

13 CLIMATE ACTION



GHG Emissions Summary - Ajman University
Conducted by Axosomatic | Sustainable Intelligence
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I. Institutional GHG Measures

The data in this report describes the GHG Emissions summary attributed to Ajman University activities, conducted by Axosomatic for the periods 2020 – 2021 and 2021 – 2022. A target reduction plan is described in sections 8 and 9.

Table 1. Institutional GHG Measures.

Description	Year 2020 - 2021	Year 2021 - 2022	% Increase
Scope 1: Direct GHG Emission¹ (tCO₂e)	871.469	946.113	8.57%
Scope 2: Indirect GHG Emission¹ (tCO₂e)	12,100.645	12576.450	3.93%
Scope 3: Indirect GHG Emission¹ (tCO₂e)	6,902.975	7,034.360	1.90%
Total (tCO₂e)	19,875.089	20,556.923	3.43%
Base Year (2020 2021)	19,875.089	-----	-----
FTEF²	803	813	-----
FTSE²	6,196	5,537	-----
GHG/FTEE and FTSE²	2.840	3.237	-----
Weighted Campus Users	5,405.25	7,231.75	-----
GHG/Weighted Campus Users³	2.400	1.870	-----
GHG/Campus Area	0.092	0.096	-----

2. Benchmarking

Table 2. Benchmarking with national and international HEIs.

University	Scope 1	Scope 2	TFS ²	TE ²	WCU ⁴	GHG/WCU ⁵	% Reduction ⁶
Loyola U Chicago	9,275.00	3,234.00	15,818.00	2,835.00	13,573.25	0.92	79.0%
Florida State U	17,627.00	90,606.00	39,829.00	7,079.00	35,538.75	3.05	23.4%
University of NC	19,457.00	37,673.00	27,599.00	3,658.00	23,973.00	2.38	38.6%
Ohio University	42,775.00	32,257.00	22,632.00	3,823.00	19,027.00	3.93	46.8%
U Tennessee, Knoxville	80,464.00	82,493.00	28,329.00	7,089.00	26,565.75	6.13	24.0%
AUS, UAE	302.27	57,791.87	5,230.00	536.00	5,814.75	9.99	0.0%
HCT, UAE	254.40	27,595.00	24,766.00	2,105.00	20,153.25	1.38	18.2%
Ajman University, UAE	12,972.114	13,522.56	5,537	813	7,231.75	1.870	22.1%

¹ Source: Axosomatic (www.axosomatic.com)

² FTEE (Full-Time Employee Equivalent) and FTSE (Full-Time Student Equivalent), based on CHEDS formula.

³ Scope 1 and Scope 2 only.

⁴ Weighted Campus Users.

⁵ GHG Emissions (Scope 1 and 2) per Weighted Campus Users. A ratio less than 1 indicate reduction of scope 1 and scope 2.

⁶ However, it should be noted that it took the listed US universities an average of 10 years to bring down the GHG emissions by an average of 42%.

3. GHG Emissions Comparison

Table 3. GHG Emissions in 2020 – 2021 and 2021 – 2022.

2020 – 2021 (Base Year)		
Description	GHG Emission (tCO ₂ e)	% of Total
Scope 1: Direct GHG Emission	871.469	4.4%
Scope 2: Indirect GHG Emission	12,100.645	60.9%
Scope 3: Indirect GHG Emission	6,902.975	34.7%
	0	0
	0	0
Total	19,875.089	100.0%
2021 – 2022 (Performance Year)		
Description	GHG Emission (tCO ₂ e)	% of Total
Scope 1: Direct GHG Emission	946.113	4.6%
Scope 2: Indirect GHG Emission	12,576.450	61.2%
Scope 3: Indirect GHG Emission	7,034.360	34.2%
	0	0
	0	0
Total	20,556.923	100.0%

4. Scope 1 and Scope 2 GHG Emissions by Source

Table 4. Scope 1 and 2 GHG emissions by source.

Year 2020 – 2021		Year 2021 - 2022			
Scope 1 GHG Emissions Associated with Stationary Combustion					
Source	Consumption	(tCO ₂ e)	Consumption	(tCO ₂ e)	% Increase
Diesel	Not Applicable	-----	Not Applicable	-----	-----
Heating Oil	Not Applicable	-----	Not Applicable	-----	-----
Propane/LPG (m ³)		778.882		778.882	-----
Refrigerant Leakage ⁷	Not Provided	-----	Not Provided	-----	-----
Total		778.882		778.882	0%
GHG Emissions Associated with Mobile Combustion⁸					
Source	Consumption	(tCO ₂ e)	Consumption	(tCO ₂ e)	% Increase
Petrol (litres)	15,264.48	35.718	22,339.20	52.274	46.35%
Diesel (litters)	20,383.20	56.869	41,203.20	114.957	102.14%
Total		92.587		167.231	80.62%
Total Scope 1 GHG Emissions		871.469		946.113	8.57%
Scope 2 GHG Emissions Associated with Purchased Electricity					
Source	Consumption	(tCO ₂ e)	Consumption	(tCO ₂ e)	% Increase
Electricity (MWH)	20,930	12,100	21,75	12,576	3.93%
Total Scope 2 GHG Emissions⁹		12,100		12,576	3.93%

⁷ Refrigerant leakage from air-conditioning system.

⁸ Ajman University owns cars, buses, pickup and truck vehicles, some petrol operated, and some diesel operated.

⁹ The increase in GHG emissions associated with mobile combustion is high because the base year was the lockdown year.

5. Scope 3 GHG Emissions by Source

Table 5. Scope 3 GHG emissions by Source.

Scope 3 GHG Emissions				
Category	Source	2020 - 2021	2021 - 2022	
		(tCO ₂ e)	(tCO ₂ e)	% Increase
1. Purchased goods and services	Food & Beverages, Printing Papers, Toilet Papers, Tissue Papers, Water, and Cloud Services.	98.266	118.783	20.88%
2. Capital goods	IT Equipment, Office Furniture, Medical Equipment	6,658.335	6,740.846	1.24%
3. Fuel- and energy-related activities	Transmission and Distribution (T&D) losses of purchased electricity.	117.279	136.628	16.50%
4. Upstream T&D ¹⁰	T&D of Purchased Good and Capital Good	1.532	1.532	0.00%
5. Waste generated in operations	Wastewater, General Waste, Medical Waste, Food Waste, Paper Waste.	19.098	20.92	9.54%
6. Business travel	Travel and accommodation of employees/contractors.	Not Provided	----	----
7. Employee commuting ¹¹	Employee commuting from and to AU.	8.465	15.652	84.9%
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	----	----
Total Scope 3 GHG Emissions		6,902.975	7,034.360	1.90%

¹⁰ T&D of purchased goods was provided for the in-campus cafeterias only.

¹¹ Employee and student commuting data was partially provided. Conservative approach and averaging were used to estimate the commuting distance and means the missing data.

6. Emissions by Scope and Greenhouse Gases

The following tables provide the approximate emissions of greenhouse gasses associated with Scope 1, 2, and 3 activities at AU, during the periods 2020 – 2021 and 2021 – 2022. It should be noted that, because of the rounding of digits, the figures may not add up exactly to the total tCO₂e in table 6. It should also be noted from the tables, the emissions associated to Scope 2 are higher because of the consumption of purchased electricity.

Table 6. Emissions by Scope and greenhouse gases 2020 – 2021.

2020 - 2021			
	Scope 1	Scope 2	Scope 3
Carbon dioxide (CO ₂)	869.378	11,976.542	6901.7585
Methane (CH ₄)	0.722	45.590	0
Nitrous oxide (N ₂ O)	1.370	78.073	0.016
Hydrofluorocarbons (HFCs)	0	0	1.222
Perfluorocarbons (PFCs)	0	0	0
Sulphur hexafluoride (SF ₆)	0	0	0
Total (tCO₂e)	871.470	12,100.204	6902.9965

Table 7. Emissions by Scope and greenhouse gases 2021 – 2022.

2021 - 2022			
	Scope 1	Scope 2	Scope 3
Carbon dioxide (CO ₂)	946.113	12,576.37	7,034.360
Methane (CH ₄)	943.12	12448.622	7,033.144
Nitrous oxide (N ₂ O)	0.78	47.387	0
Hydrofluorocarbons (HFCs)	2.22	81.151	0.016
Perfluorocarbons (PFCs)	0	0	1.222
Sulphur hexafluoride (SF ₆)	0	0	0
Total (tCO₂e)	946.113	12,577.16	7,034.382

7. GHG Emissions Reduction Schemes

The following table shows the reduction scheme that AU does not have indicated as (AU – No Activity and n/a).

Table 8. Emissions reduction scheme.

GHG Emissions Reduction Schemes		
Mobile and stationary combustion of biomass	Mass	tCO ₂ e
AU - No Activity	n/a	n/a
Deforestation of two hectares or more	Mass	tCO ₂ e
AU - No Activity	n/a	n/a
GHG stock liability	Mass	tCO ₂ e
AU - No Activity	n/a	n/a
Renewable electricity generation & use	kWh generated	tCO ₂ e avoided
AU - No Activity	n/a	n/a
Types of emission reductions purchased	Amount	tCO ₂ e
Certified green electricity (tCO ₂ -e)	n/a	n/a
Purchased emission reductions (tCO ₂ -e)	n/a	n/a
Total	n/a	n/a

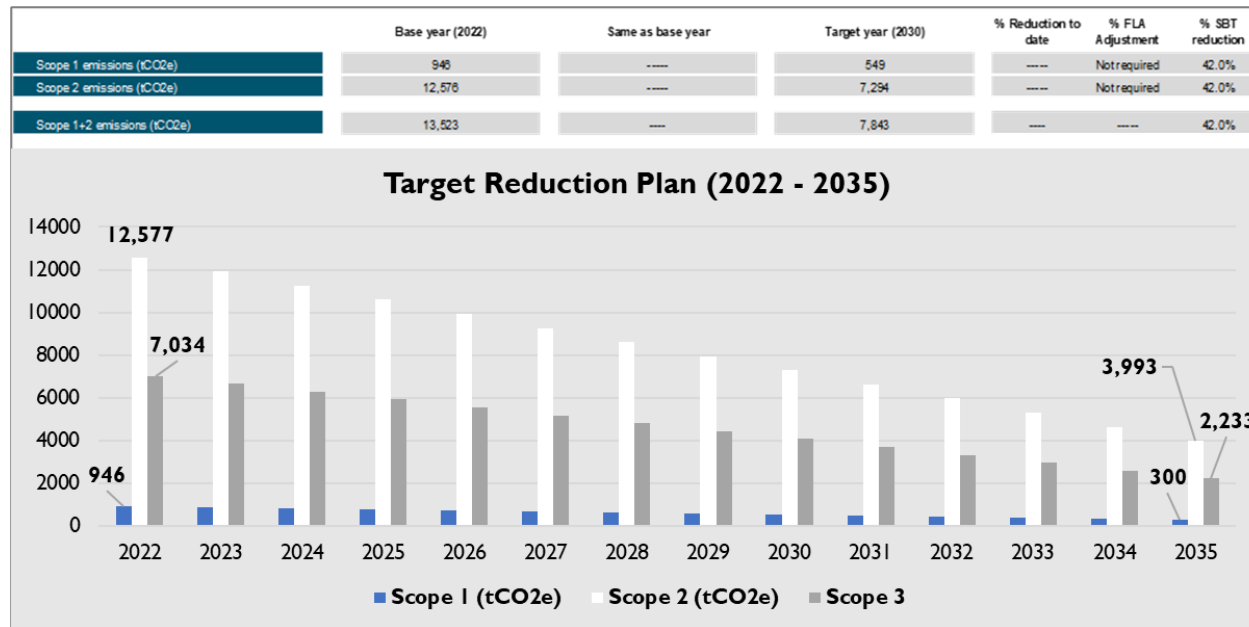
8. Proposed Reduction Plan¹²

The following data shows the proposed reduction plan based on the AU GHG emissions.

Table 9. Proposed reduction plan from 2023 till 2035.

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Scope 1 (tCO₂e)	946	896	847	797	747	698	648	598	549	499	449	400	350	300
Scope 2 (tCO₂e)	12,577	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 1 & 2 (tCO₂e)	13,523	12,813	12,103	11,393	10,683	9,973	9,263	8,553	7,843	7,133	6,423	5,713	5,003	4,293
Scope 3 (tCO₂e)	7,034	6,665	6,296	5,926	5,557	5,188	4,819	4,449	4,080	3,711	3,341	2,972	2,603	2,233
Annual Reduction		5.3%	5.5%	5.9%	6.2%	6.6%	7.1%	7.7%	8.3%	9.0%	10.0%	11.1%	12.4%	14.2%

Table 10. Visual presentation of the Proposed reduction plan from 2023 till 2035.



¹² Based on the SBTi (Scientific Based Target Initiative).

Table 11. Scope 1 and 2 Reduction Breakdown.

Target Reduction Percentage		5.30%	5.50%	5.90%	6.20%	6.60%	7.10%	7.70%	8.30%
	Ref. Year								
Description	2021 - 2022	2022 - 2023	2023 - 2024	2024 - 2025	2025 - 2026	2026 - 2027	2027 - 2028	2028 - 2029	2029 - 2030
Scope 1									
Stationary Combustion									
Propane/LPG (m3)									
Consumption	504	477.29	451.04	424.43	398.11	371.84	345.44	318.84	292.37
tCO ₂ e	778.882	737.60	697.03	655.91	615.24	574.64	533.84	492.73	451.83
Refrigerant Leakage	Not Provided	-----							
Total (tCO₂e)		737.60	697.03	655.91	615.24	574.64	533.84	492.73	451.83
Mobile Combustion									
Petrol (liters)									
Consumption	22,339.20	21,155.22	19,991.69	18,812.18	17,645.82	16,481.20	15,311.03	14,132.08	12,959.12
tCO ₂ e	52.27	49.50	46.78	44.02	41.29	38.57	35.83	33.07	30.32
Diesel (litters)									
Consumption	41,203.20	39,019.43	36,873.36	34,697.83	32,546.57	30,398.49	28,240.20	26,065.71	23,902.25
tCO ₂ e	114.957	108.86	102.88	96.81	90.80	84.81	78.79	72.72	66.69
Total Scope 1 Reduction	946.11	895.97	846.69	796.74	747.34	698.01	648.46	598.52	548.85
Scope 2									
Purchased Electricity (MWH)									
Consumption	21,755	20,601.99	19,468.88	18,320.21	17,184.36	16,050.19	14,910.63	13,762.51	12,620.22
(tCO ₂ e)	12,576.5	11,909.90	11,254.85	10,590.82	9,934.19	9,278.53	8,619.75	7,956.03	7,295.68

Table 12. Scope 3 Reduction Breakdown.

Target Reduction Percentage		5.30%	5.50%	5.90%	6.20%	6.60%	7.10%	7.70%	8.30%
	7,034.36	6,665.00	6,296.00	5,926.00	5,557.00	5,188.00	4,819.00	4,449.00	4,080.00
Description	2021 - 2022	2022 - 2023	2023 - 2024	2024 - 2025	2025 - 2026	2026 - 2027	2027 - 2028	2028 - 2029	2029 - 2030
Scope 3 GHG Emissions									
Category¹³									
1. Purchased goods and services	118.78	112.49	106.30	100.03	93.83	87.63	81.41	75.14	68.91
2. Capital goods	6,740.85	6,383.58	6,032.48	5,676.57	5,324.62	4,973.20	4,620.10	4,264.35	3,910.41
3. Fuel- and energy- related activities	136.63	129.39	122.27	115.06	107.92	100.80	93.64	86.43	79.26
4. Upstream T&D	1.53	1.45	1.37	1.29	1.21	1.13	1.05	0.97	0.89
5. Waste generated in operations	20.92	19.81	18.72	17.62	16.52	15.43	14.34	13.23	12.14
6. Business travel	Not Provided								
7. Employee & student commuting	15.65	14.82	14.01	13.18	12.36	11.55	10.73	9.90	9.08
8. Upstream leased assets	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Scope 3 GHG Emissions	7,034.36	6,661.54	6,295.16	5,923.74	5,556.47	5,189.74	4,821.27	4,450.03	4,080.68

¹³ See category details in Table 5.

9. Impact and Mitigation Measures

The following two tables present a summary of the environmental impacts caused by AU activities in terms tCO_{2e} (Tone Carbon Dioxide Equivalent) during 2020 – 2021 and 2021 and 2022, and the suggested mitigation measures.

Table 13. Suggested Mitigation Plan.

Source (tCO _{2e})	2020 - 2021	2021 - 2022	Suggested Mitigation Measures
Stationary Combustion - LPG	778.882	778.882	Report the consumed and not the purchased amount.
Stationary Combustion - Refrigerant Leakage	Not Provided	Not Provided	Leakage must be measured at each charging period.
Mobil Combustion - Petrol	35.718	52.27	Optimize consumption, EVs, or hybrid.
Mobil Combustion - Diesel	56.869	114.957	Optimize consumption, EVs, hybrid cars, or bio diesel.
Purchased Electricity	12,100	12,576.45	Solar panels or PVs
Purchased Goods	98.266	18.78	Reduce water consumption, printing papers, purchase material that are environmentally friendly, and deal with suppliers who adopt sustainability measures.
Capital Goods	6,658.335	6,740.85	Purchase material that are environmentally friendly, and deal with suppliers who adopt sustainability measures.
Fuel- and energy- related activities	117.279	136.63	This can't be directly controlled by AU since it is related to energy transmission loss, but the decrease in purchased electricity will decrease this impact.
Upstream T&D	1.532	1.53	This is related to the transport of goods to AU and could be reduced by dealing with suppliers who adopt sustainability measures.
Waste generated in operations	19.098	20.92	Reduce paper waste, food waste, and encourage plastic-free cafeteria.
Business travel	Not Provided	Not Provided	Data related was not provided.
Employee & student commuting	8.465	15.65	Emissions was calculated
Upstream leased assets	NA	NA	NA
Total	19,874.44	20,556.92	Purchase of renewable energy credits, and carbon offsetting.

Table 14.

Criteria	Current Status at AU	Mitigation
GHG Emissions Reduction Scheme	Not Implemented	Plan is in the process to be executed.
GHG/WCU ¹⁴	1.87	This is an indication of the effectiveness on the reduction strategy.
PECM ¹⁵	0%	This indicates that renewable energy has not been used to decrease the consumption of purchased electricity.

¹⁴ This value indicates reductions in the GHG emissions with respect to the reference year, Scope 1 + Scope 2 only.

¹⁵ Percent of Electricity Consumption Mitigated (PECM) indicates % of electricity consumption that has been reduced or offset.

10. AU Own Reduction Target

AU defined reduction targets consisting of criteria, show below:

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 2020-2021.
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 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 50% of fleet to be electric by 2030.

11. The Next Step

The GHG reports measured the emissions in 2020 – 2021 and 2021 – 2022. Since the year 2020 – 2021, was the lockdown year, the emissions of that year do not reflect the correct emissions. For this reason, we suggest considering the Year 2021 – 2022 as the reference year.

Axosomatic will work with AU towards its path to Net-Zero emissions, as follows:

1. Measure and report the GHG emissions for 2022 – 20323.
2. Conduct benchmarking of best practices.
3. Work with AU to develop and implement a Net-Zero strategic plan to reach the 2030 and 2050 targets.
4. Structure the procurement procedures to provide accurate and comprehensive data for scope 3.
5. Define the required load of renewable energy to reduce the purchase of electricity.
6. Define the required hybrid and/or EV vehicles to replace the existing ones.
7. Define and implement a Life-Cycle Assessment (LCA) of key-products and equipment used by AU, and processes to improve Scope 3 emissions.
8. Contact AU suppliers to take sustainability actions.
9. Provide status report of the GHG Emissions reduction to be submitted to QS and Race to Net Zero.

10. The GHG emissions report 2022 – 2023 will be ready before COP 28.

AU needs to define the annual budget for the reduction plan that covers the following:

1. Installation of solar panels or PVs.
2. Replacing the existing lighting with energy efficient ones.
3. Replacing the vehicles with EVs or hybrid cars.
4. Installation of EV charging stations.
5. Purchase of Renewable Energy Credits.
6. Other measures as necessary.

