



Ain Shams University

Carbon Footprint Report

May 2021

by: Institute of Environmental Studies and Research.

THE PRESIDENT says that:

Ain Shams University is keen to contribute effectively to solving community problems... Therefore, the Community Service and Environmental Development Sector is keen, through many activities and events, to provide many different services that can work on the advancement and development of society on the one hand, in addition to involving students in social interaction and planting a spirit of cooperation in them to be more effective and serve their country.

We believe that investors who measure their carbon footprints are better able to understand, quantify and manage climate change-related impacts, risks and opportunities.

Mahmoud El-Metini
President
Ain Shams University

Team Members and Acknowledgements

Institute of Environmental Studies and Research.

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Acknowledgements

We thank everyone who helps us with his valuable time, his efforts and his believing in our commitment.

Institute of Environmental Studies and Research.

The Institute of Environmental Studies and Research is one of the specialized institutes in the graduate studies in the field of environment. It has seven sections; each department represents a faculty in specialization.

Contents

#	Item	Page
1.	Introduction	6
	i) Greenhouse Gas Emissions in Egypt and the North Africa Region	
	ii) Why Do a Carbon Footprint Study at ASU?	
2.	Methodology and Organization of Report	9
	i) Reference Carbon Calculator	
	ii) Calculating Carbon Dioxide Equivalents (CO ₂ e)	
3.	Electricity for Lighting and Other Equipment (Non-HVAC)	13
	i) Electricity (total summation)	
	ii) Results	
	iii) Environmental recovery of Carbon Emission due to Electricity (non-HVAC)	
4.	Heating, Ventilation, Air Conditioning (HVAC)	16
	i) Electricity for HVAC	
	ii) Results	
	iii) Environmental recovery of Carbon Emission due to HVAC	
5.	Transportation and Passengers	18
	i) Curves and represented diagram	
	ii) Results	
	iii) Environmental recovery of Carbon Emission due to transportation	
6.	Refrigerators	21
	i) Curves and represented diagram	
	ii) Results	
	iii) Environmental recovery of Carbon Emission due to transportation	
7.	Water USE	24
	i) Curves and represented diagram	
	ii) Results	
	iii) Environmental recovery of Carbon Emission due to transportation	

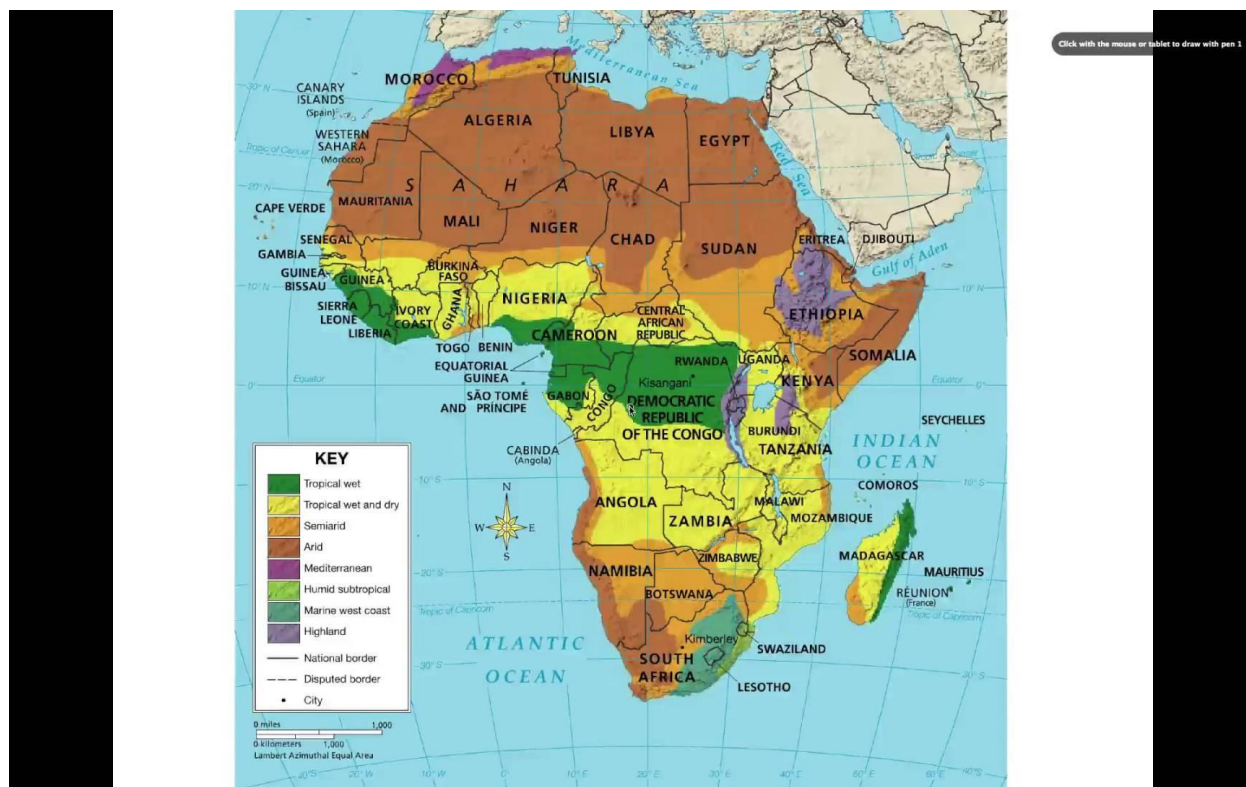
8.	PAPER USE	27
	i) Curves and represented diagram	
	ii) Results	
	iii) Environmental recovery of Carbon Emission due to transportation	
9.	PAPER TISSUE USE	30
	i) Curves and represented diagram	
	ii) Results	
	iii) Environmental recovery of Carbon Emission due to transportation	
10.	Carbon Emissions per FTE Student	
11.	Recommendations for Reducing ASU's Carbon Footprint	
12.	Appendix 1: Campus 1 and Campus 2 and Map	
13.	Appendix 2: Emission Factor Calculations	
14.	Environmental program of Zero carbon plan	
15.	Executive summary	

1) Introduction

Ain Shams University footprint was carried out using available data for that year, and it direct and indirect emissions and vehicle fleet emissions. Climate changes is considered one of the most important issues of today's world. It is defined as an average of weather conditions, typically measured over 30 years, since 1880, global average temperatures have increased by 1.53°F (Leigh and Wulf-horst, 2017).

i) Greenhouse Gas Emissions in Egypt and the North Africa Region

Determining the University's carbon footprint is seen as a critical step in achieving the goal of sustainability at it. Knowing the University's carbon footprint will not only give a tangible value with which its carbon footprint can be compared with other academic institutions but will also provide a much-needed baseline against which future mitigation efforts on campus will be measured.



Map of Egypt climate (Northern Africa - Africa)

A university's carbon footprint is the annual total of carbon dioxide (CO₂) and other significant greenhouse gases emitted into the atmosphere as a result of daily activities and campus operations. Carbon footprints are commonly measured in metric tons of carbon dioxide equivalents (MT CO₂e).

The greenhouse gases in our analysis are those covered by the internationally recognized GHG Protocol and include, where available, carbon dioxide (CO₂), nitrogen trifluoride (NF₃), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆). All gases are converted to CO₂ equivalents (CO₂e) to calculate the carbon footprint.

ii) Why Do a Carbon Footprint Study?

The answer is at least four good reasons to calculate the Ain Shams University in carbon footprint: first, the University's commitment to innovative research in the Greenhouse Gas Emissions; second the potentially serious consequences of global warming for Egypt and the North Africa Region; third the improvement of public health approach for the university ; fourth the development plans for the Egyptian society and environment.

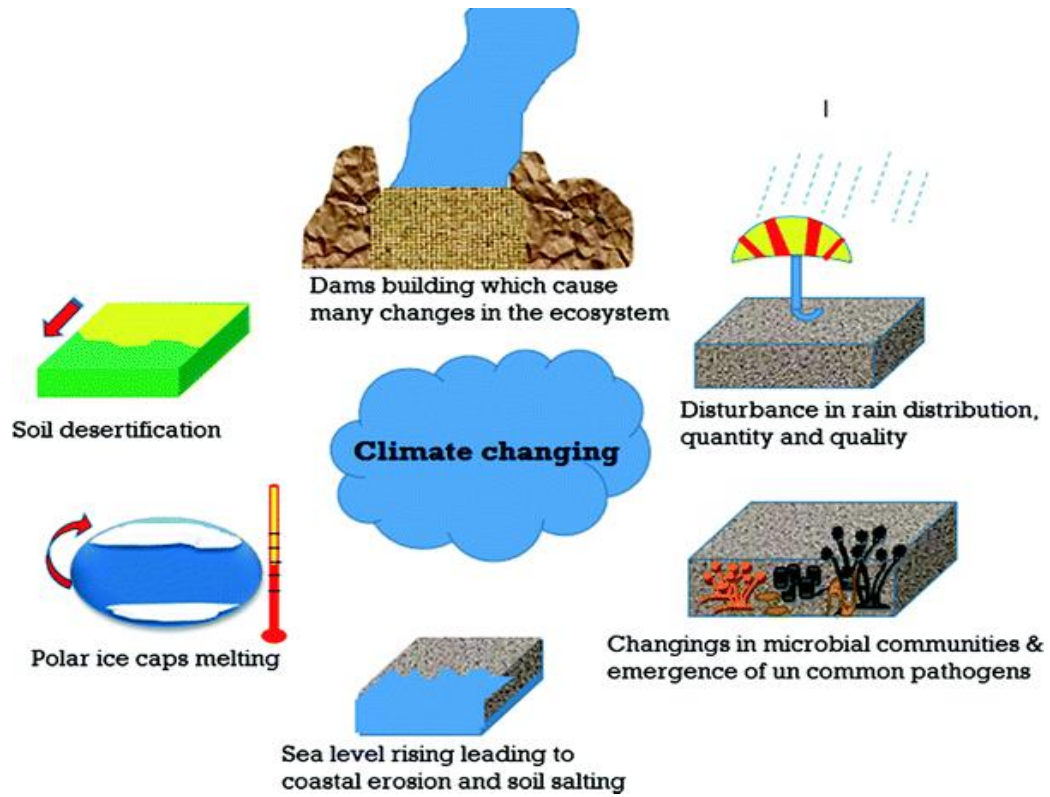


Figure 1; *Example of climatic changes impacts*

2) Methodology and Organization of Report.

i) Reference Carbon Calculator

Ain Shams University's carbon footprint team observed that is no standard method of calculating a carbon footprint. For this report, we've included all four measures outlined in the EPA implementation guidelines.














1	2	3		
<div> Company facilities</div> <div> Company vehicles</div>	<div> Purchased electricity, steam, heating & cooling for own use</div>	<div><div> Purchased goods, services and capital goods</div><div> Transportation and distribution</div><div> Use of sold products</div></div> <div><div> Fuel and energy related activities</div><div> Leased assets</div><div> End-of-life treatment of sold products</div></div> <div><div> Business travel and employee commuting</div><div> Company investments</div></div> <div><div> Waste generated in operations</div><div> Franchises</div></div>		
Reporting Company	Upstream Activities	Upstream Activities	Upstream & Downstream	Downstream Activities
Scope 1: Direct Emissions from sources that are owned or controlled by the company.	Scope 2: Indirect Emissions generated in the production of electricity, heat or steam consumed by the company.	Scope 3: Indirect Emissions from sources not owned or directly controlled by the company but that are a consequence of the activities of the company.		

Figure 2; the EPA Simplified GHG Emissions Calculator

Sources Covered by the EPA Simplified GHG Emissions Calculator:-

Emission sources of all seven major GHGs are accounted for in an inventory: CO₂, CH₄, N₂O, HFCs, PFCs, SF₆, and NF₃. Based on key characteristics of emissions sources, such as the control the organization has to affect them, the GHG Protocol organizes sources into the following three categories, or scopes:

- **Scope 1:** Emissions from sources that the organization owns or controls, like natural gas-fired boilers or vehicle fleets. These are also called direct emissions.

- **Scope 2:** Emissions that are a consequence of the operations of the organization but occur at sources owned or controlled by another organization. These are most typically electricity, heat, or steam. These are also called indirect emissions.
- **Scope 3:** Indirect emissions that are not covered in scope 1 or 2, including business travel, employee commuting, and product transport. Guidance on identifying and quantifying scope 3 emissions and identifying possible advantages of reporting them, is provided in the calculator.

The GHG Protocol is based on five principles. When in doubt about applying the tools explained in this guide to ambiguous issues or situations, refer back to these principles to ensure the creation of a high-quality, credible inventory:

- 1. Relevance:** Ensure the GHG inventory appropriately reflects the GHG emissions of the organization and serves the decision-making needs of internal and external users.
- 2. Completeness:** Account for and report on all GHG emission sources and activities within the chosen inventory boundary. Disclose and justify any specific exclusions.
- 3. Consistency:** Use consistent methodologies to allow for meaningful comparisons of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.
- 4. Transparency:** Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.
- 5. Accuracy:** Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that

uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

ii) Calculating Carbon Dioxide Equivalents (CO₂e)

The main unit of measure is metric tons (MT) of carbon dioxide equivalents (CO₂e), which is the most widely used reporting method. Carbon dioxide equivalents of CH₄ and N₂O are based on the global warming potential (GWP) of each gas – which compares the amount of heat trapped by a similar mass of carbon dioxide. Methane has a GWP of 21 and nitrous oxide has a GWP of 310.18 Carbon dioxide equivalents (CO₂e) are used here to express the relative global warming impact of each of the three greenhouse gases through a single unit of measure.

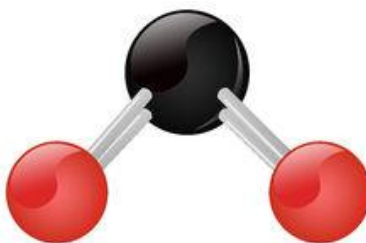


Figure 3; *Chemical structure of Carbon dioxide gas*

ASU sustainable team use a Microsoft Excel workbook developed by EPA the calculation sheet separated into the following sections:

- Introduction to the Calculator
- Boundary Questions
- Summary of Organization's Emissions
- Data entry and calculation for scope 1 emissions sources
 - Stationary Combustion
 - Mobile Sources
 - Refrigeration and Air Conditioning Leakage

- Fire Suppression Systems
- Purchased Gases
- Waste Gases
- Data entry and calculation for scope 2 emissions sources
 - Purchases of Electricity
 - Purchases of Steam or Heat
- Data entry and calculation for scope 3 emissions sources
 - Employee Business Travel
 - Employee Commuting
 - Product Transport
 - Waste
 - Purchased Offsets
 - Unit Conversions
 - Heat Content
 - Emission Factors
 - Help Sheets

3) Electricity for Lighting and Other Equipment (Non-HVAC)

i) Electricity (total summation)

Carbon Footprint of Electricity consumption			
Faculty	Electricity consumption (kWh / year)	factor electric power to Carbon	Amount of Carbon Emission in MTCO ₂ E
University administration headquarters on campus	70,000.0	1,411.3	49.6
Faculty of medicine	4,340,000.0	1,410.9	3,076.0
faculty of Pharmacy	3,677,885.0	1,566.5	2,347.9
Faculty of Dentistry	510,000.0	1,460.9	349.1
Faculty of Nursing	507,222.0	1,566.5	323.8
Faculty of Science	1,200,000.0	1,410.9	850.5
faculty of Agriculture	1,152,000.0	1,566.5	735.4
College of Engineering	3,250,000.0	1,400.9	2,319.9
Faculty of Computing and Information	989,000.0	1,400.9	706.0
Faculty of Education	778,000.0	1,400.9	555.3
Faculty of education quality	873,000.0	1,400.9	623.2
Faculty of women	816,100.0	1,566.7	520.9
Faculty of Commerce	540,000.0	1,409.9	383.0

Faculty of Law	629,000.0	1,410.3	446.0
faculty of Literature	950,000.0	1,411.6	673.0
Faculty of Foreign Language	75,868.0	1,567.5	48.4
Faculty of Graduate of Childhood	331,279.0	1,566.3	211.5
Environmental Studies and Research Institute	350,400.0	1,410.0	744.0
Graduate Studies and Research Institute for Agriculture in Arid Zones	1,050,000.0	1,411.3	744.0
Faculty of Archaeology	65,500.0	1,411.6	46.4
Ain Shams Specialized Hospital	5,500,000.0	1,411.0	3,898.0
Ain Shams University Hospitals, "Demerdash"	6,250,000.0	1,411.2	4,429.0
Total Emissions (MTCO ₂ e)			24,080.9

Table 1, Total Emissions (MTCO₂e) for each faculty

From table 1 it is estimated that more than 24,000 MT CO₂e is emitted of all electricity consumed by ASU in AY 20. Those emission is near to 48 % of total emission of the Ain Shams university.

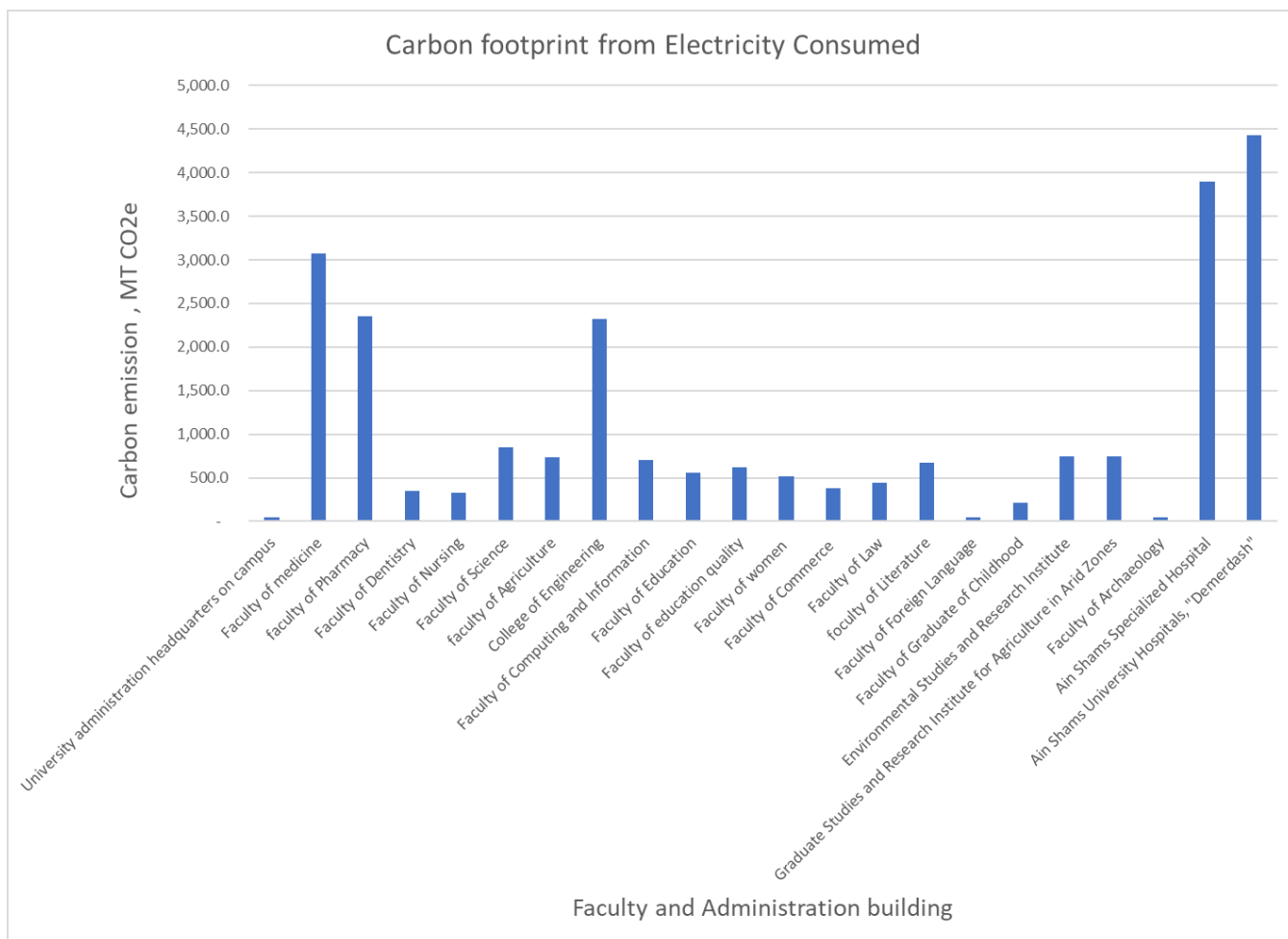


Figure 4; Carbon emission from electricity used in metric ton of CO₂e per Educational and administration building.

ii) Results

Figure 3 illustrates that electricity consumed by hospitals is the higher value due to the urgent and emergency activities were done by those tow medical center to recover the crisis of Covid 19.

iii) Environmental recovery of Carbon Emission due to Electricity (non-HVAC)

4500 MT CO₂e emitted from Eldemerdash Hospital, this value was calculated by EPA online. 4500 MT CO₂e is equal to the amount of CO₂ gas may emit if about 2447 ton of coal is burned.

4) Heating, Ventilation, Air Conditioning (HVAC)

Electricity for HVAC

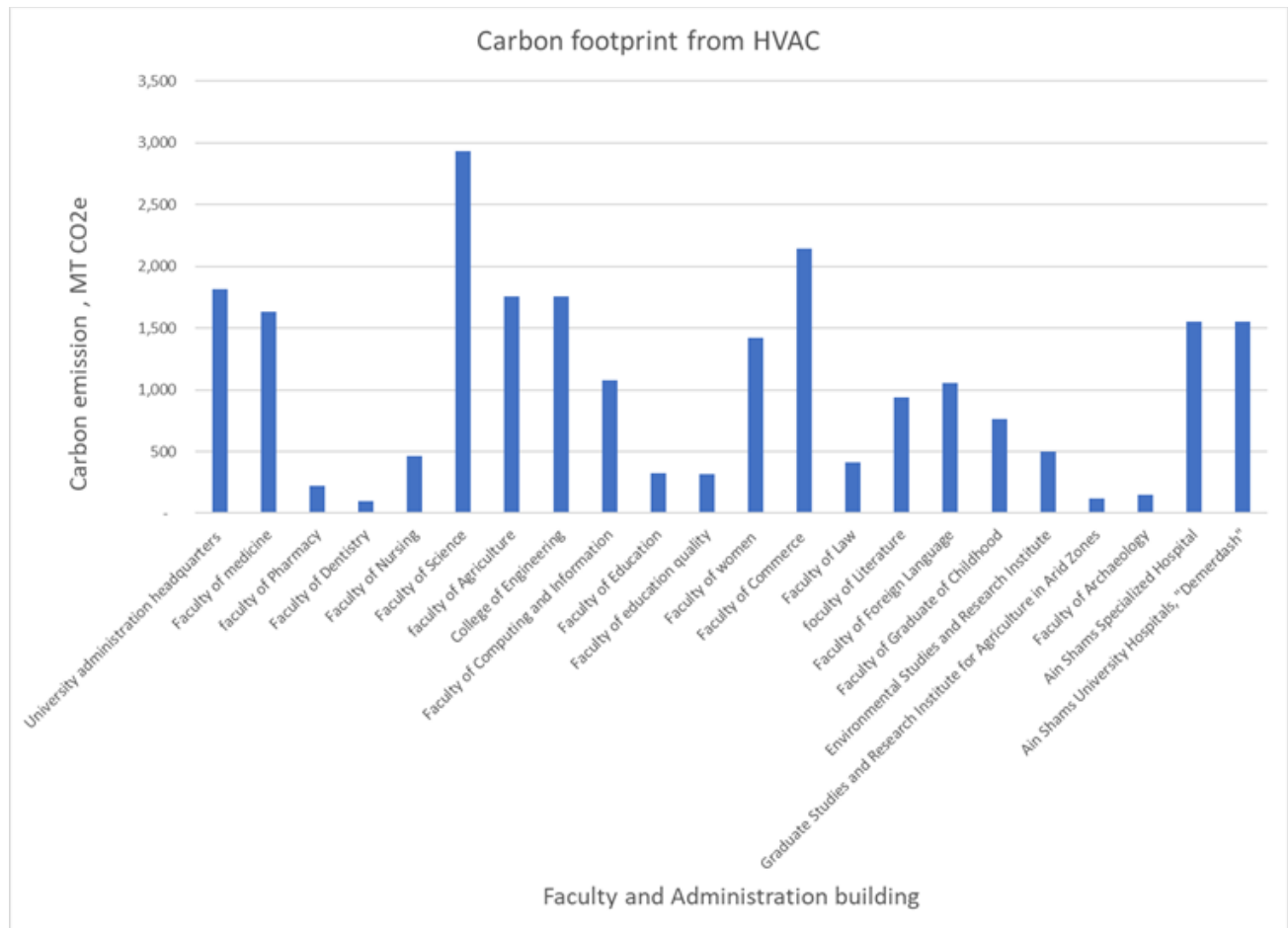


Figure 5; Carbon emission from HVAC used in metric ton of CO₂e per Educational and administration building.

Figure 5 shown that electricity consumed by HVAC share the second higher percentage of 46 % , 23000 MT CO₂e

Faculty	HVAC	average cooling capacity per one set (cooling hp)	average electricity capacity per one set (kw)	average electricity capacity per one set (kw / month)	average electricity capacity per one set (kw / year)	total power kwh / faculty	Amount of Carbon Emission in MTCO2E
University administration headquarters	309	2.0	1.9	690.0	8280.0	2,558,520.0	1,813
Faculty of medicine	278	2.0	1.9	690.0	8280.0	2,301,840.0	1,631.00
faculty of Pharmacy	38	2.0	1.9	690.0	8280.0	314,640.0	223.00
Faculty of Dentistry	17	2.0	1.9	690.0	8280.0	140,760.0	99.80
Faculty of Nursing	79	2.0	1.9	690.0	8280.0	654,120.0	464.00
Faculty of Science	500	2.0	1.9	690.0	8280.0	4,140,000.0	2,934.00
faculty of Agriculture	300	2.0	1.9	690.0	8280.0	2,484,000.0	1,760.00
College of Engineering	300	2.0	1.9	690.0	8280.0	2,484,000.0	1,760.00
Faculty of Computing and Information	184	2.0	1.9	690.0	8280.0	1,523,520.0	1,080.00
Faculty of Education	55	2.0	1.9	690.0	8280.0	455,400.0	323.00
Faculty of education quality	54	2.0	1.9	690.0	8280.0	447,120.0	317.00
Faculty of women	242	2.0	1.9	690.0	8280.0	2,003,760.0	1,420.00
Faculty of Commerce	365	2.0	1.9	690.0	8280.0	3,022,200.0	2,142.00
Faculty of Law	70	2.0	1.9	690.0	8280.0	579,600.0	411.00
faculty of Literature	160	2.0	1.9	690.0	8280.0	1,324,800.0	939.00
Faculty of Foreign Language	180	2.0	1.9	690.0	8280.0	1,490,400.0	1,056.00
Faculty of Graduate of Childhood	130	2.0	1.9	690.0	8280.0	1,076,400.0	763.00
Environmental Studies and Research Institute	85	2.0	1.9	690.0	8280.0	703,800.0	499.00
Graduate Studies and Research Institute for Agriculture in Arid Zones	20	2.0	1.9	690.0	8280.0	165,600.0	117.00
Faculty of Archaeology	25	2.0	1.9	690.0	8280.0	207,000.0	147.00
Ain Shams Specialized Hospital	264	2.0	1.9	690.0	8280.0	2,187,344.6	1,550.00
Ain Shams University Hospitals, "Demerdash"	264	2.0	1.9	690.0	8280.0	2,187,344.6	1,550.00

Total Emissions (MTCO ₂ e)							22,999
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Table 2, Total Emissions from HVAC (MTCO₂e) for each faculty

From table 2, it is estimated that about than 23,000 MT CO₂e is emitted of all HVAC - electricity consumed by ASU in AY 20.

iii) Environmental recovery of Carbon Emission due to HVAC

Faculty of science achieve the maximum value of Carbon emission 2900 MT CO₂e emitted, this value was calculated by EPA online. 2900 MT CO₂e is equal to the amount of CO₂ gas may emit if around 1620 ton of coal is burned.

5) Transportation and Passengers

i) Curves and represented diagram.

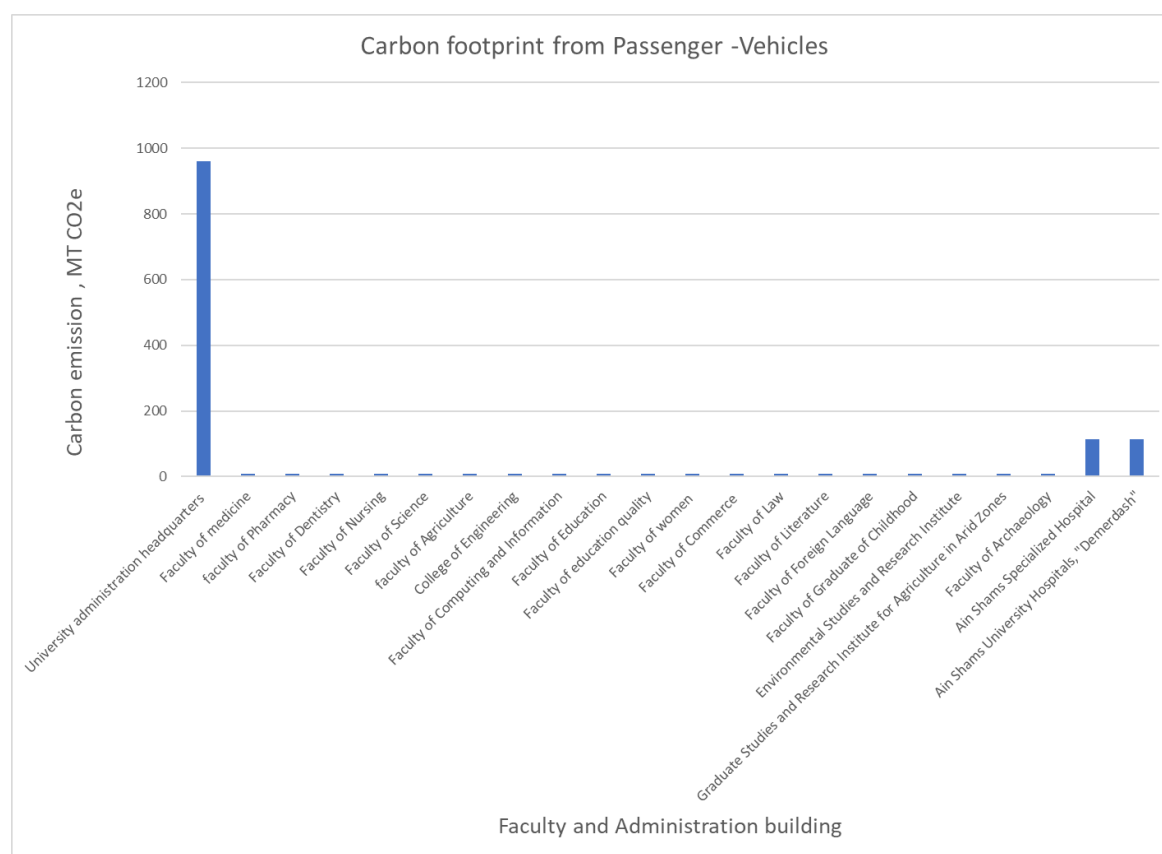


Figure 6; Carbon emission from Vehicles used in metric ton of CO₂e.

ii) Results

From figure 6, it is estimated that about than 900 MT CO₂e is emitted of the passengers who use the vehicles and cars in AY 20.

iii) Environmental recovery of Carbon Emission due to transportation

Headquarter and centers of the University achieve the maximum value of Carbon emission 900 MT CO₂e emitted, this value was calculated by EPA online. 900 MT CO₂e is equal to the amount of CO₂ gas may emit if around 530 ton of coal is burned.

Carbon Footprint of Passenger			
Faculty	number of vehicles	number of passengers per vehicle	Amount of Carbon Emission in MTCO2E
University administration headquarters	33	209	961
Faculty of medicine	1	2	9.2
faculty of Pharmacy	1	2	9.2
Faculty of Dentistry	1	2	9.2
Faculty of Nursing	1	2	9.2
Faculty of Science	1	2	9.2
faculty of Agriculture	1	2	9.2
College of Engineering	1	2	9.2
Faculty of Computing and Information	1	2	9.2
Faculty of Education	1	2	9.2
Faculty of education quality	1	2	9.2
Faculty of women	1	2	9.2
Faculty of Commerce	1	2	9.2
Faculty of Law	1	2	9.2
faculty of Literature	1	2	9.2
Faculty of Foreign Language	1	2	9.2
Faculty of Graduate of Childhood	1	2	9.2
Environmental Studies and Research Institute	1	2	9.2
Graduate Studies and Research Institute for Agriculture in Arid Zones	1	2	9.2
Faculty of Archaeology	1	2	9.2
Ain Shams Specialized Hospital	5	25	115.0
Ain Shams University Hospitals, "Demerdash"	5	25	115.0

Total Emissions (MTCO ₂ e)			1366
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Table 3, Total Emissions from vehicles (MTCO₂e) for each faculty

6) Refrigerators

i) Curves and represented diagram.

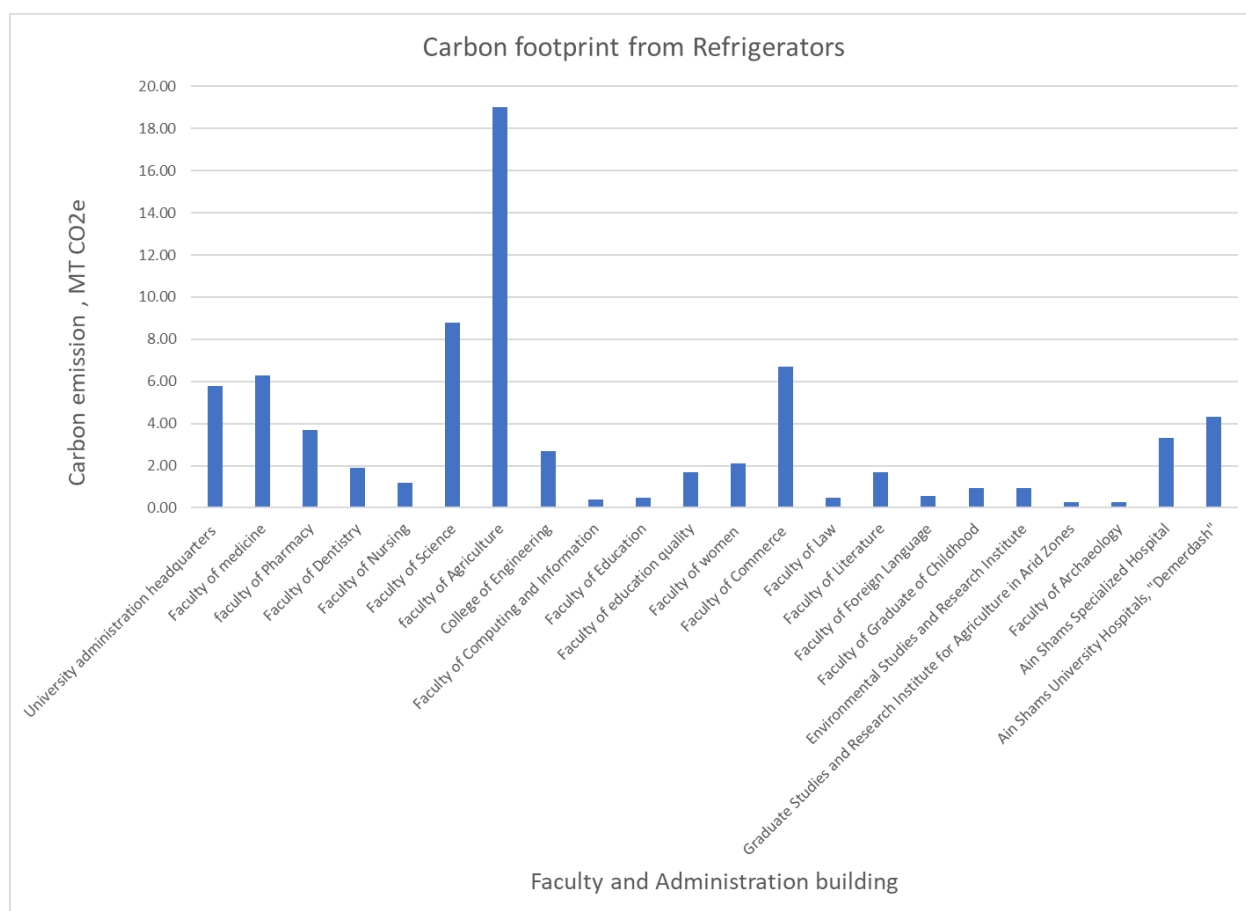


Figure 7; Carbon emission from refrigerator used in metric ton of CO₂e.

From figure 7, Faculty of Agriculture contain about 500 set of refrigerators which emit about 19 MT CO₂e in AY 20.

ii) Results

Carbon Footprint of Refrigerators					
Faculty	Refrigerators	one-hour electrical power consumption kw	monthly electrical power consumption kw	annually electrical power consumption kw	Amount of Carbon Emission in MTCO2E
University administration headquarters	61	1.4	683	8,198.4	5.80
Faculty of medicine	66	1.4	739	8,870.4	6.30
faculty of Pharmacy	39	1.4	437	5,241.6	3.70
Faculty of Dentistry	20	1.4	224	2,688.0	1.90
Faculty of Nursing	13	1.4	146	1,747.2	1.20
Faculty of Science	92	1.4	1030	12,364.8	8.80
faculty of Agriculture	200	1.4	2240	26,880.0	19.00
College of Engineering	28	1.4	314	3,763.2	2.70
Faculty of Computing and Information	4	1.4	45	537.6	0.38
Faculty of Education	5	1.4	56	672.0	0.48
Faculty of education quality	18	1.4	202	2,419.2	1.70
Faculty of women	22	1.4	246	2,956.8	2.10
Faculty of Commerce	70	1.4	784	9,408.0	6.70
Faculty of Law	5	1.4	56	672.0	0.48
faculty of Literature	18	1.4	202	2,419.2	1.70

Faculty of Foreign Language	6	1.4	67	806.4	0.57
Faculty of Graduate of Childhood	10	1.4	112	1,344.0	0.95
Environmental Studies and Research Institute	10	1.4	112	1,344.0	0.95
Graduate Studies and Research Institute for Agriculture in Arid Zones	3	1.4	34	403.2	0.29
Faculty of Archaeology	3	1.4	34	403.2	0.29
Ain Shams Specialized Hospital	35.0	1.4	392	4,704.0	3.30
Ain Shams University Hospitals, "Demerdash"	45	1.4	504	6,048.0	4.30
Total Emissions (MTCO ₂ e)					73.58

Table 4, Total Emissions from refrigerators (MTCO₂e) for each faculty

ii) Environmental recovery of Carbon Emission due to refrigerators
Faculty of Agriculture achieve the maximum value of Carbon emission 19 MT CO₂e emitted, this value was calculated by EPA online. 19 MT CO₂e is equal to the amount of CO₂ gas may emit if around 10.5 ton of coal is burned (see attached calculation sheet).

7) **Water USE**
i) **Curves and represented diagram.**

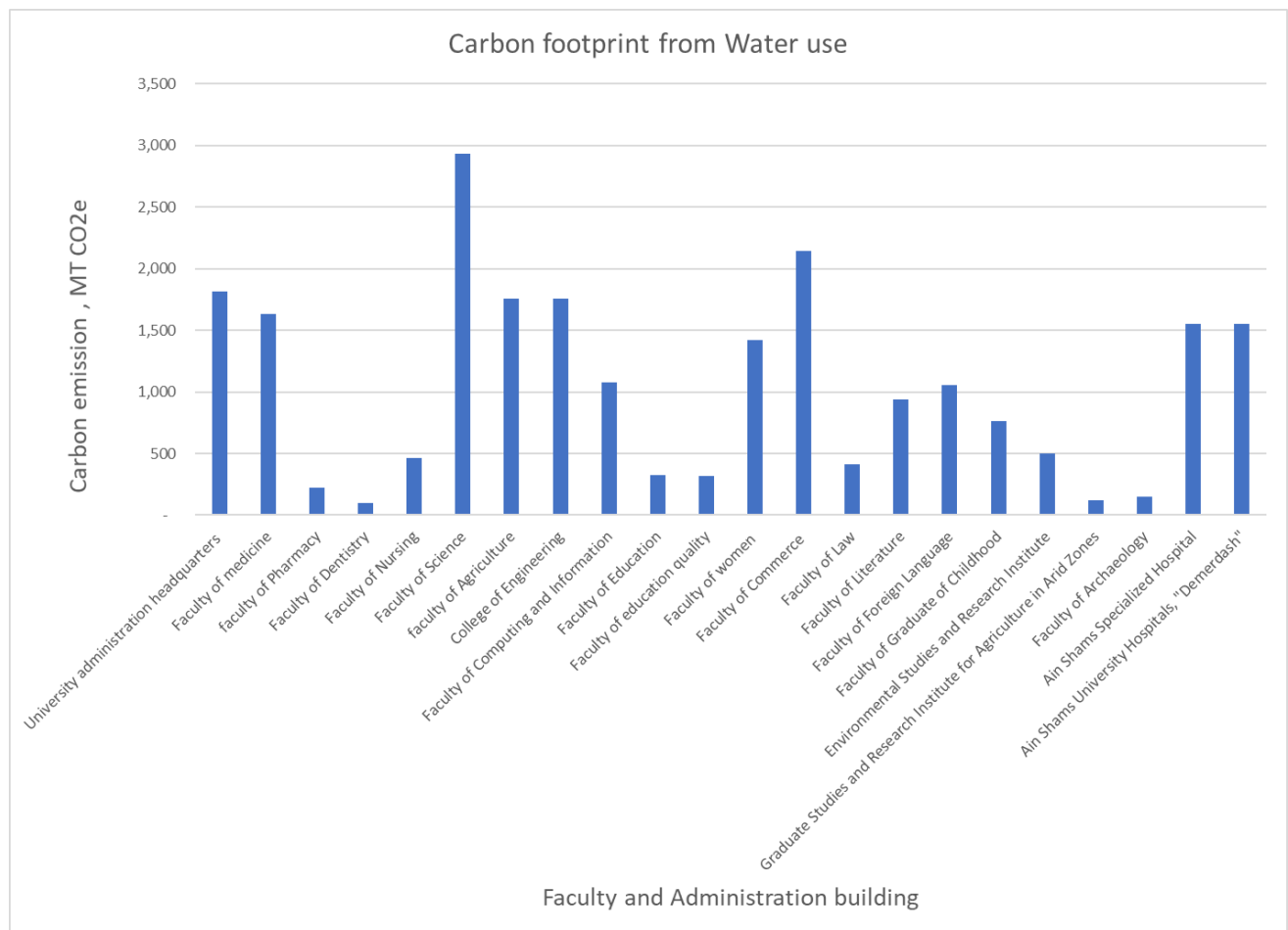


Figure 8; Carbon emission from water use in metric ton of CO₂e.

From figure 8, Headquarter and centers contain the maximum land scape areas which emit more than 290 MT CO₂e in AY 20.

ii) Results

Faculty	Water consumption (m3)	converter factor	Water consumption (Gallons)	factor water to carbon	Amount of Carbon Emission in MTCO2E
University administration headquarters	539,948.0	264.2	142,639,171.1	483,750.0	294.9
Faculty of medicine	88,832.5	264.2	23,467,063.8	483,750.0	48.5
faculty of Pharmacy	33,980.0	264.2	8,976,566.3	483,911.9	18.6
Faculty of Dentistry	45,600.0	264.2	12,046,245.6	483,750.0	24.9
Faculty of Nursing	36,179.0	264.2	9,557,480.7	483,923.1	19.8
Faculty of Science	75,126.0	264.2	19,848,289.2	483,868.6	41.0
faculty of Agriculture	44,162.0	264.2	11,667,600.4	483,731.4	24.1
College of Engineering	61,294.0	264.2	16,193,874.8	483,750.0	33.5
Faculty of Computing and Information	76,000.0	264.2	20,079,200.0	483,750.0	41.5
Faculty of Education	70,000.0	264.2	18,494,000.0	483,750.0	38.2
Faculty of specific education	24,000.0	264.2	6,340,800.0	483,750.0	13.1
Faculty of women	61,327.0	264.2	16,202,593.4	483,803.9	33.5
Faculty of Commerce	71,220.0	264.2	18,816,324.0	483,750.0	38.9
Faculty of Law	78,220.0	264.2	20,665,724.0	483,750.0	42.7

faculty of Literature	126,903.0	264.2	33,527,772.6	483,750.0	69.3
Faculty of Foreign Language	63,672.0	264.2	16,822,142.4	483,812.0	34.8
Faculty of Graduate of Childhood	8,019.0	264.2	2,118,619.8	483,703.2	4.4
Environmental Studies and Research Institute	8,019.0	264.2	2,118,619.8	483,750.0	4.4
Graduate Studies and Research Institute for Agriculture in Arid Zones	24,000.0	264.2	6,340,800.0	483,750.0	13.1
Faculty of Archaeology	6,500.0	264.2	1,717,300.0	483,750.0	3.5
Ain Shams Specialized Hospital	85,800.0	264.2	22,668,360.0	483,750.0	46.9
Ain Shams University Hospitals, "Demerdash"	88,900.0	264.2	23,487,380.0	483,750.0	48.6
Total Emissions (MTCO ₂ e)					938.0

Table 5, Total Emissions from water use (MTCO₂e) for each faculty

iii) Environmental recovery of Carbon Emission due to water use
Faculty of Agriculture achieve the maximum value of Carbon emission 19 MT CO₂e emitted, this value was calculated by EPA online. 294 MT CO₂e is equal to the amount of CO₂ gas may emit if around 150 ton of coal is burned.

8) PAPER USE

i) Curves and represented diagram.

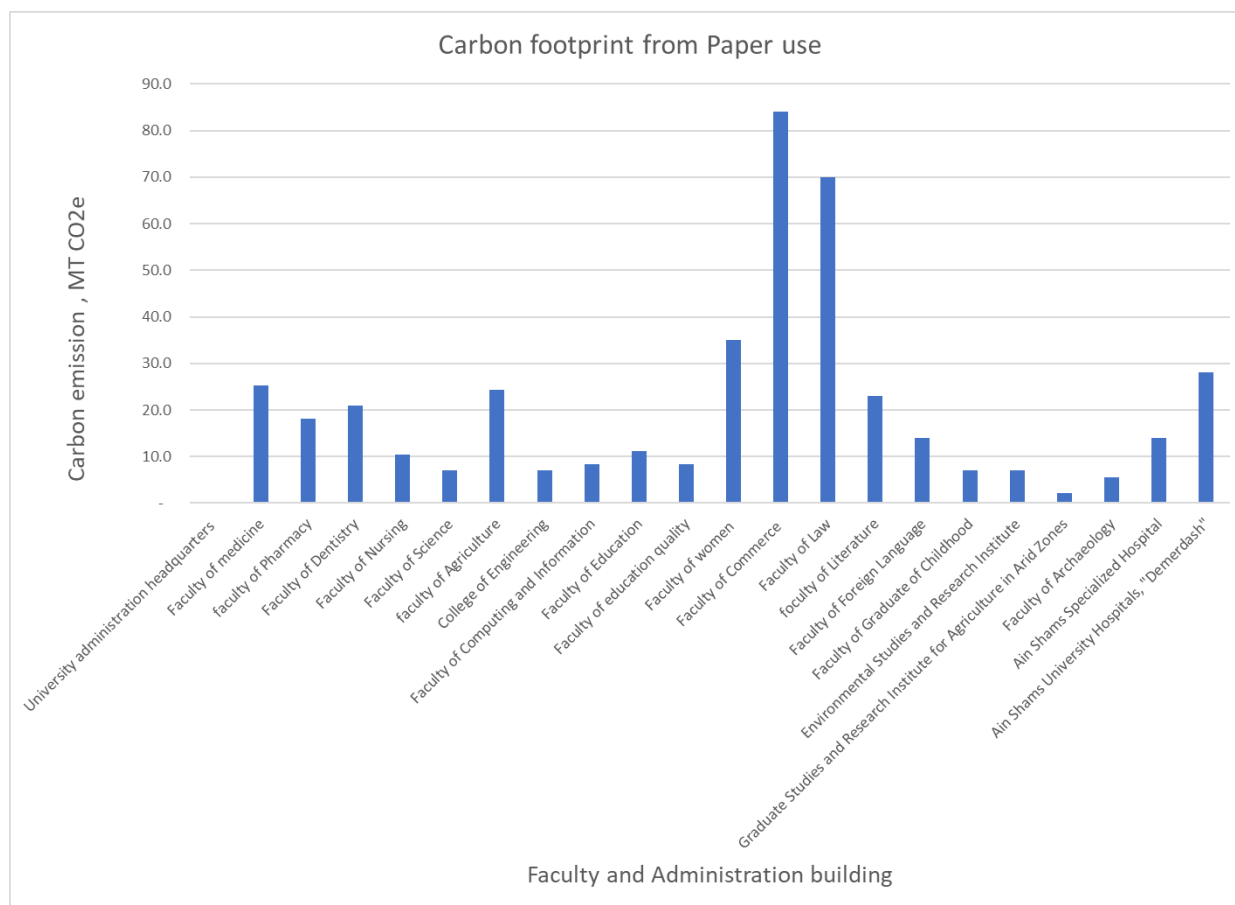


Figure 8; Carbon emission from paper use in metric ton of CO₂e.

From figure 8, faculty of commerce consume the maximum amount of paper which emit more than 80 MT CO₂e in AY 20.

i) Results

Faculty	Paper consumption (ton/y)	Mass Emissions (MT CO ₂ e/ton of paper)	Amount of Carbon Emission in MTCO ₂ E
University administration headquarters	0.057	2.8	0.2
Faculty of medicine	9	2.8	25.2
faculty of Pharmacy	6.5	2.8	18.2
Faculty of Dentistry	7.5	2.8	21.0
Faculty of Nursing	3.75	2.8	10.5
Faculty of Science	2.5	2.8	7.0
faculty of Agriculture	8.7	2.8	24.4
College of Engineering	2.5	2.8	7.0
Faculty of Computing and Information	3	2.8	8.4
Faculty of Education	4	2.8	11.2
Faculty of education quality	3	2.8	8.4
Faculty of women	12.5	2.8	35.0

Faculty of Commerce	30	2.8	84.0
Faculty of Law	25	2.8	70.0
faculty of Literature	8.25	2.8	23.1
Faculty of Foreign Language	5	2.8	14.0
Faculty of Graduate of Childhood	2.5	2.8	7.0
Environmental Studies and Research Institute	2.5	2.8	7.0
Graduate Studies and Research Institute for Agriculture in Arid Zones	0.75	2.8	2.1
Faculty of Archaeology	2	2.8	5.6
Ain Shams Specialized Hospital	5	2.8	14.0
Ain Shams University Hospitals, "Demerdash"	10.0	2.8	28.0
Total Emissions (MTCO ₂ e)			431.2

Table 6, Total Emissions from paper use (MTCO₂e) for each faculty

iii) Environmental recovery of Carbon Emission due to paper use
Faculty of commerce and faculty of law achieve the maximum value of Carbon emission 84 MT CO₂e, 70 MT CO₂e emitted respectively, this value was calculated by EPA online. 154 MT CO₂e is equal to the amount of CO₂ gas may emit if around 75 ton of coal is burned.

9) PAPER TISSUE USE

i) Curves and represented diagram.

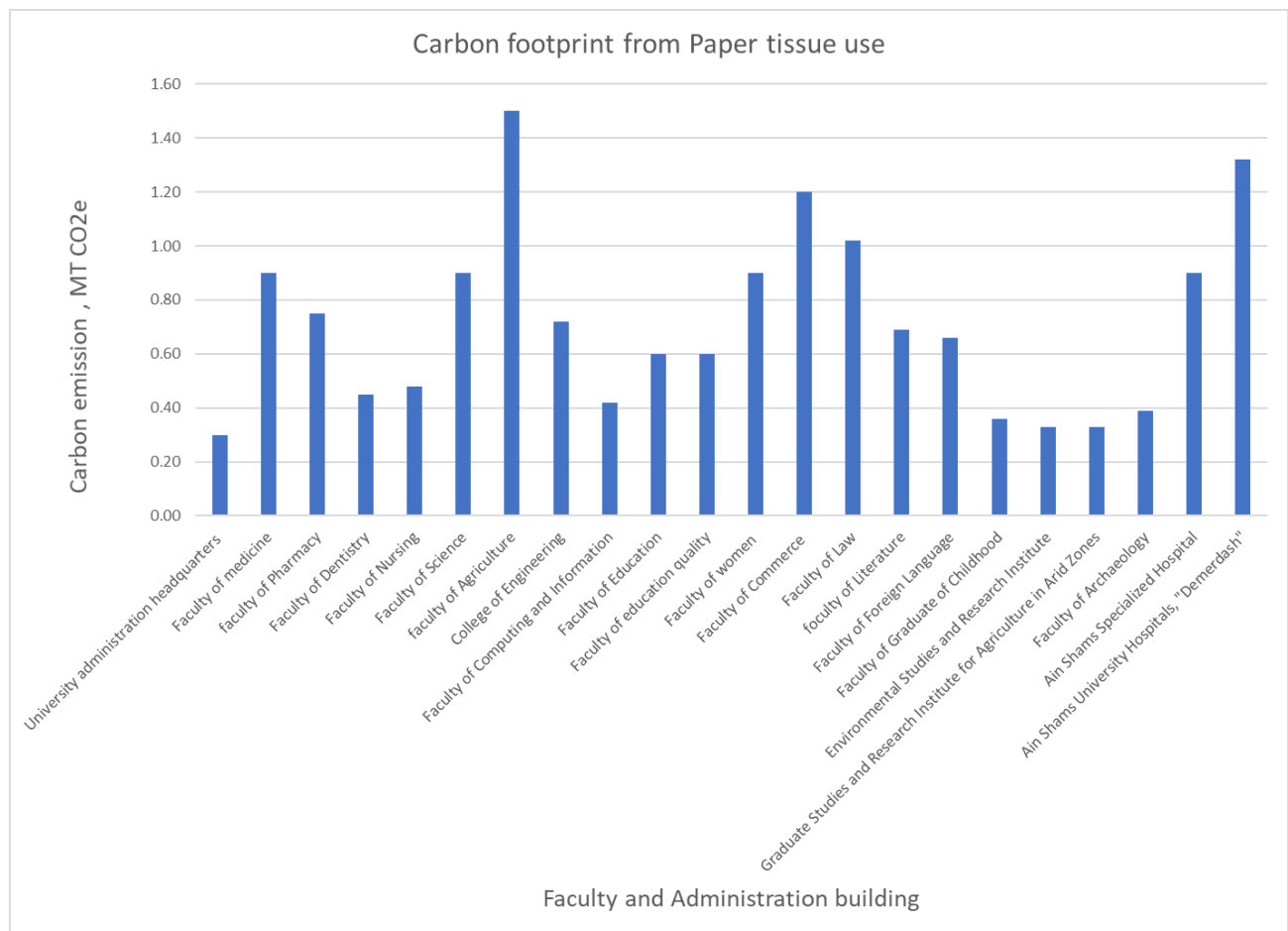


Figure 9; Carbon emission from paper tissue use in metric ton of CO₂e.

From figure 9, faculty of agriculture consume the maximum amount of paper tissue which emit more than 1.5 MT CO₂e in AY 20.

ii) Results

Faculty	Paper tissues consumption (ton/y)	Mass Emissions (MT CO ₂ e/ton of paper)	Amount of Carbon Emission in MTCO ₂ E
University administration headquarters	0.10	3	0.30
Faculty of medicine	0.30	3	0.90
faculty of Pharmacy	0.25	3	0.75
Faculty of Dentistry	0.15	3	0.45
Faculty of Nursing	0.16	3	0.48
Faculty of Science	0.30	3	0.90
faculty of Agriculture	0.50	3	1.50
College of Engineering	0.24	3	0.72
Faculty of Computing and Information	0.14	3	0.42
Faculty of Education	0.20	3	0.60
Faculty of education quality	0.20	3	0.60
Faculty of women	0.30	3	0.90
Faculty of Commerce	0.40	3	1.20
Faculty of Law	0.34	3	1.02

Faculty of Literature	0.23	3	0.69
Faculty of Foreign Language	0.22	3	0.66
Faculty of Graduate of Childhood	0.12	3	0.36
Environmental Studies and Research Institute	0.11	3	0.33
Graduate Studies and Research Institute for Agriculture in Arid Zones	0.11	3	0.33
Faculty of Archaeology	0.13	3	0.39
Ain Shams Specialized Hospital	0.30	3	0.90
Ain Shams University Hospitals, "Demerdash"	0.44	3	1.32
Total Emissions (MTCO ₂ e)			15.72

Table 7, Total Emissions from paper tissue use (MTCO₂e) for each faculty.

iii) Environmental recovery of Carbon Emission due to paper tissue use

Faculty of Agriculture and faculty of Hospital of Al-demerdash achieve the maximum value of Carbon emission 1.5 MT CO₂e, 1.32 MT CO₂e emitted respectively, this value was calculated by EPA online. 2.82 MT CO₂e is equal to the amount of CO₂ gas may emit if around 100 kg of coal is burned.