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"It is not enough to do your best; you must know what to do, and then do your best"
W. Edward Deming

2025

Axosomatic | Organizational Sustainable Intelligence

"GHG emissions blanket the earth and cause global warming and climate change. The world is now warming faster than in any point in history. This poses a risk to all kind of life on earth"

The United Nations

GHG Inventory Report
2023– 2024

Calculated and Prepared by
Axosomatic
For
Ajman University

www.axosomatic.com

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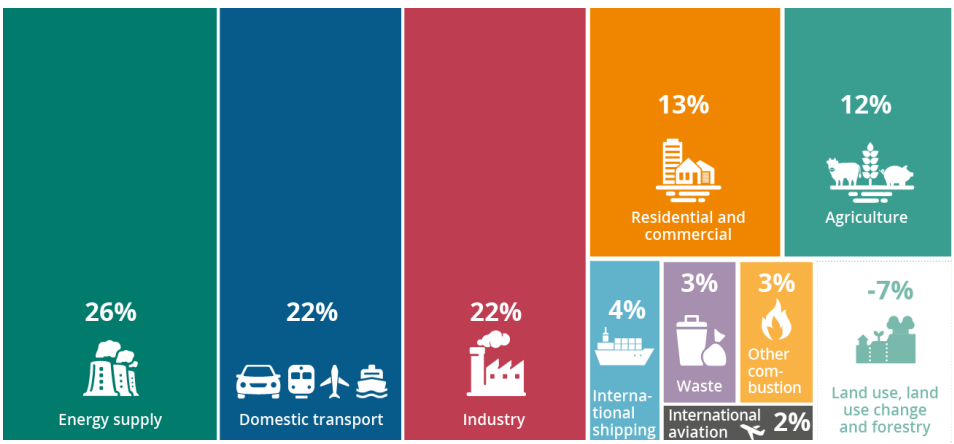

Sources of Greenhouse Gases (GHG) Emissions

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List of Acronyms and Abbreviations

BEIS	Department for Business, Energy, and Industrial Strategy
BSI	British Standards Institute
CDP	Carbon Disclosure Project
CO_2e	Carbon Dioxide Equivalent
EPA	Environmental Protection Agency
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	kilometer
LPG	liquefied petroleum gas
m^2	Square Meters
m^3	Cubic Meters
MW	Megawatt
MWh	megawatt-hour
passenger.km	passenger-kilometer
SBT	science-based target
SBTi	Science-Based Target initiative
t	metric ton
tCO_2e	metric ton carbon dioxide equivalent
T&D	Transmission and Distribution
UAE	United Arab Emirates
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute
WTT	Well-To-Tank

EXECUTIVE SUMMARY

This Greenhouse Gas (GHG) Inventory Report is the result of the assessment phase of Axosomatic's Net-Zero Carbon Intelligence solutions framework at Ajman University (AU). It presents AU's annual Scope 1 and Scope 2 GHG emissions for the period from September 2023 to August 2024 (2023–2024). For reference, the periods 2021–2022 and 2023–2024 are referred to as the baseline and performance years, respectively.

The report's objectives are to:

1. Establish a precise and rigorous approach to carbon accounting and reporting in alignment with the GHG Protocol Standards.
2. Include all AU-related GHG emissions, including upstream emissions and those from employee commuting.
3. Compare GHG emissions of the performance year against the baseline year.
4. Provide AU with expert recommendations for reducing GHG emissions.
5. Validate AU's performance in managing GHG emissions.
6. Enhance AU's ranking.

The GHG Protocol, widely recognized for its rigor, is adopted across private and public sectors for emissions accounting. The calculation of GHG emissions in this report is based on methodologies from the GHG Protocol, BEIS, BSI, CEDA, CDP, EPA, GRI, GWP, IPCC, ISO, SBT, SBTi, WBCSD, WRI, and local energy data

Summary of GHG Emissions for the Performance Year[1]

The following table summarizes the GHG emissions attributed to AU in the past 3 years:

	2021 – 2022 (Baseline Year)	2022 - 2023		2023 – 2024 (Performance Year)		
Description	GHG Emission (tCO_2e)	GHG Emission (tCO_2e)	% Difference Baseline Year	GHG Emission (tCO2e)	% Difference Baseline Year	% Difference Previous Year
Scope 1: Direct GHG Emission	1,240.36	966.64	-22.07%	1,090.23	-12.10%	12.79%
Scope 2: Indirect GHG Emission	12,576.45	12,586.35	0.08%	12,469.78	-0.85%	-0.93%
Scope 1 + Scope 2	13,816.81	13,552.99	-1.91%	13,560.01	-1.86%	0.05%
Scope 3: Indirect GHG Emissions	7,661.86	7,703.31	0.54%	12,297.50	60.50%	59.64%
Certified green electricity	0	0	0	0	0	0
Purchased emission reductions	0	0	0	0	0	0
Total GHG Emissions	**21,478.67**	**21,256.31**	-1.04%	25,857.51	20.39%	21.65%

Table 1. Summary of GHG Emissions in the past 3 years.

[1] Details are described in sections 2 to 5 of this report.

In 2023–2024, Ajman University (AU) made progress in managing, controlling, and reducing Scope 1 and Scope 2 GHG emissions from its operations, except for mobile emissions from petrol and diesel. The following summarizes the outcomes for Scope 1 and 2 emissions in the performance year 2023–2024 compared to the baseline year 2021–2022:

1. Total Scope 1 emissions decreased by 12%, with respect to the baseline year, but increased with respect to the previous year.
2. Scope 2 emissions from purchased electricity remained nearly the same as in the baseline year, with a slight decrease of 0.85% with respect to the baseline year, and a 0.93% decrease with respect to the previous year.
3. Combined Scope 1 and 2 emissions decreased by 1.86% compared to the baseline year, and remained almost the same with respect to the previous year.
4. There is considerable increase in emissions related to Purchased Good - Food consumptions (Catering and Cafeteria).
5. There is considerable increase in emissions related to waste (General waste 211.45 tons and medical waste 11,404.90 tons).
6. The high emission related to WTT is not due to AU consumption, but due to purchased electricity that we now have emission factor for it. It was not locally available during the previous years.
7. **HEI Benchmarking Metric**
    a. The AU (GHG/Weighted Campus Users[2]) in the performance year is higher than that in the baseline year, which indicates that additional effort is needed to reduce the Total Scope 1 and 2 emissions, by adopting our recommendation and reduction strategies.

Benchmarking with Previous Years			
Metric	2021 - 2022	2022 - 2023	2023 - 2024
GHG/WCU (tCO_2e)	1.877	2.44	2.56

Table 2. GHG/WCU for the past 3 years.

The above table shows that GHG emissions attributed to AU activities are increasing per weighted campus user. This is because there has been considerable increase in the mobile consumption of petrol and diesel, and a slight decrease in the consumption of purchased electricity.

8. **Universal Reduction Target**
    a. The annual reduction plans as outlined by the Science-Based Targets initiative (SBTi) were detailed in our previous report.
    b. According to SBTi guidelines, AU must reduce its Scope 1 and Scope 2 emissions by an average of 8.4% per year to achieve target reductions by 2035.
    c. The charts below illustrate Scope 1 and Scope 2 emissions over the past three years, including the baseline year, along with the required reduction targets as per SBTi.
    d. Scope 1 emissions in 2023–2024 show a slight reduction relative to the target but are higher than in 2022–2023.
    e. Scope 2 emissions in 2023–2024 exceed the expected target by 11%.
    f. Scope 3 emissions can be reduced by installing renewable energy, reducing energy and waste consumption.

In conclusion, we recommend that AU implement effective actions to reduce Scope 1 and Scope 2 emissions in order to meet the 2030 and 2050 targets. This can be accomplished by following the strategy outlined in the 2022–2023 GHG emissions report.

[2] This metric is developed by AACHE to help universities measure their greenhouse gas (GHG) emissions relative to the size of their campus population. It allows institutions to account for the different levels of energy and resource consumption by various campus users, such as students, faculty, and staff, in order to compare emissions across campuses of different sizes and compositions, and within the institution itself.

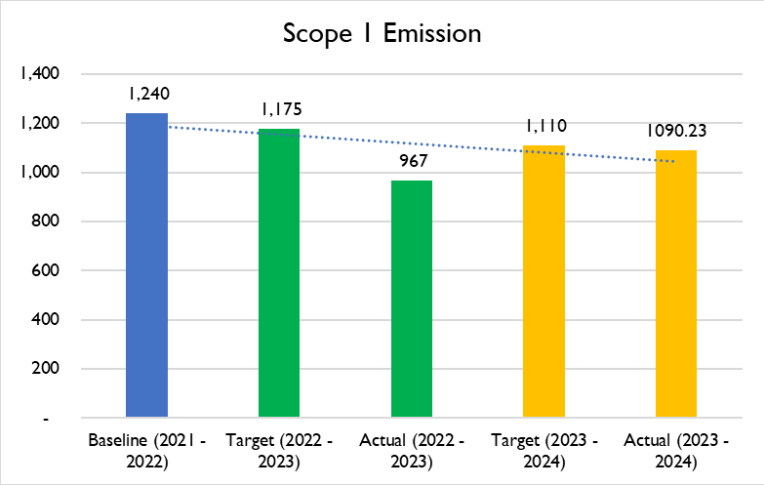

Figure 1. Scope 1 emissions during the past 3 years.

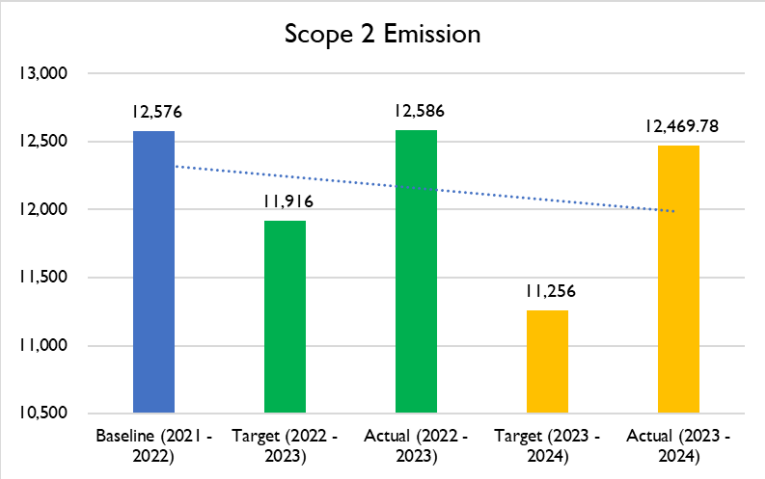

Figure 2. Scope 2 emissions during the past 3 years.

Impact of AU's Activities on the Environment

The following table compares the warming effect of AU's activities on the environment, in the performance year to the baseline year. The impact has increased due to increase in generated waste and WTT of purchased electricity.

Impact of Warming Effect on the Environment			
Greenhouse Gases	Total Baseline Year 2021 - 2022	Total 2022 - 2023 Year	Total Performance Year
Carbon dioxide (CO2)	21,346.47	21,124.02	25,697.03
Methane (CH4)	48.17	48.04	58.21
Nitrous oxide (N2O)	83.39	82.9	100.62
Hydrofluorocarbons (HFCs)	1.36	1.36	1.65
Perfluorocarbons (PFCs)	0	0	0
Sulphur hexafluoride (SF6)	0	0	0
Total	21,479.38	21,256.33	25,857.51

Table 3. Impact of AU's Activities on the Environment.

Campus Sustainability Metrics

The following table lists the AU's campus sustainability metrics. These metrics serve as indicators of AU's effort to reduce its emissions, water, waste, and energy consumption. It is noted from the table that the energy consumption and carbon intensity per capita have slightly increased in the performance year, with respect to the previous year. Water consumption per capita has decreased, while waste generated per capita has increased.

Description	2021 - 2022	2022 - 2023	2023 - 2024
Total GHG Emissions	21,478.67	21,256.30	25,857.51
Energy Consumption per Capita (KW/h)	3,425.94	3,115.17	3,268.72
Carbon Intensity per Campus Area (CO_2/m^2)	0.10	0.10	0.12
Carbon Intensity per Capita (Students and Employees)	3.36	3.02	3.89
Total Water Consumption (liters per Capita)	0.012	0.006	0.004
Total Waste Generated per Capita (kg per students and employees)	13.75	30.76	1,598.60
Percentage of Green Space on Campus	4.0%	4%	4%
Tree Canopy Cover (m^2 of green space per student)	1.55	1.39	1.45

Table 4. AU's Campus Sustainability Metrics.

Axosomatic Recommendations to Reduce GHG Emissions

After thorough analysis of the GHG emissions for the years 2021-2022, and 2022-203, and 2023 - 2024 calculated by our team, and based on best practices, we recommend the following:

Objectives	Actions
1. Revise AU sustainability strategic plan.	Include OKR (Objectives and Key Results) and propagate it downward.
2. Reduce energy consumption.	a. Conduct energy audits to identify where and how energy is used across the campus. b. Replace incandescent bulbs with LED or energy-efficient lighting systems. c. Install motion sensors and daylight sensors to reduce lighting in unoccupied spaces and areas with sufficient natural light. d. Use energy-efficient air conditioning (HVAC) systems. e. Conduct regular maintenance of HVAC systems to ensure they operate efficiently. f. Implement smart thermostats to optimize cooling schedules based on occupancy and weather conditions. g. Encourage students and employees to adopt energy-saving habits, such as turning off lights and electronics when not in use. h. Increase awareness campaigns and workshops to educate the campus community about energy conservation. i. Use smart meters and energy management systems to monitor and control energy use across the campus.
3. Install Solar Panels	a. This option requires huge investment and careful planning. b. A 5KW panel costs approximately AED 35,000 and the return on investment could around 6 to 8 years.
4. Reduce stationary consumption.	a. Reduce the consumption of LPG or replace it with eco-friendly solutions. b. Measure and reduce the refrigerant leakage.

Objectives	Actions
5. Reduce consumption of petrol and diesel.	a. Replace some or all of AU vehicles with hybrid and/or EVs. b. This would reduce the scope 1 emissions from mobile sources by approximately 25%. c. Optimize the travel distance of student transport provided by AU.
6. Reduce emissions associated to Upstream activities (scope 3)	a. Partner with suppliers that are GHG compliant. b. Optimize transportation routes to reduce fuel consumption and emissions. c. Implement waste reduction and recycling programs to minimize waste generation. d. Promote virtual meetings and telecommuting to reduce the need for travel. e. Offset unavoidable travel emissions through carbon offset programs or investments in renewable energy projects. Promote carpooling and ridesharing among employees to reduce single-occupancy vehicle trips.

Table 5. Axosomatic Recommendations.

Axosomatic has the expertise to work with AU to achieve the above objectives with the action plans. The report is divided into 7 sections. Section 1 describes the institutional boundary, parameters, data assumption and methodology. Section 2 presents a comparison of annual emissions and benchmarking. Sections 3 to 6 describe, respectively, the reduction plan, and the calculated scope 1, 2, and 3 emissions based on the provided data. Section 7 presents a summary and recommendations.

1. INTRODUCTION

This section describes an overview of Ajman University, the institutional boundary, the institutional parameters, data assumption and methodology.

1.1 Institutional Description[3]

Established in 1988 as the first private university in the GCC, Ajman University (AU) was also the first university in the UAE to admit expatriate students. AU continues to be a pioneer for inclusion, innovation, and social impact. In 2020, Ajman University became one of the first six higher education institutions in the world to receive global accreditation from the Quality Assurance Agency (QAA), UK's independent body and a global leader in quality assurance for higher education.

Ajman University is proactive in maintaining a green campus and raising sustainability awareness among its students, faculty, and staff, details of which is available at this link: Energy Conservation | CAMPUS (ajman.ac.ae).

To further support its mission, AU established a Sustainable Investment Policy to guide its investment and in line with United Nations Sustainable Development Goals (SDGs 11,12,13) and the Global 2050 CO_2 Net Zero. Details of the AU Sustainable Investment Policy is available at this link: Sustainable Investment Policy | CAMPUS (ajman.ac.ae). The Green House Inventory Report is a further to the AU mission to maintain an Organizational Sustainable Intelligence.

1. 2 Institutional Boundary

Descriptive information	Company response
Company name	Ajman University
Description of the company	Higher Education Institution
Chosen consolidation approach (equity share, operational control or financial control)	Operational Control
Description of the businesses and operations included in the company's organizational boundary	Providing undergraduate and graduate programs in Art, Humanities, Engineering, and Medical Sciences in one campus. Provides in-campus cafes and restaurants, transportation, and housing for students.
The reporting period covered	Sep 2023 – Aug 2024
A list of scope 3 activities included in the report	Upstream
A list of scope 1, scope 2 and scope 3 activities excluded from the report with justification for their exclusion	All scope 1 and scope 2 are included. Upstream scope 3 activities are included, excluding Upstream leased assets. All Downstream are excluded. Reason for exclusion: activities are not applicable to Ajman University.
The year chosen as Baseline year and rationale for choosing the Baseline year	2021 - 2022[4]
Carbon reduction plan and target by at least 2050.	Ajman University is in the process of implementing a solution framework to optimize its operations and reduce GHG emissions by 50%, by 2030.

Table 6. Institutional Boundary.

[3] Source: Ajman University website.
[4] The year 2021 – 2022 is chosen as the Baseline year because the year 2020 – 2021 was the lockdown year.

1.3 Institutional Parameters[5]

Organizational Metrics				
Item	**Descriptions**	**Baseline year (2021 – 2022)**	**2022 - 2023**	**2023 - 2024**
1	Number of campuses owned	1	1	1
2	Number of campuses rented	0	0	0
3	Number of buildings owned	13	13	13
5	Total FT Faculty	259	239	248
6	Total PT Faculty	74	65	83
7	Total FT Staff	525	527	371
8	Total PT Staff	15	16	60
9	**Total Employee**	873	847	762
10	**Employee FTE[6]**	813	793	667
11	Total FT Students	5,048	5,848	5,548
12	Total PT Students	1,467	1,045	1,151
13	**Total Students (TS)**	6,515	6,893	6,699
14	**Student FTE[7]**	5,537	6,196	5,932
15	Total Students in dormitories	1085	1239	1367
16	Total campus area (m^2)	215,000	215,000	215,000
17	Total area occupied by buildings	125,680	125,680	125,680
18	Total green area (m^2)	8,600	8,600	8,600
19	Number of trees	4,237	4,237	4,237
20	Total grass area (m^2)	6,500	6,500	6,500

Table 7. Institutional parameters.

1.4 Data Assumption & Estimation

The following table provides information about the data submitted by AU for the 2023 – 2024 performance year, and methods used by Axosomatic to estimate the missing data:

Scope 1	**Provided Data**	**Comments/Recommendations**
Stationary Combustion	AU does not consume diesel and/oil for generation of electricity. AU provided consumption data of LPG, and Refrigerant R22 and 410A,	The provided LPG data is the purchased quantity and not the actual consumption. The provided data was used to calculate the emissions due to LPG. We suggest the LPG consumption be corrected to measure the consumed LPG per period and not the purchased volume. Similarly, the refrigerant data was the purchased quantity and not the leakage. Axosomatic assumed, with the agreement of AU engineer in-charge, that the leakage is 10% of the provided data. The same leakage was used for the baseline year. AU agreed to measure the top up as of March 2024.
Mobile Combustion	AU was able to provide data of the models and manufacturing years of their fleet of cars, buses, and other vehicles; and the petrol and diesel consumptions for each vehicle.	The provided data was very helpful to determine the GHG emissions with applying approximation.
Scope 2	**Provided Data**	**Comments/Recommendations**
Purchased Electricity	There are 13 buildings at the AU campus. AU provided the electricity and water consumptions for all buildings.	The provided data was used to calculate scope emissions.

[5] Source: Ajman University.
[6] Employee Full-time Equivalent based on CHEDS Formula.
[7] Student Full-time Equivalent based on CHEDS formula.

Scope 3	Provided Data	Comments/Recommendations
Purchased goods and services	AU does not operate restaurants on its campus, but there are cafeterias operated by external business. Data about Food & Beverages, Printing Papers, Toilet Papers, Tissue Papers, Water, online advertising, and Cloud Services were provided.	We suggest that AU improves its procurement procedures, the product and process Life Cycle Assessment to improve data acquisition and GHG emissions calculation accuracy. We also recommend that AU deals with suppliers that are GHG compliant.
Capital goods	IT Equipment, Office Furniture, Medical Equipment, and books were provided.	Sufficient data was provided to estimate the GHG emissions related to the IT equipment and furniture. Axosomatic used approximate data for the medical equipment at AU. Equipment depreciation was applied.
Fuel- and energy- related activities	Transmission and Distribution (T&D) losses of purchased electricity, and WTT	T&D losses of purchased electricity was based on the consumption of electricity provided by AU and the current UAE emissions factor.
Upstream T&D	T&D of Purchased Good and Capital Good	Data for T&D of purchased goods was provided for the in-campus cafeterias only. AU was unable to provide similar data for all the goods purchased, such as LPG, papers, etc. It should be noted that this data is hard to get since most suppliers in the UAE are not GHG compliant. AU is in the process to restructure its procurement processes in line with the GHG standard.
Waste generated in operations	Wastewater, General Waste, Medical Waste, Food Waste, Paper Waste.	AU provided complete data for all types of waste.
Business travel	Travel and accommodation of employees/contractors.	Complete business travel data, by land and air, was provided. Approximate business travel data was used for the baseline year,
Employee commuting	Employee commuting from and to AU.	Axosomatic designed a survey questionnaire and submitted it to AU Office of Sustainability (AUOS), which was then sent by the AUOS to their employees and students.

Table 8. Data Assumption and Estimation.

1.5 Methodology

The GHG accounting and reporting procedure adhere to the foundations outlined in the 'The Greenhouse Gas Protocol: GHG Protocol: A Corporate Accounting and Reporting Standard – Revised Edition' (referenced hereafter as the 'GHG Protocol') and its supplementary guide, the 'Corporate Value Chain (Scope 3) Accounting and Reporting Standard'. These standards represent the preeminent global accounting frameworks, endorsed by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD), that are utilized by both governmental entities and corporate leaders as trusted tools to effectively comprehend, quantify, and manage greenhouse gas (GHG) emissions. The development of these standards was a collaborative effort between the aforementioned institutions, reflecting collective wisdom and expertise in the field of GHG emissions measurement.

The accounting process was meticulously executed upon key principles encapsulated within the 'GHG Protocol, as outlined below:

1. Relevance: This involves the establishment of an inventory boundary that accurately represents the GHG emissions attributable to the company and caters to the informational needs of its user base, thereby facilitating informed decision-making.
2. Completeness: The execution of thorough and all-encompassing accounting that encapsulates every emission source that lies within the delineated inventory boundary. Any emissions not included are explicitly acknowledged and justified as to why they are not covered within the scope of the inventory.
3. Consistency: Ensuring that the GHG emissions information is comparable over distinct time periods and that any modifications to the collected data are methodically documented, maintaining a clear and consistent historical record.
4. Transparency: Upholding a standard of clarity and sufficiency in the data inventory that involves a coherent and systematic approach to handling and addressing pertinent issues.
5. Accuracy: Striving to minimize uncertainties and actively preventing the systematic overstatement or understatement of GHG emissions, thus achieving a high level of confidence in the reported figures.

1.6 Emission Factors

Axosomatic used a database of 20k global emissions factor and UAE location-based emissions factor used for scope 1 and scope 2.

Note

It should be noted that, because of the rounding of digits, the figures may not add up exactly to the total tCO2e of the same emission in different tables.

2. COMPARISON OF ANNUAL EMISSIONS

The following table shows the Year-on-Year change of AU GHG emissions in scope 1 and scope 2 from the baseline year 2021 – 2022 till the performance year 2023 – 2024. The % Decrease indicate the change in emission in performance year with respect to the baseline year.

Description	2021-2022 (tCO_2e)	2022-2023 (tCO_2e)	Year-on-Year Change	2023-2024 (tCO_2e)	Year-on-Year Change	% Difference Baseline Year
Scope 1: Direct GHG Emission	1,240.36	966.64	-22.07%	1090.23	12.79%	-12%
Scope 2: Indirect GHG Emission	12,576.45	12,586.35	0.08%	12,469.78	-0.93%	-1%
Scope 3: Indirect GHG Emission	7,661.86	7,703.31	0.54%	12,297.50	59.64%	61%
Total GHG Emissions	21,478.67	21,256.30	-1.04%	25,857.51	21.65%	20%
Source	2021-2022 (tCO_2e)	2022-2023 (tCO_2e)	Year-on-Year Change	2023-2024 (tCO_2e)	Year-on-Year Change	% Difference Baseline Year
LPG	778.88	528.13	-32.19%	505.25	-4.33%	-35%
Refrigerant Leakage	294.25	294.25	0.00%	308.97	5.00%	5%
Petrol	52.27	42.11	-19.44%	78.71	86.92%	51%
Diesel	114.96	102.15	-11.14%	197.3	93.15%	72%
Purchased Goods	118.78	675.61	468.78%	2,557.37	278.53%	2053%
Capital Assets	6740.85	6026.99	-10.59%	6,054.61	0.46%	-10%
TD Loss	1.83	7.08	286.57%	7.26	2.58%	297%
Waste	20.92	15.90	-23.99%	254.06	1497.66%	1114%
Business Travel	604.85	806.46	33.33%	140.83	-82.54%	-77%
Employee Commuting	15.60	15.75	0.99%	15.07	-4.37%	-3%
WTT (Well-To-Tank)	158.98	155.51	-2.18%	3,268.30	2001.61%	1956%

Table 9. Year-on-Year GHG emissions change.

2.1 Explanation of Emission Changes

- Scope 1
  - Scope 1 GHG emissions decreased by 12% in 2023–2024 compared to the baseline year, primarily due to a 35% reduction in emissions from LPG consumption.
  - However, this decrease is lower than the reduction observed in 2022–2023.
- Scope 2
  - No significant change was observed, with emissions following best practices in purchased electricity consumption, showing a minor reduction of -0.31%.
- LPG
  - A notable decrease in GHG emissions resulted from a reduction in LPG consumption.
- Refrigerant Leakage

    - As described in Section 1.4, AU does not directly measure refrigerant leakage. Axosomatic adopted a conservative estimate, assuming a 10% leakage of total refrigerant purchased, as discussed and agreed upon with the AU engineer in charge.
- Petrol and Diesel
    - The most significant change in GHG emissions for the performance year 2023–2024 was attributed to high petrol and diesel consumption in AU-owned vehicles.
- Scope 3
    - There is considerable increase in emissions related to Purchased Good - Food consumptions (Catering and Cafeteria).
    - There is considerable increase in emissions related to waste (General waste 211.45 tons and medical waste 11,404.90 tons).
    - The high emission related to WTT is not due to AU consumption, but due to purchased electricity that we now have emission factor for it.

2.2 GHG Emissions Benchmarking Metrics

GHG emissions benchmarking for universities is based on established metrics, listed in table 8 below:

Description	Year 2021 - 2022	Year 2022 - 2023	
Scope 1: Direct GHG Emission[8] (tCO_2e)	1,240.36	966.64	1,090.23
Scope 2: Indirect GHG Emission[1] (tCO_2e)	12,576.45	12,586.35	12,469.78
Total (tCO_2e)	13,816.81	13,552.99	13,560.01
-------	-----	-----	
FTEF[2]	813	793	667
FTSE[2]	5,537	6,196	5,896
GHG/FTEE and FTSE[9]	2.66	1.94	2.06
Weighted Campus Users	7,231.75	5,392.00	5,290.50
GHG/Weighted Campus Users[10] (tCO_2e)	**1.87**	**2.44**	**2.56**
GHG/Campus Area	0.0643	0.0630	0.0630

Table 10. GHG Emissions and Metrics.

The Weighted Campus Users (WCU) metric, developed by the Association for the Advancement of Sustainability in Higher Education, measures how intensively an institution's population utilizes campus resources, particularly for residential institutions. Institutions with a high percentage of on-campus residents typically have higher GHG emissions, electricity and water consumption, and waste generation compared to non-residential institutions.

The metric, GHG per Weighted Campus User (GHG/WCU), is calculated based on Scope 1 and Scope 2 emissions, total full-time employee and student equivalents, and the number of students residing in institution-owned housing.

A decrease in GHG/WCU from a baseline year to a performance year reflects the effectiveness of the institution's emissions reduction efforts.

In the table above, the GHG/WCU value in the performance year is higher than in the baseline year, indicating that further actions are required to reduce total Scope 1 and 2 emissions

.

[8] Source: Axosomatic (www.axosomatic.com)
[9] FTEE (Full-Time Employe Equivalent) and FTSE (Full-Time Student Equivalent), based on CHEDS formula.
[10] Scope 1 and Scope 2 only.

2.3 GHG Emissions Benchmarking[11]

The table below compares Ajman University's Scope 1 and Scope 2 GHG emissions and related metrics to those of selected international universities. Two key metrics, GHG per Weighted Campus User (WCU) and % Decrease, are used to assess the effectiveness of each institution's GHG reduction plan on the path to Net-Zero Carbon.

The % Decrease metric shows the percentage reduction in total GHG emissions (Scope 1 and Scope 2) per WCU for the performance year compared to baseline years. A higher positive % Decrease indicates a more effective reduction plan, while a negative % Decrease signals an increase or an insufficient reduction in emissions relative to the baseline year.

								Performance Year		Baseline Year	
	Scope 1	Scope 2	TFES[12]	TFE[13]	WCU[14]	GHG/WCU[15]	% Reduction[16]	Start	End	Start	End
Loyola U Chicago	9,275.00	3,234.00	15,818.00	2,835.00	13,573.25	0.92	79.0%	01-Jul-21	30-Jun-22	01-Jul-07	30-Jun-08
Florida State U	17,627.00	90,606.00	39,829.00	7,079.00	35,538.75	3.05	23.4%	01-Jul-22	30-Jun-22	01-Jul-17	30-Jun-18
University of NC	19,457.00	37,673.00	27,599.00	3,658.00	23,973.00	2.38	38.6%	01-Jul-21	30-Jun-22	01-Jul-02	30-Jun-03
U Tennessee, Knoxville	80,464.00	82,493.00	28,329.00	7,089.00	26,565.75	6.13	24.0%	01-Jul-20	30-Jun-21	01-Jul-14	30-Jun-15
Ajman University, UAE	**1,090.23**	**12,469.78**	**5,896**	**667**	**5,264.00**	**2.56**	**-37.1%[17]**	**01-Sep-22**	**31-Aug-23**	**01-Sep-23**	**31-Aug-24**

Table 11. Benchmarking of AU GHG with international HEIs.

Year-on-Year Benchmarking			
	2021 - 2022	2022 - 2023	2023 - 2024
GHG/WCU (tCO_2e)	1.877	2.44	2.56

Table 12. Year-on-Year comparison of GHG per weighted campus user.

The above table shows that GHG emissions attributed to AU activities are increasing per weighted campus user, which can be reduced by following the recommended target reduction plan and Axosomatic implementation strategy.

[11] Data compiled by Axosomatic (www.axosomatic.com). There are no official data published by other institutions in the UAE.
[12] Total Full Time Equivalent Students.
[13] Total Full-time Equivalent Employees.
[14] Weighted Campus Users.
[15] GHG Emissions per Weighted Campus Users.
[16] All values above 30%, indicate reductions in the GHG emissions with respect to the Baseline year.
[17] The negative percentage indicates that AU reduction strategy needs to be improved. A value of 0.86, with other parameters constant, would be reached if AU scope 1 + scope 2 is reduced by 58% with respect to the baseline 13817 tCO_2e.

3. REDUCTION PLAN AND TARGETS

A carbon reduction target covering Scope 1 and 2 emissions by at least 2050 refers to Ajman University's commitment to reduce greenhouse gas (GHG) emissions that are directly produced by its own activities (Scope 1 emissions) and the emissions associated with the energy it consumes (Scope 2 emissions) by the year 2050.

3.1 AU Reduction Plan

Ajman University is committed to setting ambitious carbon reduction targets covering Scope 1 and 2 emissions in alignment with the urgency to combat climate change. These targets vary in terms of their specific emission reduction goals, timelines, and strategies, but they all share a common aim of transitioning to a low-carbon economy and reducing dependence on fossil fuels.

The targets set are as follows:

1. Net Zero Emissions by 2050: where Ajman University aims to balance its emissions with equivalent carbon removal or offsetting activities.
2. Percentage Reduction Targets: to reduce emissions by 50% by 2030 and 100% by 2050 compared to the baseline year of 2021-2022.
3. Renewable Energy Transition: Ajman University plans to transition to 100% renewable energy sources for electricity consumption (Scope 2) by 2040.
4. Energy Efficiency Improvement: to improve the energy efficiency of buildings by aiming for a 25% reduction in energy consumption over the next 2 years.
5. Fleet Electrification Targets: to transition to electric vehicles (EVs) or other low-carbon alternatives, by aiming for a 50% of fleet to be electric by 2030.

3.2 Science Base Target Initiative

Axosomatic proposes an effective and structured reduction plan for AU, based on the Science Based Target Initiative (SBTi). This is a universal approach followed by many organizations.

The reduction targets for Scope 1 and 2 are shown in the table and chart in the next page. The baseline year is 2021 – 2022, and the Interim Target year is 2030. It is noted that the average annual reduction till 2030 is 6.6%, and 11.3% from 2030 to 2035, for scope 1, 2.

SBTi Recommended Emissions Reduction Targets														
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Scope 1 (tCO_2e)	1,240	1,175	1,110	1,045	980	915	850	785	719	654	589	524	459	394
Scope 2 (tCO_2e)	12,576	11,916	11,256	10,596	9,935	9,275	8,615	7,955	7,294	6,634	5,974	5,314	4,653	3,993
Scope 3 (tCO_2e)	10,779.31	10,208.00	9,646.56	9,077.42	8,514.62	7,952.65	7,388.01	6,819.14	6,253.15	5,684.11	5,115.70	4,547.86	3,983.92	3,418.21
Annual Reduction		5.3%	5.5%	5.9%	6.2%	6.6%	7.1%	7.7%	8.3%	9.1%	10.0%	11.1%	12.4%	14.2%

Table 13. Proposed emission reductions based on SBTi and baseline year.

Comments

1. The table above outlines the reduction targets Ajman University needs to achieve to reach Net-Zero emissions by 2030 and 2050, based on SBTi guidelines and a 2021–2022 baseline.
2. Though AU has been making considerable progress towards Net-Zero, we recommend implementing our proposed reduction strategy to achieve the recommended SBTi emissions reduction.

4. SCOPE 1: DIRECT GHG EMISSIONS

Scope 1 direct GHG emissions attributed to Ajman University, occurred from stationary combustion of LPG, refrigerant leakage, and mobile combustion of petrol and diesel operated cars, buses, pickups, trucks, and mobile dental clinic owned by AU.

4.1 Scope 1 Data Provided by AU

Table 14 below lists the consumption data provided by AU for LPG, Refrigerant Leakage, petrol, and diesel. AU does not use stationary energy sources such as diesel and heating oil.

Summary of Scope 1 Data Provided by AU				
Source	**2021 - 2022**	**2022 - 2023**	**2023 - 2024**	**% Difference**
Stationary Combustion				
Diesel	Not Applicable	Not Applicable		------
Heating Oil	Not Applicable	Not Applicable		------
Propane/LPG (m^3)	504	342	324.48	-36%
Refrigerant Leakage[18] (Kg)	167	167	174.5	4%
Mobile Combustion[19]				
Petrol (liters)	22,339.20	17,920.99	33,491.52	50%
Diesel (litters)	41,203.20	38,400.96	74,172.48	80%

Table 14. Summary of Scope 1 Data provided by AU.

4.2 Scope 1 GHG Emissions

Table 15 below lists the GHG emissions attributed to stationery and mobile sources listed in the above table:

Summary of Scope 1 GHG Emissions (tCO_2e)				
Source	**2021 - 2022**	**2022 - 2023**	**2023 - 2024**	**% Difference**
GHG Emissions - Stationary Consumption[20]				
Diesel	Not Applicable	Not Applicable		------
Heating Oil	Not Applicable	Not Applicable		------
Propane (LPG)	778.88	528.13	505.25	-35%
Refrigerant Leakage	294.25	294.25	308.97	5%
Sub-Total	1,073.13	822.38	814.23	-24%
GHG Emissions - Mobile Consumption[21]				
Petrol (liters)	52.274	42.11	78.71	51%
Diesel (litters)	114.957	102.15	197.30	72%
Sub-Total	167.231	144.26	276.00	65%
Total Scope 1 Emissions	1,240.36	966.64	1,090.23	-12%

Table 15. Scope 1 GHG Emission from stationery and mobile combustions.

[18] Refrigerant leakage from air-conditioning system (R22+R410A).
[19] Ajman University owns cars, buses, pickup and truck vehicles, some petrol operated, and some diesel operated.
[20] GHG emissions from the consumption of LPG, and leakage of refrigerant in the air-conditioning system.
[21] GHG emissions from transportation vehicles owned by AU.

4.3 Scop 1 GHG Emissions by Mobile Combustion Source (2023 – 2024)

The following table shows the GHG emissions by petrol and diesel combustion during the year 2023 – 2024:

GHG Emission: Mobile Combustion (Petrol)		
Source	Units	tCO_2e
Cars	6	23.21
Buses	9	47.74
Pickup	2	7.76
	Sub-total	78.71
GHG Emissions: Mobile Combustion (Diesel)		
Source	Units	tCO_2e
Truck	1	2.62
Buses	25	190.12
Pickup	2	2.71
Dental Clinic	1	1.85
	Sub-total	197.30
	Total GHG Emissions	276.00

Table 16. GHG emissions by petrol and diesel consumption.

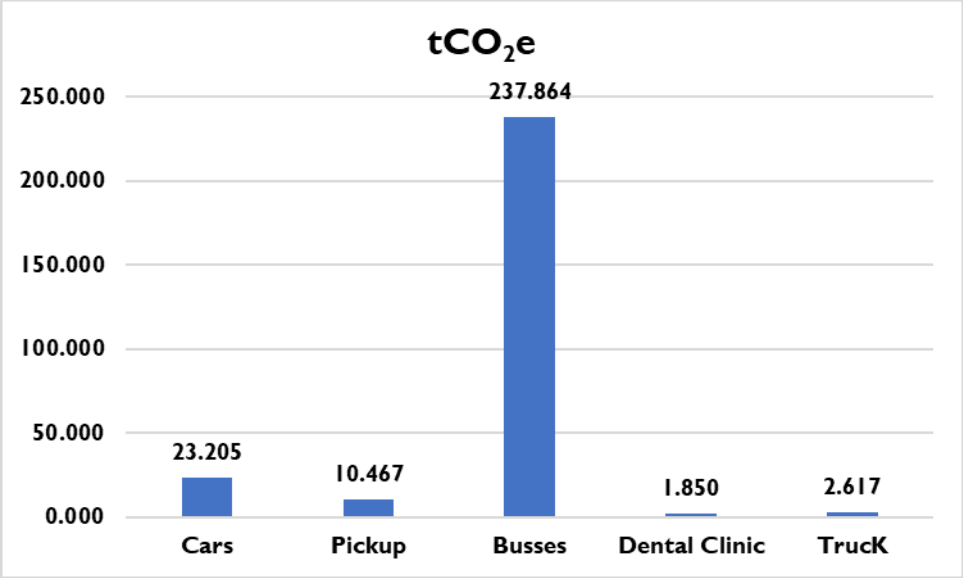

Figure 3. Total GHG emissions by vehicle.

4.4 Summary of Scop 1 Direct GHG Emissions

The following table and chart provide a summary of Scope 1 Direct GHG Emissions by source at Ajman University. Key observations include:

1. Total GHG emissions from all sources—both stationary and mobile—in 2023–2024 are 12% lower than in 2021–2022, although they are higher than in 2022–2023.
2. GHG emissions from LPG in 2023–2024 are lower than in the baseline year.
3. Emissions from mobile combustion (petrol and diesel) are significantly higher than in 2022–2023 and 2021–2022. These emissions could be further reduced by replacing current vehicles with electric or hybrid models. Research by the European Energy Agency indicates that electric vehicles produce 17–30% less carbon emissions compared to petrol or diesel vehicles.

Table 17. Summary of Scope 1: Direct GHG emissions by source.

Source	2021 - 2022	2022 - 2023	2023 - 2024	% Decrease
LPG	778.88	528.13	505.25	-35%
Refrigerant Leakage	294.25	294.25	308.97	5%
Petrol	52.274	42.11	78.71	51%
Diesel	114.957	102.15	197.30	72%
Total	**1,240.36**	**966.64**	**1,090.23**	-12%

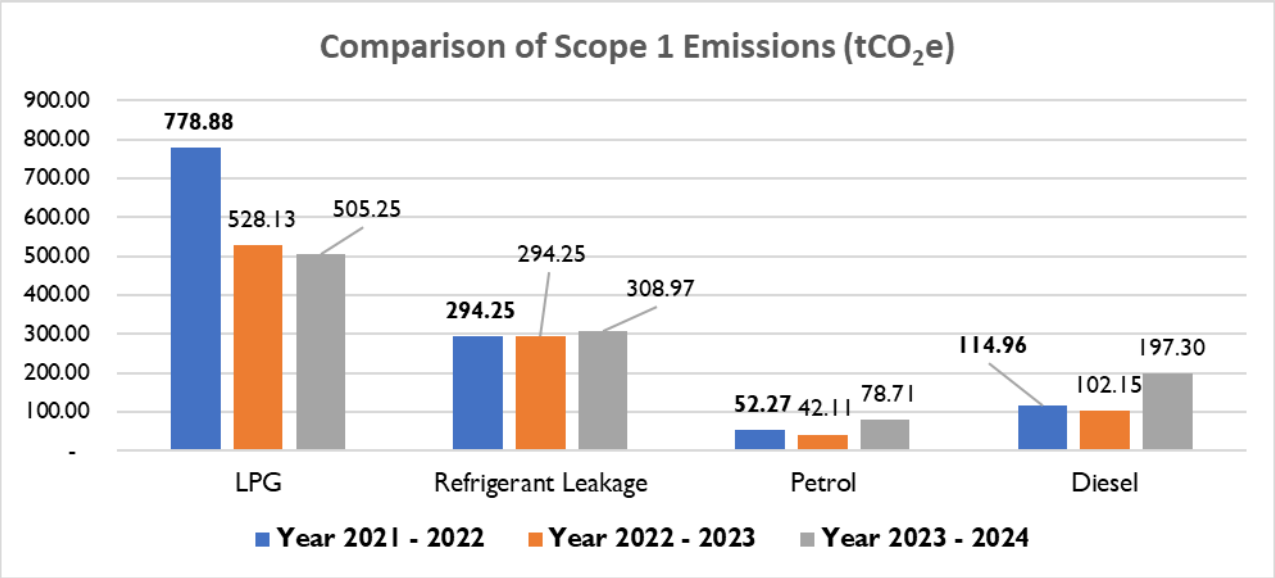

Figure 4. Scope 1 GHG emissions by source during the past 3 years.

5. SCOPE 2: INDIRECT GHG EMISSIONS

Scope 2 indirect GHG emissions are attributed to Ajman University, from the consumptions of purchased electricity.

5.1 Electricity & Water Consumption

There are 13 buildings at AU, the electricity and water consumptions were provided for all buildings, as demonstrated in table 20 below. The GHG emissions associated with water consumption will be included in Scope 3.

The following table compares the electricity consumption and GHG emissions, expressed in metric ton of CO_2 equivalent, at AU during the periods of 2021 – 2022, 2022 – 2023, and 2023 - 2024.

	2021 - 2022	2022 - 2023	2023 - 2024	% Decrease
Electricity (MWH)	21,754.69	21,771.93	21,570.28	-1%
GHG Emissions (tCO_2e)	12,576.39	12,586.35	12,469.78	-1%

Table 18. Year-on-Year electricity consumption and scope 2 GHG emissions.

Electricity Consumption (MWh)				
Building	2021 - 2022	2022 - 2023	2023 - 2024	% Decrease
1. SZC	2,254.18	2,289.66	1898.73	-15.77%
2. 4088 J2	1,197.16	1,231.48	1061.513	-11.33%
3. 4089 J2	1,403.48	1,368.07	1213.287	-13.55%
4. 4083 J2	2,973.14	2,534.47	2352.288	-20.88%
5. J2+S.FIELD	2,311.15	2,276.71	2333.057	0.95%
6. J1+LABOR CAMP	1,347.00	1,364.07	1355.117	0.60%
7. 4085 J1	1,972.75	1,965.98	2029.815	2.89%
8. 4086 J1	1,764.42	1,919.64	2072.698	17.47%
9. S. COMPLEX	603.46	811.89	831.196	37.74%
10. 4092 F. HOSTEL	2,716.91	2,642.07	2815.479	3.63%
11. 0508 F. HOSTEL	---	---	---	---
12. 4091 F. HOSTEL	817.13	807.42	821.895	0.58%
13. 5614 S. HUB	2,393.91	2,560.47	2785.201	16.35%
Total AU	**21,754.69**	**21,771.93**	**21,570.28**	-0.85%

Table 19. Year-on-Year electricity consumption by building.

	2021 - 2022	2022 - 2023	2023 - 2024	% Decrease
14. SZC	1,303.14	1,323.65	1,097.66	**-15.77%**
15. 4088 J2	692.08	711.92	613.66	**-11.33%**
16. 4089 J2	811.35	790.88	701.40	**-13.55%**
17. 4083 J2	1,718.77	1,465.18	1,359.86	**-20.88%**
18. J2+S.FIELD	1,336.08	1,316.17	1,348.74	0.95%
19. J1+LABOR CAMP	778.70	788.57	783.39	0.60%
20. 4085 J1	1,140.45	1,136.53	1,173.44	2.89%
21. 4086 J1	1,020.01	1,109.74	1,198.23	**17.47%**
22. S. COMPLEX	348.86	469.35	480.51	**37.74%**
23. 4092 F. HOSTEL	1,570.65	1,527.38	1,627.63	3.63%
24. 0508 F. HOSTEL	---	---	---	---
25. 4091 F. HOSTEL	472.38	466.77	475.14	0.58%
26. 5614 S. HUB	1,383.92	1,480.21	1,610.12	16.35%
Total AU	12,576.39	12,586.35	12,469.78	-0.85%

Table 20. Year-on-Year scope 2 GHG emissions by building.

Comments:

a. GHG emissions from purchased electricity have remained nearly constant compared to the baseline year, with a slight decrease of 0.85%.
b. In the performance year, GHG emissions from electricity consumption in 33% of the buildings (marked in green) are lower than in the baseline year.
c. Conversely, GHG emissions from electricity consumption in 17% of the buildings (marked in red) are significantly higher in the performance year compared to the baseline year.

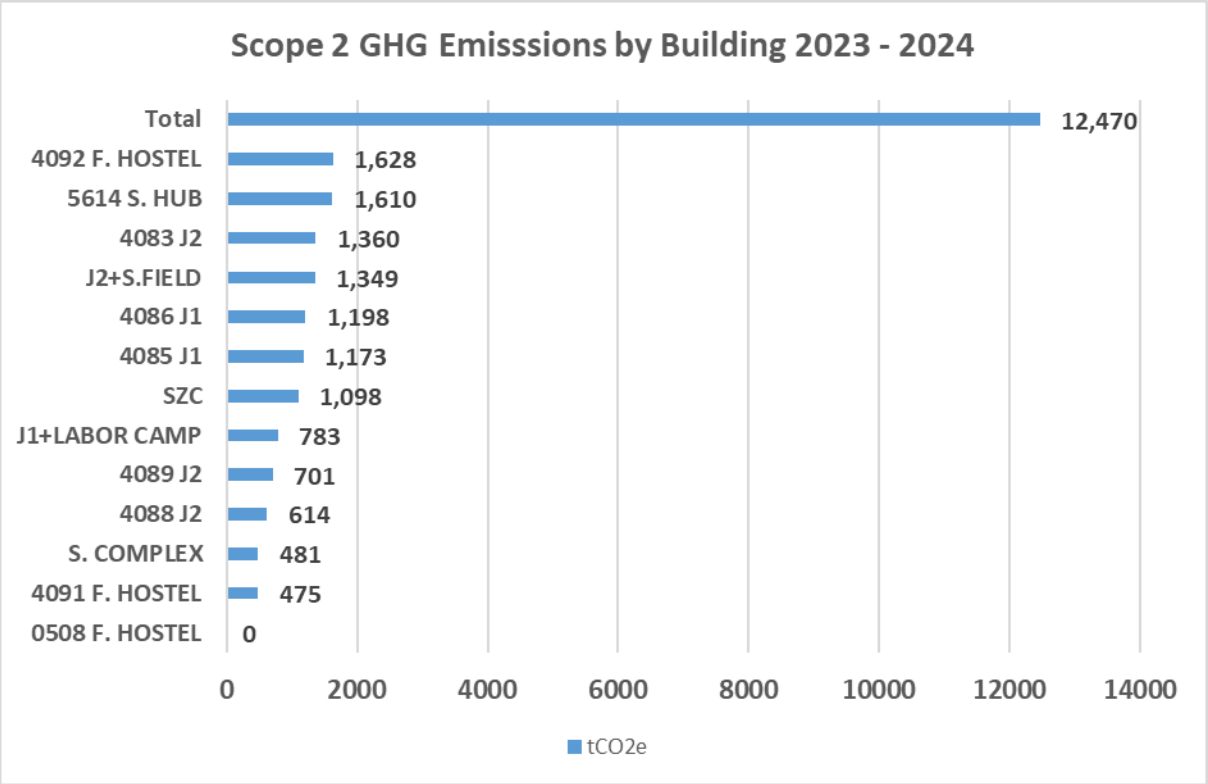

Figure 5. Scope 2 GHG emissions by building during 2023 – 2024.

Table 21. Monthly Scope 2 GHG emission by byulding in (2023 – 2024).

	SZC	4088 J2	4089 J2	4083 J2	J2+S.FIELD	J1+LABOR CAMP	4085 J1	4086 J1	S.COMPLEX	4092 F.HOSTEL	0508 F.HOSTEL	4091 F.HOSTEL	5614 S.HUB
Sep-22	133.54	67.94	74.52	167.15	123.80	87.58	144.88	134.57	56.32	154.31		43.50	164.68
Oct-22	132.52	70.97	79.04	182.78	172.13	95.65	130.58	162.82	47.67	173.85	-	42.38	173.95
Nov-22	57.10	65.28	76.61	170.93	170.25	88.41	114.83	154.87	51.28	163.46	-	39.43	168.78
Dec-22	38.85	38.85	46.07	61.71	100.16	43.14	70.69	49.71	32.65	93.46	-	37.98	89.79
Jan-23	25.03	25.03	34.63	69.48	61.60	34.07	59.61	42.36	23.49	96.33	-	37.36	85.99
Feb-23	49.66	49.66	57.29	108.10	40.26	58.27	50.29	84.39	41.23	117.91	-	41.15	114.48
Mar-23	94.04	43.89	48.76	55.30	42.12	51.88	54.37	65.70	28.87	124.56	-	37.94	98.79
Apr-23	80.61	42.88	47.50	62.99	41.29	49.76	47.72	54.65	33.53	120.36	-	38.81	86.98
May-23	67.23	40.08	45.30	60.96	97.24	42.44	80.23	47.24	28.41	98.67	-	36.25	91.60
Jun-23	154.06	52.71	62.64	197.49	142.06	79.20	126.45	151.84	55.22	176.43	-	39.05	227.57
Jul-23	134.37	59.55	66.35	137.73	189.42	77.13	146.25	130.68	47.09	160.79	-	39.16	160.98
Aug-23	130.63	56.79	62.70	85.24	168.41	75.86	147.53	119.40	34.77	147.51	-	42.13	146.54
Total	1,098	614	701	1,360	1,349	783	1,173	1,198	481	1,628	-	475	1,610

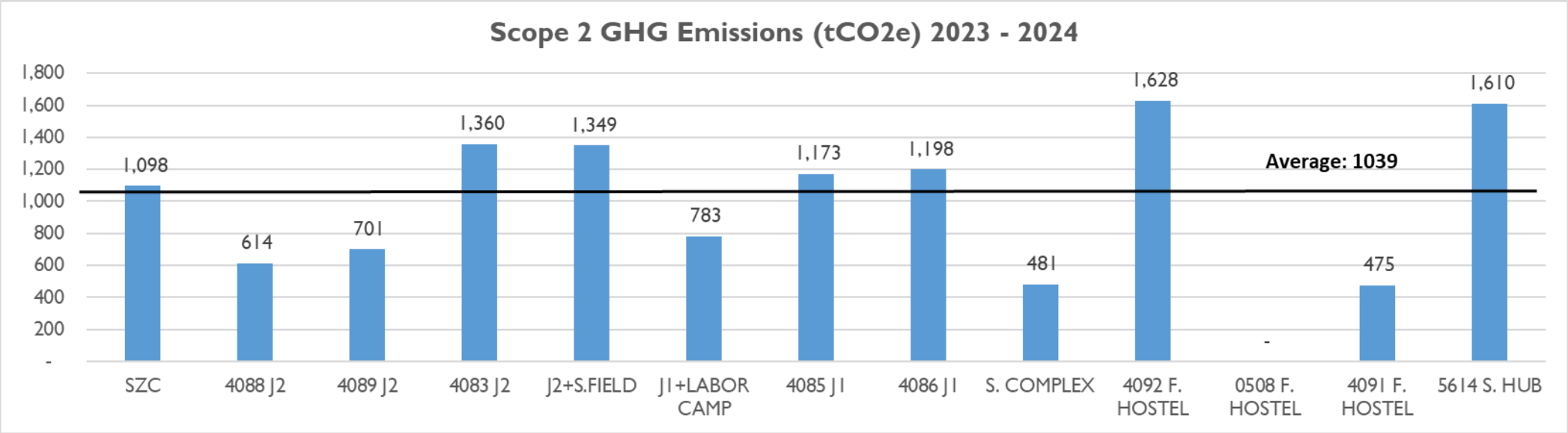

Figure 6. Monthly scope 2 GHG emissions by building 2023 – 2024.

6. SCOPE 3: INDIRECT GHG EMISSIONS

Scope 3 indirect GHG emissions attributed to Ajman University, occurred from the consumptions of Upstream Activities (categories 1 to 7), listed in the following table:

Category	Emission Sources	Status
1. Purchased goods and services	Food & Beverages, Printing Papers, Toilet Papers, Tissue Papers, Water, and Cloud Services.	Included
2. Capital goods	IT Equipment, Office Furniture, Medical Equipment	Included
3. Fuel- and energy-related activities	Transmission and Distribution (T&D) losses of purchased electricity.	Included
4. Upstream T&D	T&D of Purchased Good and Capital Good	Included
5. Waste generated in operations	Wastewater, General Waste, Medical Waste, Food Waste, Paper Waste.	Included
6. Business travel	Travel and accommodation of employees/contractors.	Included
7. Employee commuting	Employee commuting from and to AU.	Included
8. Upstream leased assets	Operation of assets leased by AU (lessee) in the reporting year and not included in scopes 1 or 2.	Not applicable
9. Downstream T&D	T&D of products sold by the organization.	Not applicable
10. Processing of sold products	Processing of intermediate products sold by the organization.	Not applicable
11. Use of sold products	Use of sold goods that require energy to operate.	Not applicable
12. End-of-life treatment of sold products	Waste disposal and treatment of sold products.	Not applicable
13. Downstream Leased Assets	Emissions from the operation of assets that are owned by AU company and leased to other entities.	Not applicable
14. Franchises	Emissions from the operation of franchises to sell or distribute another company's goods or services within a certain location.	Not applicable
15. Investments	Emissions associated with AU's investments.	Not applicable

Table 22. List of Scope 3 Categories.

6.1 Axosomatic Comments

AU provided all Upstream data (categories 1 to 7) related to scope 3. AU does not lease any assets and does not have operations related to Downstream.

Employee commuting includes commuting data of faculty, staff, and students. To obtain commuting data, Axosomatic designed a survey questionnaire and submitted it to AU Office of Sustainability (AUOS), which was then sent by the AUOS to their employees and students.

6.2 Scope 3 Emissions Breakdown

The table below presents the emissions related to AU scope 3 activities.

Total Scope 3 Emissions (2023– 2024)				
Category 1	Unit	Consumption	tCO2e	% of Total Scope 3
Food & Beverages (catering)	USD	375,022.29	149.00	1.212%
Food & Beverages (cafeteria)	ton	63.83	236.26	1.921%
Printing Papers	ton	9.45	8.69	0.071%
Toilet Papers	ton	5.84	5.37	0.044%
Tissue Papers	ton	24.40	22.43	0.182%
Water (Bottled Drinking Water)	m3	2.64	0.00	0.000%
Water Supply	m3	24,389.45	19.51	0.159%
Cloud Services	Euros	2,153,710.70	1,974.86	16.059%
Online Advertising	AED	1,365,459.64	141.24	1.149%
		Total Category 1 GHG Emissions	**2,557.37**	20.796%
Category 2				
Capital Assets	Unit	Consumption	tCO2e	% of Total Scope 3
IT Equipment	AED	261,266.35	679.54	5.526%
Furniture	Euros	239,206.73	2,429.16	19.753%
Medical Equipment	Euros	579,125.43	2,923.11	23.770%
Books	AED	243,974.36	22.80	0.185%
		Total Category 2 GHG Emissions	6,054.61	49.234%
Category 3 & 4				
T&D Loss and Upstream T&D	Unit	Consumption	tCO2e	% of Total Scope 3
T&D Loss - Purchased Electricity	MWh	21,570.28	0.297	0.002%
T&D - Purchased Good	KM	35,389	6.967	0.057%
Well-To-Tank (WTT)[1]			3268.304	26.577%
		Total Category 3 & 4 GHG Emissions	3,275.568	26.636%
Category 5				
Waste	Unit	Consumption	tCO2e	% of Total Scope 3
Wastewater	m3	23,169.98	6.30	0.051%
General Waste	ton	211.45	4.50	0.037%
Plastic Waste	ton	5.00	0.11	0.001%
Medical Waste	ton	11,404.90	242.99	1.976%
Food Waste	ton	7.14	0.15	0.001%
		Total Category 5 GHG Emissions	254.06	2.066%
Category 6	Unit	Consumption	tCO2e	% of Total Scope 3
Business Travel - Air	passenger.km	568,200.00	137.60	1.119%
Business Travel - Land	passenger.km	8,970.00	3.22	0.026%
		Total Category 6 GHG Emissions	140.83	1.145%
Category 7				
Commuting	Unit	Consumption	tCO2e	% of Total Scope 3
Employee Commuting	KM	10,244.20	1.78	0.014%
Student Commuting	KM	76,465.08	13.29	0.108%
		Total Category 7 GHG Emissions	**15.07**	0.123%
		Total Scope 3	**12,297.50**	

Table 23. Scope 3 emissions breakdown.

6.3 Scope 3 Emissions Summary by Category

The following 2 tables represent, respectively, the scope 3 emissions for the performance year 2023-2024 and the comparison to the baseline year 2021-2022.

Performance Year (2023 – 2024)			
Category	**Descriptions**	**tCO2e**	**% of Total Scope 3**
1. Purchased goods and services	Food & Beverages, Printing Papers, Toilet Papers, Tissue Papers. Water supply, Bottled Water, Cloud Services.	2,557.37	20.80%
2. Capital goods	IT Equipment, Office Furniture, and Medical Equipment	6,054.61	49.23%
3. Fuel- and energy- related activities	Transmission and Distribution Loss, WTT,	3,275.568	26.58%
4. Upstream T&D	T&D of Purchased Good and Capital Good	6.97	0.06%
5. Waste generated in operations	Wastewater, General Waste, Medical Waste, Food Waste, Paper Waste.	254.06	2.07%
6. Business Travel	Faculty and staff travel paid by AU	140.83	1.15%
7. Employee commuting	Employee and Student commuting from and to AU.	15.07	0.12%
	Total Scope 3 GHG Emissions	12,297.51	100.000%

Table 24. Scope 3 Emissions Summary for 2022-2023

Baseline Year vs Performance Year				
Category	**Descriptions**	**tCO2e 2021 - 2022**	**tCO2e 2023 - 2024**	**% Difference**
1. Purchased goods and services	Food & Beverages, Printing Papers, Toilet Papers, and Tissue Papers. Water, Cloud Services.	118.783	2,557.37	2052.98%
2. Capital goods	IT Equipment, Office Furniture, and Medical Equipment	6740.846	6,054.61	-10.18%
3. Fuel- and energy-related activities	Transmission and Distribution Loss, WTT.	159.171	3,275.568	1953.51%
4. Upstream T&D	T&D of Purchased Good and Capital Good	1.532	6.97	354.96%
5. Waste generated in operations	Wastewater, General Waste, Medical Waste, Food Waste, Paper Waste.	20.919	254.06	1114.49%
6. Business Travel	Faculty and staff travel paid by AU	604.847	140.83	-76.72%
7. Employee commuting	Employee and Student commuting from and to AU.	15.652	15.07	-3.72%
	Total Scope 3 Emissions	7,661.808	12,297.51	60.50%

Table 25. Comparison of emissions data between 2021-2022 and 2022-2023.

6.4 Scope 3 Emissions Comparison

The following tables present, respectively, the GHG emissions associated with the sources in each category, as a percentage of the total Scope 3 GHG emissions during the performance year 2023 – 2024, and the comparison with the baseline year 2021- 2022:

6.4.1 Category 1: Purchase Goods

Scope 3: Category 1 Emissions Breakdown 2023 - 2024				
	Unit	Consumption	tCO2e	% Total
Food & Beverages (catering)	USD	375,022.29	149.00	5.83%
Food & Beverages (cafeteria)	ton	63.83	236.26	9.24%
Printing Papers	ton	9.45	8.69	0.34%
Toilet Papers	ton	5.842	5.37	0.21%
Tissue Papers	ton	24.4	22.43	0.88%
Water (Drinking Water)	m3	2.64	0.001	0.00%
Water Supply	m3	24,389.45	19.512	0.76%
Cloud Services	Euros	2,153,710.70	1,974.86	77.22%
Online Advertising	AED	1,365,459.64	141.24	5.52%
		Total	2557.37	100.00%

Scope 3: Category 1 Emissions – Baseline Year vs Performance Year					
	2021 – 2022 (tCO_2e)	2022 – 2023 (tCO_2e)	2023 – 2024 (tCO_2e)	% Dif. Baseline Year	% Dif. Previous Year
Food & Beverages	40.212	106.489	385.27	858.09%	262%
Printing Papers	7.631	6.896	8.69	13.86%	26%
Toilet Papers	1.011	13.331	5.37	431.26%	-60%
Tissue Paper	6.896	3.448	22.43	225.33%	551%
Water	19.863	11.428	19.512	-1.77%	71%
Cloud Services	43.170	534.017	1,974.86	4474.62%	270%
Online Advertising	----	----	141.24	-----	----
Total	118.783	675.609	2,557.37		

Table 26. Category 1 emissions breakdown.

Comment

1. The emissions related to all sources in Category 1 have increased, except for the emissions related to the consumption of toilet paper.

6.4.2 Category 2: Capital Assets

Scope 3: Category 2 Emissions Breakdown 2023 - 2024				
	Unit	Consumption	tCO_2e	% Total
IT	AED	261,266	679.543	11.22%
Furniture	Euros	239,206.73	2,429.16	40.12%
Medical Equipment	Euros	579,125.43	2,923.11	48.28%
Books	AED	243,974.36	22.80	0.38%
		Total	6,054.61	100.00%

Scope 3: Category 2 Emissions – Baseline Year vs Performance Year					
	2021 – 2022 (tCO_2e)	2022 – 2023 (tCO_2e)	2023 – 2024 (tCO_2e)	% Dif. Baseline Year	% Dif. Previous Year
IT	780.656	675.471	679.543	-12.95%	0.60%
Furniture	2,521.860	2,428.936	2,429.16	-3.68%	0.01%
Medical Equipment	3,438.330	2,922.581	2,923.11	-14.98%	0.02%
Books	----	----	22.80	---	----
Total	**6,740.846**	**6,026.988**	6,054.61		

Table 27. Category 2 emissions breakdown.

Comments

1. The emission related to capital assets has decreased with respect to the baseline year, but slightly increased with respect to the previous year.

6.4.3 Category 3&4: Energy Related Activities

Scope 3: Category 3 & 4 Emissions Breakdown 2023 - 2024				
	Unit	Consumption	tCO2e	% Total
T&D Loss - Purchased Electricity	MWh	21,570.28	0.297	4.1%
T&D - Purchased Good	KM	35,389.00	6.97	95.9%
			7.265	100%

Scope 3: Category 3 & 4 Emissions – Baseline Year vs Performance Year					
	2021 – 2022 (tCO_2e)	2022 – 2023 (tCO_2e)	2023 – 2024 (tCO_2e)	% Dif. Baseline Year	% Dif. Previous Year
T&D Loss - Purchased Electricity	0.3000	0.3002	0.297	-0.85%	0.297
T&D - Purchased Goods	1.5320	6.7818	6.967	354.78%	6.967
Total	1.8320	7.0820	7.265	296.55%	7.265

Table 28. Category 3&4 emissions breakdown.

Comments

1. The emission related to T&D loss of purchased electricity remains almost the same compared to the baseline year. This is because the UAE conversion factor has not changed.
2. The T&D emissions of purchased goods in the performance year have increased because of the increased number of deliveries to AU campus.
3. The WTT data is detailed in section 6.5.

6.4.4 Category 5: Waste Generated in Operation

Scope 3: Category 5 Emissions Breakdown 2023 - 2024				
		2022 - 2023		
	Unit	Consumption	tCO2e	% Total
Wastewater	m3	23,170	6.302	2.48%
General Waste	ton	211.45	4.501	1.77%
Plastic Waste	ton	5.00	0.106	0.04%
Medical Waste	ton	11,404.90	242.994	95.65%
Food Waste	ton	7.135	0.152	0.06%
		Total	254.056	100.00%

Scope 3: Category 5 Emissions – Baseline Year vs Performance Year					
	2021 – 2022 (tCO_2e)	2022 – 2023 (tCO_2e)	2023 – 2024 (tCO_2e)	% Dif. Baseline Year	% Dif. Previous Year
Wastewater	18.8699	10.8569	6.302	-66.60%	-41.95%
General Waste	0.9664	4.3507	4.501	365.80%	3.46%
Plastic Waste	0.1682	0.2530	0.106	-36.71%	-57.92%
Medical Waste	0.8749	0.2608	242.994	276.74	93072.62%
Food Waste	0.0400	0.1804	0.152	278.89%	-15.99%
Total	**20.9195**	**15.9018**	**254.056**	**1114.45%**	**1497.66%**

Table 29. Category 5 emissions breakdown.

Comments

1. The emissions related to General Waste, Food Waste, and Medical Waste have increased in the performance year, because of increased activities.
2. AU managed to reduce the emissions related to plastic.

6.4.5 Category 6: Business Travel

The emissions related to business travel include air and land business travel, as well as hotel stay, that are paid for by AU for academic purposes.

Business Travel - Land				
	passenger.km	tCO_2e - Hotel Stay	tCO_2 - Drive	Total tCO_2e
Abu Dhabi	6,400.00	410.00	1,494.69	1.90
Al Ain	640.00	30.00	149.47	0.18
Dubai	1,200.00	580.00	280.25	0.86
Sharjah	30.00	30.00	7.01	0.04
Ras Al Khaimah	700.00	80.00	163.48	0.24
Total	8,970.00	1,130.00	2,094.90	3.22
Business Travel – Air				
	passenger.km	tCO_2e - Hotel Stay	tCO_2e - Flight	Total tCO_2e
First Clas	111,536	1.23	38.72	39.95
Business Class	26,300	0.51	9.86	10.37
Economy Class	430,364	6.63	80.66	87.29
Total	568,200	8.37	129.23	137.60

Table 30. Category 6 emissions breakdown.

	2021 - 2022	2022 - 2023	2023 – 2024 (tCO_2e)	% Dif. Baseline Year	% Dif. Previous Year
Business Travel - Air	601.19	801.58	137.60	-77.11%	-82.83%
Business Travel - Land	3.66	4.88	3.22	-11.89%	-33.92%
	604.85	806.46	140.83	-76.72%	-82.54%

Table 31. Baseline Year vs Performance Year.

Comments

1. The GHG emissions related to business travel include WTT emissions.
2. Please note that when the GHG report for the baseline year (2021-2022) was prepared in 2023, AU did not provide Axosomatic the business travel data at that time. Consequently, the scope 3 emissions for that year did not include business travel, as agreed with the AU Office of Sustainability.
3. In 2024, the Office of Sustainability managed to collect the business travel data for the performance year (2022-2023) and provided it to Axosomatic.
4. Based on best practice, and to provide meaningful comparison with the baseline year and avoid emissions inflation, Axosomatic applied statistical methods to estimate the business travel data for the baseline year based on the data for the performance year.
5. With this estimation, AU will have a reference to lower the emissions related to business travel for the coming years.
6. In addition, without including the missing data in the baseline year the SBTi target reduction will not be accurate.
7. The emissions in all sources have decreased in the performance year, with respect to the baseline and previous years.

6.4.6 Category 7: Employee & Students Commuting

Scope 3: Category 7 Emissions Breakdown 2023 - 2024				
	Unit	Consumption	tCO2e	% Total
Employee Commuting	KM	10,244.20	1.78	11.81%
Student Commuting	KM	76,465.08	13.29	88.19%
			15.07	100%

Scope 3: Category 6 Emissions – Baseline Year vs Performance Year					
	2021 - 2022	2022 - 2023	2023 – 2024 (tCO_2e)	% Dif. Baseline Year	% Dif. Previous Year
Employee Commuting	2.0254	2.0939	1.78	-12.12%	-15.00%
Student Commuting	13.5732	13.6598	13.29	-2.12%	-2.74%
Total	15.5985	15.7537	15.07	-3.42%	-4.37%

Table 32. Category 7 emissions breakdown.

Comments

1. Employee commuting includes commuting data of faculty, staff, and students. To obtain commuting data, Axosomatic designed a survey questionnaire and submitted it to the AU Office of Sustainability (AUOS), which was then sent by the AUOS to their employees and students. Axosomatic used statistical tools and a conservative approach to estimate the commuting data for the entire AU population.
2. The emissions in all sources have decreased, mainly due to decreased numbers of employees and students.

6.5 Other Related Activities

In the context of GHG protocol, Well-to-Tank (WTT) is included as part of Scope 3 emissions. It refers to the emissions associated with the entire life cycle of a fuel, including its extraction, production, transportation, and distribution, up to the point where it is stored in a vehicle's fuel tank.

Based on the data provided by AU, the WTT related emissions are listed in the following table for the periods baseline year 2021 – 2022 and the performance year 2022 – 2023. It should be noted that there is no published local data for WTT for purchased electricity.

Please note that the WTT emissions are added to category 3 &4, and category 6 in the respective tables and figures presented previously.

WTT Related Emissions			
	2021 - 2022	2022 - 2023	2023 - 2024
Scope 1	**tCO_2e**		
LPG	92.650	92.650	59.649
Refrigerant Leakage	22.355	22.355	19.364
Petrol	13.467	10.803	20.190
Diesel	25.906	24.144	46.635
Total Scope 1	154.378	149.952	145.838
Scope 3	**tCO_2e**		
FTSE			
Own Vehicle - KM	2.029	2.042	1.776
Own Vehicle - Passenger.Km	1.119	1.126	0.980
Public Transportation	0.157	0.158	0.137
University Transportation	0.414	0.417	0.363
Taxi	0.000	0.000	0.000
Total FTSE	3.719	3.742	3.256
FTEE			
Own Vehicle - KM	0.474	0.478	0.407
Own Vehicle - Passenger.Km	0.075	0.073	0.062
Public Transportation	0.000	0.000	0.000
University Transportation	0.000	0.000	0.000
Taxi	0.037	0.039	0.033
Total FTEE	0.586	0.590	0.502
T&D F&B	0.300	1.229	1.263
Purchased Electricity	-----	-----	3,117.45
Total WTT Emissions	158.982	155.514	3,268.304

Table 33. WTT data for the baseline and performance years.

7. Summary and Recommendations

This report described the Scope 1, Scope 2, and Scope 3 GHG Emissions attributed to Ajman University during the performance year of 2023 – 2024. A comparison was made with the emissions of the baseline year of 2021 – 2022, and previous year 2022 - 2023

7.1 Key Observations

1. Scope 1 emissions have been reduced with respect to the baseline year but increased with respect to the previous year. This is not in line with SBTi reduction target.
2. AU managed to reduce its purchased electricity in the performance year, with respect to the baseline and previous year. Aggressive strategies must be put in place to adhere to the SBTi reduction target.
3. Scope 3 emission is higher than those in the baseline and previous years. This is, as explained previously, due to the unavailability of emission from WTT for purchased electricity in the baseline and previous year. This emission can be decreased by installing solar panels and/or increasing energy efficiency.
4. There is notable reduction in emissions related to LPG consumption, capital assets, business travel and commuting in the performance year with respect to the baseline year and the previous year.
5. Emissions from petrol and diesel consumption have increased by 65%.

7.2 Recommendations

6. Axosomatic recommends considering the replacement of vehicles with hybrid and/or electric vehicles (EVs).
7. Carbon emissions from refrigerant leakage are based on an estimated leakage rate.
    - Axosomatic recommends measuring refrigerant top-up amounts to record actual leakage.
    - Axosomatic suggests that AU implement the recommended actions from our previous report to reduce electricity consumption.
8. AU needs to effectively manage its waste.
9. We recommend that AU deals with suppliers that are GHG compliant to reduce emissions related to some sources of scope 3.
10. Regarding the annual SBTi reduction target, we recommend that AU adopt our reduction strategy detailed in our previous report.

Ajman University has made substantial progress in reducing Scope 1 and 2 GHG emissions in the performance year 2023–2024. To achieve further reductions, we recommend following the universal targets outlined in section 3.2 to align with the 1.5°C global goal, along with the specific recommendations provided in Table 5 of the Executive section of this report.

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ANNEX I: INTRODCUTION TO GHG EMISSIONS[22]

The GHG emissions consist of gases that trap heat in the atmosphere and contribute to the warming of the Earth's surface, causing climate change. The most common gases monitored are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases (HFCs, OFCs, and SF_6).

Carbon dioxide enters the atmosphere through burning fossil fuels, solid waste, trees, and other biological materials and certain chemical reactions, and is removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle.

Methane is emitted during the production and transport of coal, natural gas, and oil, as a result from livestock and other agricultural practices, land use, and by the decay of organic waste in municipal solid waste landfills.

Nitrous oxide is emitted during agricultural, land use, and industrial activities; combustion of fossil fuels and solid waste; as well as during treatment of wastewater.

Fluorinated gases are synthetic greenhouse gases that are emitted from a variety of household, commercial, and industrial applications, and processes. The sources of fluorinated gases are:

1. HFCs gas is used in refrigeration and air conditioning systems, foam insulation, aerosols, fire protection, and solvents.
2. PFCs gas is used in semiconductor manufacturing, aluminum production; production of certain consumer products such as non-stick cookware, stain-resistant textiles, and fire-fighting foam; refrigeration and air-conditioning system.
3. SF_6 is used in magnesium and aluminum production.

1 Scope 1: Direct GHG Emissions

Scope 1 emissions are direct GHG emissions that occur from sources controlled or owned by an organization, such as emissions associated with fuel combustion in boilers, furnaces, vehicles, chemical production, or during research processes.

2 Scope 2: Indirect GHG Emissions

Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary. Scope 2 emissions physically occur at the facility where electricity is generated. In another words, the consumption of electricity and water by an organization constitutes scope 2 indirect GHG emission.

3 Scope 3: Indirect GHG Emissions

Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions. It is the consequence of the activities of the company but occurs from sources not owned or controlled by the company. Some examples of scope 3 activities are extraction and production of purchased materials; transportation of purchased fuels; and use of sold products and services, business travel, and employee commuting to and from the organization's premises.

[22] Overview of Greenhouse Gases | US EPA

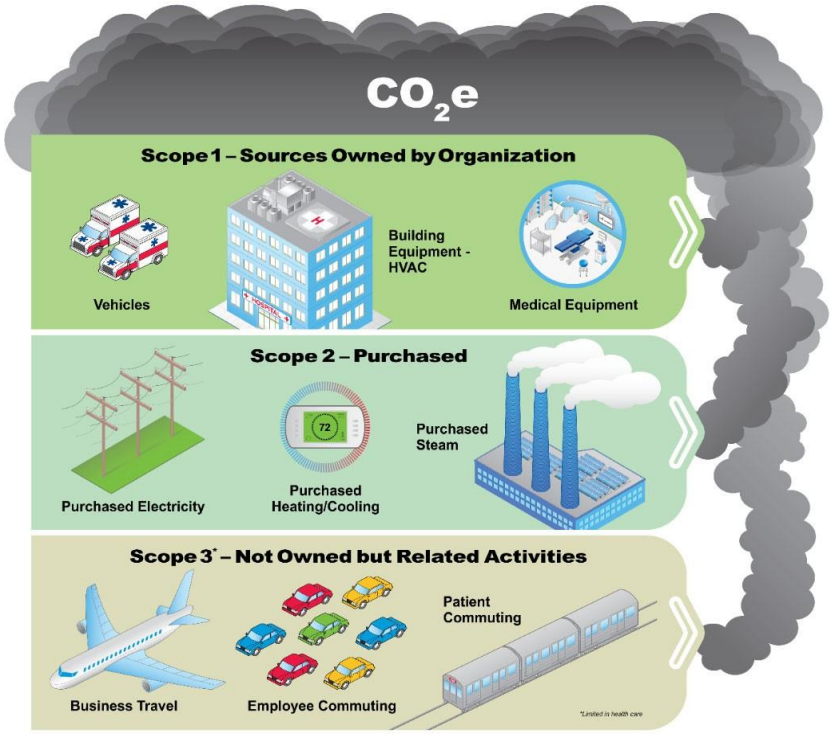

Figure 8.Illustration of CO_2e sources. Source US EPA.

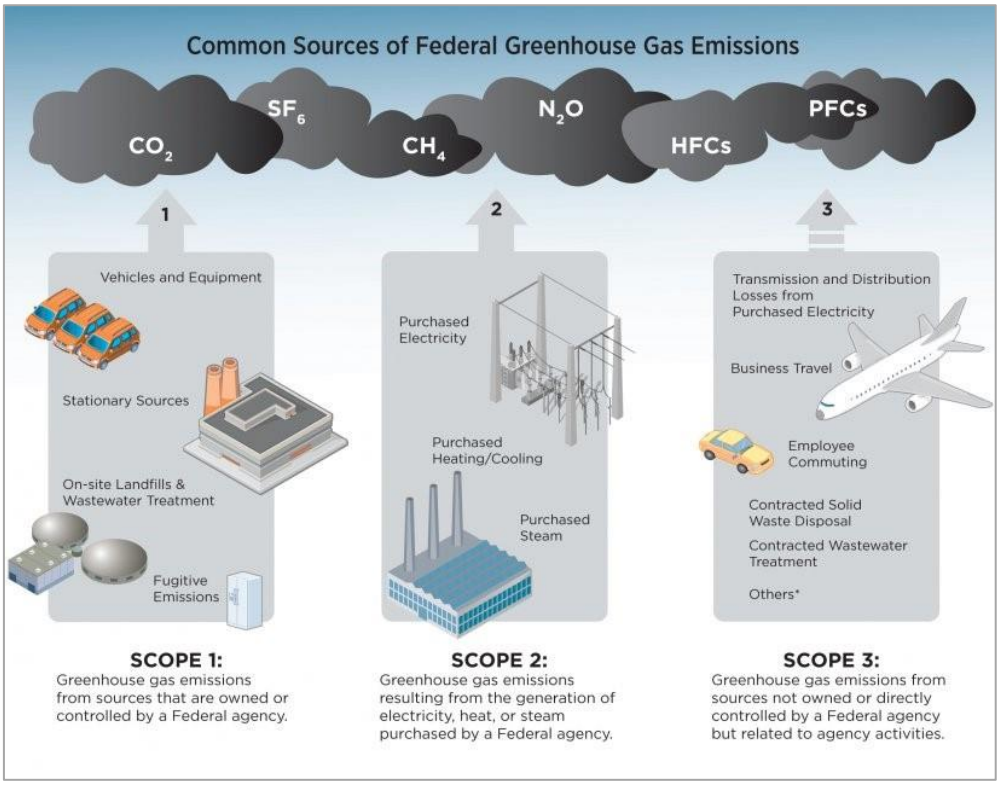

Figure 7. Illustration of sources of GHG gases. Source US EP.

4 Global Warming Potentials[23]

Global warming potential (GWP) is a measure used to compare the impact of different greenhouse gases on global warming over a specific period of time, typically 20, 100, or 500 years. It quantifies how much a particular greenhouse gas can contribute to the greenhouse effect and global warming compared to carbon dioxide (CO2), which is often used as a reference gas with a GWP of 1.

The concept of GWP is important for understanding and addressing climate change because it allows us to assess the relative contributions of various greenhouse gases to the warming of the Earth's atmosphere. Different greenhouse gases have varying abilities to trap heat, and their lifetimes in the atmosphere also influence their warming potential.

Carbon dioxide (CO2) is considered as the reference gas with a GWP of 1. Other greenhouse gases are compared to CO2 in terms of their warming potential. For example, methane (CH4) has a GWP of about 25 over 100 years, which means it is estimated to have 25 times the warming effect of CO2 over that period.

GWP values can be calculated over different time horizons, such as 20, 100, or 500 years. Shorter time horizons emphasize the short-term impact of gases that might have higher warming potential but dissipate more quickly, while longer time horizons consider the longer-term effects of gases with longer atmospheric lifetimes.

GWP values are calculated over different time horizons, such as 20, 100, or 500 years. Shorter time horizons indicate the short-term impact of gases that might have higher warming potential but dissipate more quickly, while longer time horizons consider the longer-term effects of gases with longer atmospheric lifetimes.

The following table shows the GWP – 100 years for the most common gasses:

GHG	GWP (100 years)
Carbon dioxide (CO_2)	**1**
Methane (CH_4)	**27 - 30**
Nitrous oxide (N_2O)	**298**
Hydrofluorocarbons (HFCs)	See Annex II
Perfluorocarbons (PFCs)	See Annex II
Sulphur hexafluoride (SF_6)	**22,800**

Table 34. List of common gases and their GWP 100 years.

[23] https://www.epa.gov

ANNEX II: GLOBAL WARMING POTENTIAL

Lifetimes, radiative efficiencies and direct (except for CH4) GWPs relative to CO2. For ozone-depleting substances and their replacements, data are taken from IPCC/TEAP (2005) unless otherwise indicated.

Industrial Designation Common Name (years)	Chemical Formula	Lifetime (years)	Radiative Efficiency (W m^{-2} ppb^{-1})	Global Warming Potential for Given Time Horizon SAR‡ (100-yr)	20-yr	100-yr	500-yr
Carbon dioxide	CO_2	See below[a]	[b]1.4x10^{-5}	1	1	1	1
Methane[c] Nitrous oxide	CH_4	12[c]	3.7x10^{-4}	21	72	25	7.6
	N_2O	114	3.03x10^{-3}	310	289	298	153
Substances controlled by the Montreal Protocol							
CFC-11	CCl_3F	45	0.25	3,800	6,730	4,750	1,620
CFC-12	CCl_2F_2	100	0.32	8,100	11,000	10,900	5,200
CFC-13	$CClF_3$	640	0.25		10,800	14,400	16,400
CFC-113	CCl_2FCClF_2	85	0.3	4,800	6,540	6,130	2,700
CFC-114	$CClF_2CClF_2$	300	0.31		8,040	10,000	8,730
CFC-115	$CClF_2CF_3$	1,700	0.18		5,310	7,370	9,990
Halon-1301	$CBrF_3$	65	0.32	5,400	8,480	7,140	2,760
Halon-1211	$CBrClF_2$	16	0.3		4,750	1,890	575
Halon-2402	$CBrF_2CBrF_2$	20	0.33		3,680	1,640	503
Carbon tetrachloride	CCl_4	26	0.13	1,400	2,700	1,400	435
Methyl bromide	CH_3Br	0.7	0.01		17	5	1
Methyl chloroform	CH_3CCl_3	5	0.06		506	146	45
HCFC-22	$CHClF_2$	12	0.2	1,500	5,160	1,810	549
HCFC-123	$CHCl_2CF_3$	1.3	0.14	90	273	77	24
HCFC-124	$CHClFCF_3$	5.8	0.22	470	2,070	609	185
HCFC-141b	CH_3CCl_2F	9.3	0.14		2,250	725	220
HCFC-142b	CH_3CClF_2	17.9	0.2	1,800	5,490	2,310	705
HCFC-225ca	$CHCl_2CF_2CF_3$	1.9	0.2		429	122	37
HCFC-225cb	$CHClFCF_2CClF_2$	5.8	0.32		2,030	595	181
Hydrofluorocarbons							
HFC-23	CHF_3	270	0.19	11,700	12,000	14,800	12,200
HFC-32	CH_2F_2	4.9	0.11	650	2,330	675	205
HFC-125	CHF_2CF_3	29	0.23	2,800	6,350	3,500	1,100
HFC-134a	CH_2FCF_3	14	0.16	1,300	3,830	1,430	435
HFC-143a	CH_3CF_3	52	0.13	3,800	5,890	4,470	1,590
HFC-152a	CH_3CHF_2	1.4	0.09	140	437	124	38
HFC-227ea	CF_3CHFCF_3	34.2	0.26	2,900	5,310	3,220	1,040
HFC-236fa	$CF_3CH_2CF_3$	240	0.28	6,300	8,100	9,810	7,660
HFC-245fa	$CHF_2CH_2CF_3$	7.6	0.28		3,380	1030	314
HFC-365mfc	$CH_3CF_2CH_2CF_3$	8.6	0.21		2,520	794	241
HFC-43-10mee	$CF_3CHFCHFCF_2CF_3$	15.9	0.4	1,300	4,140	1,640	500
Perfluorinated compounds							
Sulphur hexafluoride	SF_6	3,200	0.52	23,900	16,300	22,800	32,600
Nitrogen trifluoride	NF_3	740	0.21		12,300	17,200	20,700
PFC-14	CF_4	50,000	0.10	6,500	5,210	7,390	11,200
PFC-116	C_2F_6	10,000	0.26	9,200	8,630	12,200	18,200

Table 35. GWP 100 years for common gases.