0.000151 tCO ₂ e/ M3 Medium haul business class: 0.000227 tCO ₂ e/ M3 Long haul economy class: 0.000148 tCO ₂ e/ M3 Long haul business class: 0.000429 tCO ₂ e/ M3	N/A

Freight	<p>Air freight: 0.00054tCO₂e /tonne km</p> <p>Sea freight: 0.000003539 tCO₂e/ tonne km</p> <p>HGV rigid small: 0.48674 tCO₂e /tonne Km</p>	N/A
Fuel energy production	<p>Oil and gas extraction: 0.353</p> <p>Utilities: 3.165</p>	N/A

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