Sustainability Report

2023-2024

GJU
الجامعة الألمانية الأردنية
German Jordanian University

Introduction

This report provides a review of The German Jordanian University's sustainability performance, baseline and action plan for the 2023-2024 academic year. As a continuation of the previous sustainability report produced by GJU, it contains all data used to determine the university's baseline. The report is published and released to all relevant stakeholders, including professional and academic staff, students, the local community, and international partners. This reflects the University's ambitious approach to sustainability.

This report has been submitted with the approval of the University's Management.

Sustainability Vision

The German Jordanian University is committed to achieving the UN's sustainable development goals within its academic and administrative operations and activities by building relationships with local, regional, and global partners.

Sustainability Approach

Sustainability is a pillar of GJU's Strategic Plan. Every aspect of operation must be adopted and show progress in meeting the university's sustainability policies and goals. A culture of sustainability has been fostered through the university hierarchy. This is shown within the different sections of this report.

TABLE OF CONTENTS

1. SITE AND INFRASTRUCTURE

Figure 1: University Campus.

1.1. UNIVERSITY INFORMATION

The German Jordanian University is a public university located in Amman, Jordan. It was established in 2005 as a joint project between the German and Jordanian governments, with the aim of providing high-quality education and fostering cultural exchange between the two countries. The university's founding principles revolve around promoting academic excellence, innovation, and intercultural understanding. GJU offers a range of undergraduate and postgraduate programs in various fields, including engineering, applied sciences, management, and humanities.

Throughout its history, GJU has achieved several notable milestones. In 2005, the university welcomed its first batch of students and started offering its academic programs. Since then, GJU has grown steadily, expanding its infrastructure and academic offerings.

One significant milestone for GJU was the establishment of the School of Applied Technical Sciences in 2009, which further enhanced the university's focus on applied sciences and engineering disciplines. Additionally, GJU has established partnerships with numerous German universities, facilitating student and faculty exchange programs and joint research projects.

Over the years, GJU has gained recognition for its commitment to academic excellence and innovation. The university has received accreditation from reputable international bodies, ensuring the quality of its programs. GJU also actively engages in research and development activities, contributing to advancements in various fields.

All GJU Bachelor students have the opportunity of spending one year in a German speaking country abroad during their study program. This is the called German Year which includes a study semester at one of our many partner universities as well as an internship semester in the German industry sector. All different sections of the international affairs department interlink and work together to make international exchange possible and sustainable on all

levels, be it student exchange, administrative or academic exchange. The GJU German dimension, supported by the Project Office at HS Magdeburg-Stendal and is paramount in its contribution to GJU`s general internationalization strategy.

The German Jordanian University (GJU) is a public, comprehensive university devoted to academic distinction in teaching, research, and community service. The conduct of research, scholarship, and creative activities is at the core of The University, including multiple missions of education, research, service, and outreach to the nation, the region, and beyond.

1.2. LOCATIONS AND CAMPUSES

The German Jordanian university has two campuses. The main campus is located in Mushaqar, on the Amman-Madaba highway which houses most of the university's administration and undergraduate program. The second location is the collection of Buildings in Jabal Amman and houses the School of Architecture and Built Environment, the Graduate School and several university centers.

Figure 2: Mushaqar Campus.

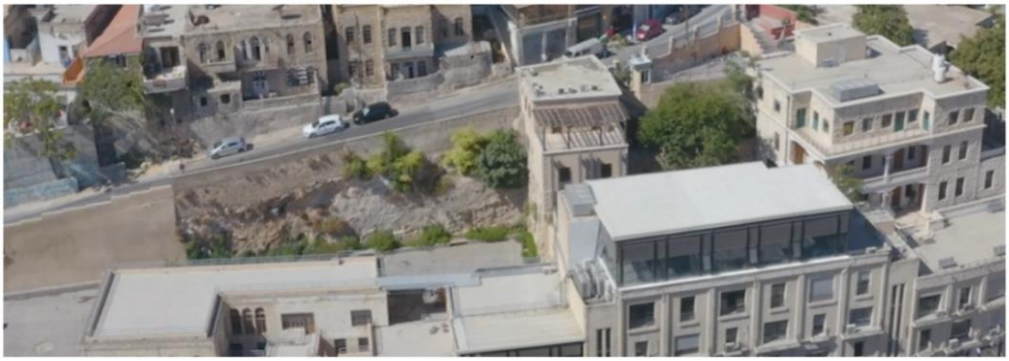

Figure 3: Jabal Amman Campus.

1.3. FACILITIES

As the campus is fairly new, a master plan was prepared for the whole campus area as shown in the figure below.

Figure 4: GJU master plan.

The university includes academic buildings, administrative buildings, a library, a sports hall, a nursery, a health clinic, parking garages, and green spaces. The total area in the main campus is 195,644 m² while the total area in Jabal Amman (second campus) is 6103 m².

1.4. BUILT AREA AND USAGE

The following shows the different buildings on campus, their area and usage.

Building A	Building B
	
Area: 463 m^2 Adminstrative Building	Area: 1137 m^2 Academic Building

Building C	Bulding D
	
Area: 3266 m^2 Academic Building	Area: 1370 m^2 Adminstrative Building

Building G	Bulding H
	
Area: 1520 m^2 Adminstrative Building	Area: 1020 m^2 Academic Building

Building M	Daret Othman (Jabal Amman campus)
	
Area: 2246 m^2 Academic Building	Area: 1500 m^2 Academic Building
Health care center	**Engineering labs**
	
Area: 269 m^2 Health Care Center	Area: 430 m^2 Engineering Labs
Building F	**Sports hall**
	
Area: 1346 m^2 Adminstrative Building	Area: 3185 m^2 Sports Hall
Building E	**Building L**
	
Area: 1385 m^2 Adminstrative Building	Area: 1651 m^2 Library

Bank Building	Nursery
	
Area: 460 m^2 Bank	Area: 267 m^2 Nursery
Alsabbagh	
	
Area: 1437 m^2 Consulationa and Training Center	

As most buildings consist of several floors, actual land usage differs from built area as shown in the table below.

Table 1: Building Area and Land Usage.

Building Name	Land Usage (m^2)	Total Built Area (m^2)
A	463	1380
B	1137	5326
C	3266	12995
D	1370	1370
E	1385	1385
F	1346	1346
G	1520	1520
H	1020	6100
M	2246	8558
L	1651	4786
Sports Hall	3185	6050
Bank Building	460	1400
Engineering Labs	430	430
WASH Labs	208	208
Nursery	267	267
Health Care Center	269	269
Engineering and Maintenance	170	170
Supply	748	1005
Maintenance	150	150
Jabal Amman	1500	3200
Alsabbagh	665	1437
Total	**23456**	**59352**

1.5. VEGETATION

The main campus is located in a very fertile area, surrounded by farms and fields. The goal of the university is to cover all areas not built with vegetation. The tables below show green areas on campus while the figures show a sample of campus vegetation.

Table 2: Area Usage.

Area Usage	Area (1000 m^2)	Percentage (%)
Planted Area	51	**25.3**
Open Space	90.22	**44.9**
Built Area	23.5	**11.6**
Roads and Pathways	36.7	**18.2**
Total	201.75	**100**

Table 3: Type and Number of Plants.

Type of Plant	Number of Plants	Percentage (%)
Forest Trees	4812	**88.6**
Ornamental plants and trees	618	**11.4**
Total Plants	5430	**100**

Figure 5: Main campus pathway.

Figure 6: Green area.

Figure 7: Green area.

1.6. FTE EMPLOYEE

To be able to quantify resource usage per employee, it is important to determine the Full Time Equivalent (FTE) Employee. A full-time employee or student for emission purposes is defined as a person that is present on campus for 40 hours a week, 49 weeks a year. Due to the nature of academic operation at GJU, this definition is only appliable to administrative staff, not to academic staff or to students. The FTE employees is determined as follows:

1) The university has 393 support staff, which work 40 hours a week, for 49 weeks a year. This is considered as the Equivalent Full Time Employ (FTE).

   Staff FTE= 393

2) The university has 304 faculty members. Since assistant, associate, and professors have different loads, and an average teaching load of 11 credit hours will be assumed, another 8 weekly office hours are added, as well as 3 hours of meeting time. Thus, on average faculty members have 22 weekly hours of on campus presence. Two full semesters equal 32 weeks including examinations. Then the faculty FTE is:

   $$\text{Faculty FTE}=304\times(32/49)\times(22/40)=109.19$$

3) 145 faculty taught during the 2022 summer semester. The summer semester 9 weeks including examinations, with average enrollment of 4.5 credit hours. Contact per week is assumed 15 hours/week.

   $$\text{Summer Faculty FTE}=145\times(9/49)\times(15/40)=9.99$$

4) The university has 4121 students. On average, a student enrolls in 16 credits hours in a normal semester, adding 10 hours/week for breaks in between classes, and 4 hours for leisure, that is 30 hours/week. Two full semesters equal 32 weeks including examinations.

   $$\text{Student FTE} = 4121\times(32/49)\times(30/40)= 2018.45$$

5) 1717 of the students enroll for the summer semester. The summer semester is 9 weeks including examination, with average enrollment of 7 credit hours. Contact per week is assumed 21 hours/week.

   $$\text{Summer Student FTE}= 1717\times(9/49)\times(21/40)=165.57$$

Then the university's FTE = 2696

2.ENERGY

2.1.FUELS AND ENERGY USE

Most energy used at GJU is electric energy. However, LPG is used for heating and diesel is used for the backup generators. The amount of LPG consumed during 2024 is summarized in the table below. No diesel was used during 2024.

Table 4: LPG Consumption

Date	Amount (kg)	Price (JOD)
2024-01-03	6190.5	6449.214
2024-01-07	6101.4	6828.584
2024-01-15	7500	7057.117
2024-01-25	8300.2	2141.84
2024-02-04	7500.3	4047.344
2024-02-13	6000.7	4408.569
2024-02-22	5500.1	3588.404
2024-03-04	6999.5	5068.14
2024-03-13	5701	5069.66
2024-03-27	5000	4225.477
2024-12-01	6000	3619.088
2024-12-10	6800.1	6449.214
2024-12-22	7693.7	6828.584
Total	85287.5	52503.437

2.2.ENERGY EFFICIENCY MEASURES

GJU intends to increase Energy Efficient by using more energy-saving appliances. All new purchases and installations must be star-rated. Currently, the two newest buildings (the sports hall and the library) completely relay on LED lighting, which reduces energy consumption from lighting by approximately 80%. As these are two of the largest buildings on campus, the area that is covered by LED lighting accounts for 20% of the campus-built area. Older buildings are being retrofitted as well, with 25% completed during the past year.

Currently 14% of all split AC units are inverter based, that save energy. There are plans to replace the older units.

The university aims at reduction of CO2 through PV generations and smart campus initiative. This includes.

- Energy Efficiency Program.
- Program to change the lighting system.
- Program to change AC units.
- Program to increase PV generated energy.
- Smart campus initiative to better manage energy usage.
- All new vehicles will be electric, supplied by PV generated energy.

The images below demonstrate LED fixtures used on campus.

Figure 8: LED lighting in classrooms.

Figure 9: LED lighting in library.

Figure 10: LED lighting in offices.

2.3. RENEWABLE ENERGY SOURCES

GJU has a 2.11 MWp PV system installed at the main campus. The system has 6,699 315Wp PV panels and 73 inverters. The system generated 3,269,000 kilowatt-hours during the past year, covering 72% of the campus' electrical energy needs. Detailed generation per month for 5 years of operation, starting in November 2017 is shown in the table below.

Table 5: Five Year PV generation

Month	Productivity (MWh)				
	First year	Second year	Third year	Fourth year	Fifth year
November	199.255	198.561	221.848	198.257	197.91
December	172.836	151.402	180.520	183.394	178.19
January	185.045	214.105	166.850	179.618	175.33
February	216.783	199.580	200.81	209.63	201.31
March	321.056	274.567	265.210	290.295	276.53
April	344.552	296.554	312.697	338.31	332.46
May	352.080	372.292	327.007	368.84	361.77
June	395.600	379.911	362.980	375.73	366.23
July	360.460	405.630	318.650	391.17	385.11
August	310.310	371.012	367.230	364.72	360.13
September	275.260	300.660	298.163	294.12	288.86
October	247.532	249.22	254.75	250.300	246.11
Total	3380.769	3413.494	3276.715	3444.384	3369.94

The system is installed as:

1) Car parking
2) Walkway shades
3) Rooftop

The system won the Emirates Silver Award for Energy for the year 2022 in its 4th cycle, organized by the Supreme Council of Energy in Dubai, with the participation of 187 projects from 16 countries, for the category of "Distributed Solar Energy – Large Scale".

An updated SCADA system is currently being installed to better monitor generation and optimize consumption. In addition, a 500 kWp upgrade has been tendered and will generate that balance of the university's current consumption.

Figure 11: PV System car park.

Figure 12: PV system rooftop installation.

Figure 13:PV car park.

2.4. ELECTRICITY USAGE

The image below shows the electrical infrastructure at GJU.

Figure 14: GJU Electrical System.

The university has an internal substation on the south side of the campus. This substation receives 33kV and steps it down to 11kV, the substation has two transforms, and GJU is billed at the 11kV voltage. This includes two meters at the main campus in addition to one meter in Jabal Amman campus. GJU manages the 11 kV network, that includes all wiring, and 6 transformers connected in a ring configuration.

Each transformer is also connected to a diesel backup generator for emergency usage. Every transformer is located in a closed room separated into two parts: one for the transformer and the other for a backup diesel generator. The generators are connected to an ATS control system designed to feed emergency loads in case of any outage of the utility grid. The figure below shows the system online diagram, also showing the location of PV connection.

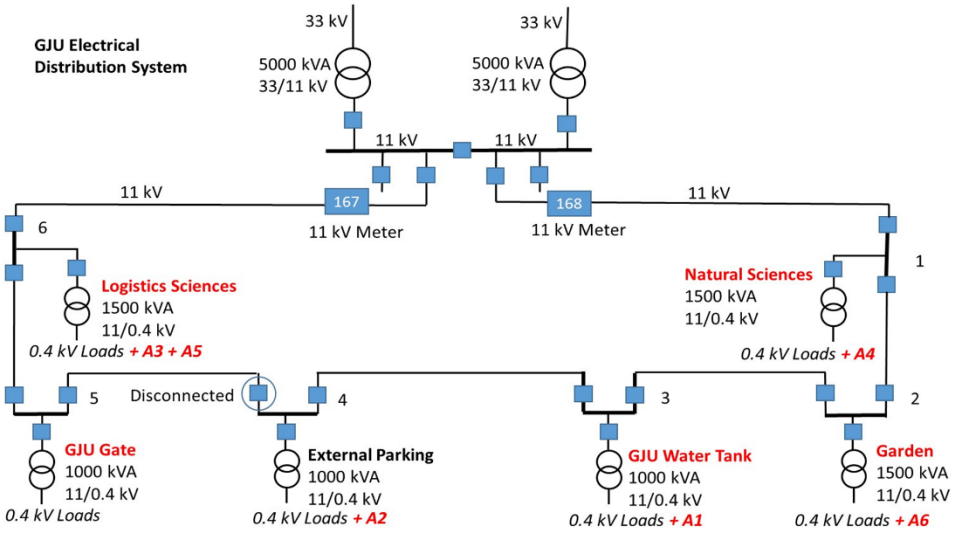

Figure 15: GJU Electrical one line diagram.

The Table below details monthly Energy Bills. 2024 Energy bills were reduced due to better operation of the PV plant in addition to increased use of energy efficiency measures. This includes saving of 96,382 JOD, which are being reinvested into additional energy efficiency measures.

Table 6. Monthly Electric Bills

Electric Bill Main Campus								
Meter Number	Month	Period	Energy Imported	Energy Exported	Billed Energy	Previous Balance	Balance	(JOD) Bill
20168000167	1	2/01/2024-1/02/2024	56920	11870	45050	0	0	13346.07
	2	2/2/2024 -1/3/2024	44440	17530	26910	0	0	8689.75
	3	2/3/2024 -1/04/2024	31420	46440	0	0	15020	1916.77
	4	2/4/2024 -1/05/2024	26150	54690	0	15020	43560	1911.5
	5	2/5/2024 -1/06/2024	40130	44840	0	43560	48270	1925.48
	6	2/6/2024 -1/07/2024	68410	37380	0	48270	17240	1953.76
	7	2/7/2024 -1/08/2024	94300	24590	52470	17240	0	15282.97
	8	2/8/2024 -1/09/2024	102960	20830	82130	0	0	22884.59
	9	2/9/2024 -1/10/2024	76850	22390	54460	0	0	15774.96
	10	2/10/2024 -1/11/2024	71600	16010	55590	0	0	16058.99
	11	2/11/2024 -1/12/2024	34240	11860	22380	0	0	7519.87
	12	2/12/2024 -1/1/2024	43760	13620	30140	0	0	9515.95
Meter Number	Month	Period	Energy Imported	Energy Exported	Billed Energy	Previous Balance	Balance	in JOD Bill
20168000168	1	2/01/2024 -1/02/2024	151300	19020	132280	0	0	35750.73
	2	2/2/2024 -1/3/2024	123050	30780	92270	0	0	25479.92
	3	2/3/2024 -1/04/2024	98070	90410	7660	0	0	3794.78
	4	2/4/2024 -1/05/2024	71720	123830	0	0	52110	1936.47
	5	2/5/2024 -1/06/2024	78290	101210	0	52110	75030	1943.04
	6	2/6/2024 -1/07/2024	73480	88950	0	75030	90500	1938.23

	7	2/7/2024 -1/08/2024	102880	49290	0	90500	36910	1967.63
	8	2/8/2024 -1/09/2024	118950	42110	39930	36910	0	12076.78
	9	2/9/2024 -1/10/2024	83970	65700	18270	0	0	6496.84
	10	2/10/2024 -1/11/2024	91410	48880	42530	0	0	12714.84
	11	2/11/2024 -1/12/2024	108310	25860	82450	0	0	22951.26
	12	2/12/2024 -1/1/2025	133310	24780	108530	0	0	29652.74

Jabal Amman Campus Electric Bill

Meter Number	Month	Period	Energy Imported	Energy Exported	Billed Energy	Previous Balance	Balance	in JOD Bill
20216006074	1	19/12/2023-18/01/2024			29986			7731.248
	2	19/1/2024 -18/2/2024			35022			9050.68
	3	19/2/2024 -18/3/2024			25592			6580.02
	4	19/3/2024 -18/4/2024			17725			0
	5	19/4/2024 -18/5/2024			18235			4652.486
	6	19/5/2024 -18/6/2024			27894			7183.144
	7	19/6/2024 -18/7/2024			25593			6580.282
	8	19/7/2024 -20/8/2024			37128			0
	9	21/8/2024 -22/9/2024			26196			6738.268
	10	23/9/2024 -22/10/2024			21937			5622.41
	11	23/10/2024 -22/11/2024			14886			0
	12	23/11/2024 -22/12/2024			26068			6704.74

2.5.GREEN AND SMART BUILDING MEASURES AND RENOVATION POLICIES

The university has started a plan for a smart campus. This includes integrating SCADA systems with individual BMS systems, adding a level of intelligence to the system, through sensors and IT. All university buildings have:

- Building Management systems (BMS)
- Physical security
- Motion sensors in bathrooms and hallways
- Video surveillance/CCTV
- Indoor environment control (thermal comfort and air quality),

As most GJU buildings are considerable new, all constructions have considered sustainable measures during the construction phase. This includes double-glazed glass for thermal insulation and noise reduction; roof top insulation for thermal insulation and waterproofing; building orientation and installation of both window curtains and air curtains. All new building will follow the newly published and adopted Jordanian Green Building Guidebook.

Buildings (A, B, C, H, I) are connected to a Building Energy Management System (BEMS) in order to monitor and control the mechanical and electrical equipment of each building. The Figure below shows the BEMS located in building C. Building 'A' contains the main computer server of the university and because of that it also contains a 60kVA UPS system. Buildings (B, C, H, I) contain a 10kVA UPS system each.

Figure 16: Building (C) BMS.

3. SOLID WASTE

3.1. UNIVERSITY WASTE MANAGEMENT

GJU is contracted with a private company to remove waste. The current schedule is four trips a week. Weekly waste produced is approximately 28 tons. Waste is taken to the Al Ghabawi Landfill. In addition, the university has signed an agreement with a paper recycling company, which processed 10,292 kgs of paper during the second half of the year.

The images below demonstrate some of the solid waste initiatives on campus.

Figure 17: Recycling bins.

Figure 18: Paper recycling bin.

Figure 19: Outdoor recycling bin.

3.2.RECYCLING AND WASTE PRODUCTION REDUCTION PROGRAMS

The university has initiated several sorting and recycling pilots to reduce waste that include:

1. Replacing plastic water bottles and cups with glass bottles and glasses, which are distributed in key areas.
2. Requesting shredders to reduce paper waste and facilitate paper recycling.
3. Reducing the number of hard copies of documents and promoting soft copy distribution.
4. Emphasizing double-sided printing to conserve paper.
5. Ensuring that all marketing and promotional giveaways are eco-friendly.
6. Creating awareness about sustainability through the created logo, email signatures, and creating the website.
7. Recycling agreements with the private sector.

Scan me!

4. WATER

4.1. WATER SOURCES, REUSE, AND USAGE

For residential usage, the university relies on three water sources 1) Water Authority 2) Water well 3) Private Water Tank Trucks. The source used of is chosen based on availability.

The well is 450 meters deep and was commissioned in 2012 and is managed by GJU. All sources of water supply a ground tank with a capacity of 1,200 m^3, which is then pumped to a water tank at the top of the water tower, which has a capacity of 40 m^3, which supplies the water network to the buildings and other demands.

Figure 20: Water Tank

A monitoring system was installed during the past year, as shown in the figures below. The total water consumption during the year was 31,441 m^3.

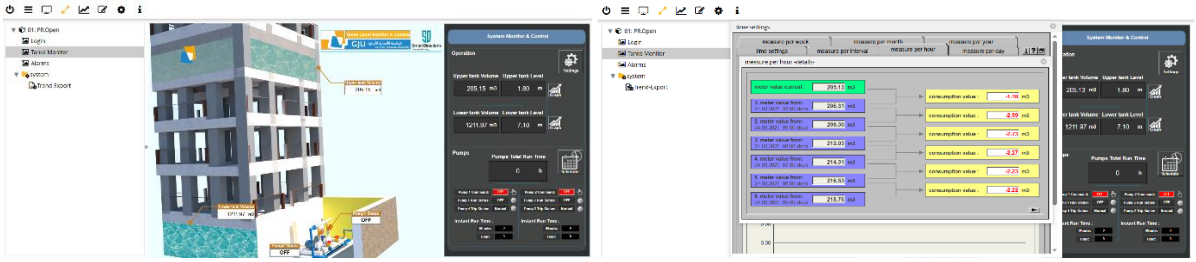

Figure 21: Water Monitoring System

In addition, water flow meters have also been installed, as can be seen in the below figure. This will allow for more prices and accurate monitoring and characterization of consumption behavior.

Figure 22: Water flow meters.

4.2.RAINWATER HARVESTING

The university takes advantage of four areas to harvest rainwater. As shown in the figure. Areas 1, 2 and 3 are soil areas, while area 4 represents all buildings' roofs.

Figure 23: Water harvesting areas.

The total area for the soil harvesting areas is 96,000 m^2, with an estimated water absorption of 80%, while area 4 is 104,000 m^2 with approximately 20% harvesting capacity. This result is 97,600 m^2 of harvesting area, which is 48.8% of the total campus area, 505m^3 of water may be stored in the storage tank.

4.3. WASTEWATER TREATMENT AND MANAGEMENT

The university is not served by the public sewage system, all sewage is collected and treated internally. The produced gray water, in addition to rainwater harvesting, is used for agricultural purposes. The system input capacity of the treatment plant is 700 m^3, while the output grey tank can hold up to 400 m^3. The sledge, any extra inflow or extra output is transferred using sewage tanks to the municipality's wastewater treatment site.

The below figure shows the plant schematic.

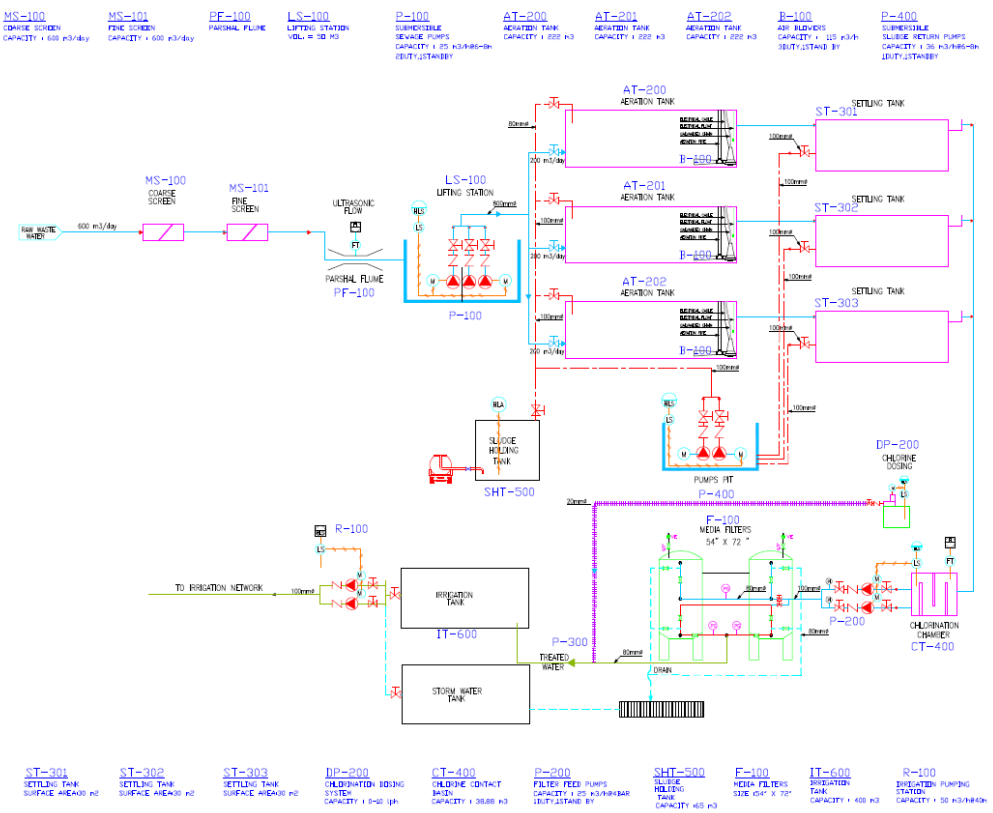

Figure 24: Wastewater treatment plant schematic.

The table below summarizes the university's water balance during 2024.

Table 7: GJU water balance

Water Balance for 2024 at the Main Campus					
Month	**Total Water Consumption (m^3)**	**Water Reaching the Treatment Plant (m^3)**	**Untreated Wastewater (m^3)**	**Treated Water (Reused) (m^3)**	**Percentage of water reused %**
January	2,524.00	1,766.80	1,395.00	371.80	21.04
February	1,773.00	1,241.10	1,215.00	26.10	2.10
March	2,467.00	1,726.90	480	1,246.90	72.20
April	2,722.00	1,905.40	390	1,515.40	79.53
May	1,834.00	1,283.80	0	1,283.80	100.00
June	2,728.00	1,909.60	0	1,909.60	100.00
July	2,603.00	1,822.10	0	1,822.10	100.00
August	2,169.00	1,518.30	60	1,458.30	96.05
September	3,407.00	2,384.90	105	2,279.90	95.60
October	4,233.00	2,963.10	1,230.00	1,733.10	58.49
November	2,320.00	1,624.00	1,005	619.00	38.12
December	2,661.00	1,862.70	1,155.00	707.70	37.99
Total	**31,441.00**	**22,008.70**	**7,035.00**	**14,973.70**	**68.04**

As can be noted from the above figure, a total of 14,973.7 m^3 of water was treated and reused, representing about 68.04% of the total water consumption. All of these volumes are used for irrigation purposes. This is a positive trend, showing that more than half of the water consumed is being reused, which is a good step toward sustainability and resource efficiency.

5. TRANSPORTATION

5.1. UNIVERSITY COMMUTE

The university is located on the Madaba- Amman highway approximately 30 km from Amman. Most students and employees commute to the university. To better understand patterns, the university counted all vehicles entering the main campus on a daily basis for a week as shown in the table.

Table 8: Results of Vehicle Survey

	Sunday	Monday	Tuesday	Wednesday	Thursday
Gasoline Cars	450	291	293	394	**315**
Hybrid Card	195	95	214	173	**126**
Electric Cars	133	64	139	133	**88**
Personal Trucks	37	11	29	18	**11**
Large Trucks	17	3	1	10	**6**
Small Buses	27	9	20	24	**23**
Large Buses	25	7	17	16	**11**

The university has an annual contract with "Al-Buraiji Transportation Services Company" to transport students and employees.

The company operates five routes in both directions as shown in the table below.

Table 9: Contracted Bus Service Routes

Route pick-up and drop-off locations								**Route name and Total Distance**
	Gulf Gas Station (Seventh Circle)	Seventh Circle (Safeway Circle)	Kilo Circle (Pedestrian Bridge)	Al-Waha Circle (Habibah)	University Hospital	Al-Israa Hospital	University of Jordan (Consultations)	**Consultations Line (32km)**
	Taj Mall	Abdoun Circle	Fourth Circle	Al-Dakhiliyah (Housing Bank Complex)	Sports City (Housing Bank)	After Al-Mashaghel Circle	Areefa Mall	**Areefa Mall Line(34km)**
Al-Kamaliah Circle	Umm Al-Nu'aj Circle	Ain Al-Basha Traffic Light	Al-Dababneh Bridge	Al-Manaseer Complex	Sports City Triangle	Al-Magharib Bridge	Al-Balqa University Triangle	**Salt Line (50km)**
Commercial Bank (Pedestrian Bridge)	Al-Shaab Circle	Hussein Gardens (Pedestrian Bridge)	Khalda Circle	Civil Defense	Sweileh (Shaab Roastery)	Princess Basma Circle	Applied Science Circle	**Applied Science Line (36km)**
					Al-Salam Gas Station	Marj Al-Hamam (Church Traffic Light)	Marj Al-Hamam (Al-Bardini Circle)	**Marj Al-Hamam Line (18km)**

The table below shows the number of passengers transported on a daily basis for a week.

Table 10: Number of Transported Passengers

Number of outgoing passengers	Number of incoming passengers	Number of Buses	Day
745	762	18	Sunday
737	758	18	Monday
750	769	18	Tuesday
712	720	18	Wednesday
459	487	13	Thursday

To better understand daily commute distances, the university conducted a survey of all students and staff. The questionnaire was:

1. Are you a: (Student, academic staff or administrative staff).
2. Your starting point to the university is …….
3. Number of Working Days per week …….
4. Method of transportation (Private Car, Shared Car, Public Transportation, University Bus Servies)
5. If private or shared car, what type (Fuel, Hybrid, EV)
6. If a shared car, how many passengers.

348 people participated in the survey. The results of the survey are shown below.

Table 11: Results of Transportation Survey

Type of Transportation Used		
Private Car	205	60%
Shared Car	9	2%
University Transportation (buses)	80	23%
Public Transportation	54	15%

Table 12: Vehicle Survey Breakdown

Car Engine Type		
Hybrid	68	32%
Fuel	106	50%
Electric	38	18%

In addition, distance covered from each starting point was obtained from google maps as shown in the table below.

Table 13: Distance to University

Starting Point to the university					
City/location	km	Number of Travelers	City/location	km	Number of Travelers
Irbid	112	9	University of Jordan	29	18
Salt	46	14	Al Jandawil	24	2
Zarqa	58	8	8th	24	6
Madaba	7	47	4th	24	1
Na'ur	13	12	5th	24	1
Tla al-Ali	28	2	7th	24	14
Al Yasmin	25	1	Al Saru	40	1
Al Akhdar	25	1	Shumaysani	39	4
Marka	34	3	Adassiyah	19	2
North Bus Station	28	3	Al Quwaysimah	27	1
Russeifa	43	1	Dair Ghbar	28	2
Abdun	22	3	Sport City	28	3
Al Salam Gas Station	12	12	Al Bayader	24	5
Al Yadudah	17	2	Applied Science Private University	39	5
Umm Uthainah	24	1	Birayn	47	1
Al Rabia	27	1	Taj mall	22	1
Dabouq	28	1	Jawa	22	1
Fuheis	32	13	Al Sahabah	19	1
Khilda	28	1	Nazzal	25	1
Jabal Amman	25	1	Khilda	28	3
Mestabah	25	1	Al-Dakhliya Cir	28	4
alsaha Cir	30	1	Al-Sha'b Cir	24	1
Umm Nowarah	28	1	Kilo Cir	26	1
Umm Al Summaq	28	1	Almashaghel Cir	30	2
Sweileh	31	1	Al-Waha Cir	27	3
Al Muqabalayn	22	2	Sahab	36	2
Abu Alanda	27	1	Al Rashid	28	1
Abu Nseir	37	6	Al nakheel	17	1
Marj Al Hamam	17	41	Tabarbour	32	7
Al Bunayyat	19	3	Airport Rd.	24	4

5.2.UNIVERSITY FLET

The university operates a fleet of vehicles for official use, as described in the table below.

Table 14: GJU Fleet

Type	Model	Year	Category	Engine Capacity	Vehicle Use	Fuel Type	Fuel Cost (JOD)	Distance Driven (km)
TOYOTA	HiAce	2014	Ambulance	2700CC	Transport Services Division	Diesel	37.235	136
MERCEDES	C200	2008	Small Passenger	1800CC	Transport Services Division	Gasoline	953.706	7332
OPEL	Vectra	2006	Small Passenger	1800CC	Transport Services Division	Gasoline	632.779	6627
TOYOTA	Corolla	2019	Small Passenger	1800CC	Transport Services Division	Hybrid	874.483	14467
MERCEDES	E200	2020	Small Passenger	1991CC	Admin Vehicle for University President	Gasoline	4746.632	37275
MERCEDES	VEANO	2008	Small Passenger (Minibus)	3199CC	Transport Services Division	Gasoline	385.774	2339
Volkswagen	ID-6	2023	Small Passenger	-	Transport Services Division	Electric	0	6622
TOYOTA	HiAce	2006	Small Passenger (Minibus)	2494CC	Transport Services Division	Diesel	619.314	8677
TOYOTA	Costar	2006	Medium Passenger (Bus)	4164CC	Transport Services Division	Diesel	1345.777	10964
TOYOTA	Costar	2006	Medium Passenger (Bus)	4164CC	Transport Services Division	Diesel	1277.808	7495
TOYOTA	Costar	2006	Medium Passenger (Bus)	4164CC	Transport Services Division	Diesel	1804.494	14637
IVECO	Lory	2012	Goods Transport / Tipper Truck	2800CC	Transport Services Division	Diesel	282.12	2656
Mitsubishi	L200	2009	Shared Transport (Pickup)	2500CC	Transport Services Division	Diesel	1096.88	13861
TOYOTA 4x4	Pickup	2015	Shared Transport (Pickup)	2494CC	Transport Services Division	Diesel	786.632	11241
Mitsubishi	L200	2015	Shared Transport (Pickup)	2500CC	Transport Services Division	Diesel	837.898	10507
FORD	Ranger	2015	Shared Transport (Pickup)	2200CC	Research Projects - External Funding	Diesel	0	0
NISSAN	Navara	2013	Shared Transport (Pickup)	2500CC	Transport Services Division	Diesel	853.553	9977
DONG FENG	Rich6-EV	2022	Shared Transport (Pickup)	-	Transport Services Division	Electric	0	10730
EP	4IM	2011	Forklift	-	Transport Division	Diesel	107.776	0

5.3. PARKING AREAS

Total parking area = 34500m^2 (main campus) + 2165 m^2 (Jabal Amman) = 36665 m^2

Figure 25: Student parking area.

Figure 26: Faculty parking area.

Figure 27: Parking area.

5.4. GREEN TRANSPORTATION INITIATIVES

To reduce the number of cars entering the campus, hence encouraging ride sharing, the Deanship of Student Affairs at the university offers students the opportunity to share one entry permit, so that every four students will be able to share one car, reducing the number of vehicles entering the campus by 75%.

The university has purchased two electrical vehicles that are charged using the university's PV system, replacing two older gasoline cars. The university has also started plans to purchase more Electric Vehicles this year, which will also be charged from the PV system as well. In addition, a tender to offer EV charging services for the university community and the local community has been released.

6.EDUCATION AND RESEARCH

6.1.COURSES AND PROGRAMS RELATED TO SUSTAINABILITY

All degree programs at the university offer courses that are related to sustainability; by incorporating sustainability into teaching, educators can empower students to become responsible and informed citizens who are capable of making positive contributions to environmental and social well-being. GJU aims to integrate principles of sustainability into educational practices and curricula to promote an understanding of environmental, social, and economic issues among students. It involves equipping students with the knowledge, skills, and mindset necessary to address and solve complex sustainability challenges.

A mapping of all schools, department and programs with the UN SDGs was completed, and a complete list of all courses offered related to Sustainability and the SDGs can be found at the GJU GO Green Website.

https://www.gju.edu.jo/content/sustainability-teaching-19974

6.2.RESEARCH PROJECTS DEDICATED TO SUSTAINABILITY RESEARCH

The mission of the Deanship of Scientific Research (DSR) at GJU is to create an environment that fosters excellence in research, promotes ethical and responsible conduct, and actively contributes to the betterment of society through knowledge creation, dissemination, and innovation. GJU is committed to be a hub of intellectual exploration and a driving force for progress in various fields of study.

The mission of the Deanship of Graduate Studies (DGS) supports the growth and excellence of graduate studies, with a goal to become among the best internationally reputable institutes for graduate studies.

The International Projects Office (IPO) provides administrative support for faculty at GJU, promoting the university abroad, to enable successfully execution of internationally funded projects.

Through these three entities, the university produces a wealth of research output average per annum over the last 3 years of 355 publications in addition to managing many internationally funded research projects. The Total research fund in 2023/2024 exceeded a million USD in external funding, in addition to 1.025 million JOD in GJU funding. A list of papers is available here:

https://www.gju.edu.jo/content/sustainability-research-17059

A list of projects is available here.

https://www.gju.edu.jo/content/projects-9587

7. COMMUNITY SERVICE AND OUTREACH

7.1.SUSTAINABILITY OUTREACH PROGRAMS.

The university manages several internationally funded projects that have an outreach component. These include local communities, schools, municipalities and refuges. Examples include:

- **Energy Smart Mediterranean School Network "ESMES"** is part of the ENI CBC Med Programme, the largest multilateral initiative for cross-border cooperation (CBC) in the Mediterranean area. ESMES contributed to increased awareness and better energy habits in schools, through practical training in REEE delivered to 8,000 students. 44 schools, 50 energy and education decision-makers, 37,000 school users, both staff and students and many Universities, research centers, NGOs and SMEs in the field of sustainable energy are involved.
- **Water, sanitation, and hygiene (WaSH)** needs are considered as one of the top priorities in most countries in the region, inviting an array of humanitarian actors to get involved to meet those needs. In order to be able to develop national capacities in the Middle East that extend globally as well, the German Jordanian University (GJU), Action Against Hunger, and Bioforce, in partnership with UNICEF and the Global WaSH Cluster and other humanitarian organizations, started a WaSH Masters' Degree program.
- **Green City** aims to promote sustainable and resilient urban development through the strengthening of urban planning capacities in the field of energy and Municipal Solid Waste Management (SWM). Through this project, GJU is supporting the municipalities of Irbid and Karak.
- **Center for the Study of Natural and Cultural Heritage (CSNACH).** The Nabateans employed elaborate flood control systems in Petra. These involved terraces, cisterns, check dams and perhaps full-scale dams. These measures not only mitigated much of the flood damage in the ancient city but led to water harvesting and agricultural development in the hinterlands. One of the major sources of flooding to Petra is Wadi Madras to the southeast of the ancient Siq and Treasury. As a result of a previous study, the Petra Archaeological Park requested that the CSNACH team at GJU explore the possibility of putting the results to practical use in this wadi.
- **Increasing Access to Efficient Cooling Systems**. Climate change has serious implications on Jordan's efforts to eradicate poverty and realize sustainable development for current and future generations, making climate change an issue of intergenerational equity. Hence, Jordan's National Climate Change Policy and Sector Strategic Guidance

Framework emphasizes the need for adaptation measures, while maintaining a strong commitment on reducing its GHG emissions. The project aimed to provide technical assistance to the Jordanian Government in upgrading its NDC to include efficient and climate-friendly cooling and in defining a strategic and financial action plan for the fulfillment of the established target. Pilot interventions in public schools were implemented and technical guidelines for intervention in public buildings were released, to demonstrate how new enhanced NDC can be practically reached.

- **German Energy Academy**. The objective of the project is the establishment of a training academy for vocational and technical upskilling of technicians in the field of renewable energy and energy efficiency. The aim of the project is to effectively provide competences and know-how from education and industry for the Jordanian renewable energy and energy sectors.
- **International Social Work Acting in Crises**. training of social workers, that enable interactivity, participation and participation as well as personal exchange even in online/ blended-learning formats. Topic include "Life of Refugees in Host Communities: Reducing Inequalities and promoting peaceful and inclusive societies", “Refugees Transit and Safe Havens” and "Life of Refugees in Host Communities: Health, Education and Gender Equality".
- **Decarbonizing Jordanian Energy Systems Utilizing Smart Solutions based on Energy Storage**. Raise public awareness about energy decarbonization. Provide smart energy storage solutions for on-grid and off-grid energy systems, implemented by students in their senior design projects and master theses. Develop a training program in energy storage for students and young engineers and improvement of engineering technical skills.
- **Innovative Peer to Peer Electricity Sharing Towards the Development of Smart and Cooperative Microgrids**. Developing an innovative P2P energy trading mechanism based on minimizing power losses in the network. Developing an electricity trading platform to be a groundwork of potential industrial usage. Developing an interactive demonstrator; smart meter connected with the platform. Carry out campaigns and workshops to enhance the understanding of Energy trading projects on both national and individual consumer levels. Developing a business model for energy trading in a neighborhood area in Jordan
- **BONEX, Boosting the Nexus Framework Implementation in the Mediterranean**. The project is interdisciplinary as it aims at tackling the Water Energy Food Nexus, also with a specific demonstration pilot of sustainable and smart agricultural techniques. Also, the project is involving a CBO of youth with high female participation.
- **Resilience in Times of Crisis**. Active in planning, implementation, and evaluation was a mix of academic staff, students and members of local NGOs. This ensured that issues are

addressed with a multi-perspectival breadth. Three parallel workshops: a) Management of Humanitarian Organizations, b) Research in Community Building, c) Storytelling and Philosophizing with Children.

- **Support to Jordanian Educational Institutions in Offering Labour Market-Oriented Vocational Training** The project aimed to enhance the practicality of higher education in Jordan. Collaboration between universities and the private sector, previously non-existent in Jordan, was initiated. The joint responsibility assumed for student education underscores the project's high level of innovation, aiming to bring about significant transformations in higher education. To realize this objective, GJU adopted the concept of Dual Studies, a global educational concept linking classroom learning with real-world applications. During the practical part of the Dual Studies program, students are exposed to the organizational structure, projects, and main activities of the company, enhancing their learning experience.

7.2.STUDENT CLUBS AND INVOLVEMENT

The Sustainability Club was created to promote learning and promote work towards sustainability at GJU, by involving students in real life exercises. The main objective is to spread awareness towards Sustainability within the GJU community.

The Sustainability Club mainly focuses on spreading awareness in events and activities such as:

- Booths and Seminars discussing Sustainability in individual's lifestyle and Recycling.
- Students' documentary night about energy saving projects around the world.
- Students Field Trip to Azraq Wetlands and Shummari Reserve to view the restoration of the ecosystems.
- Paper Recycling Campaign, where the Sustainability Club worked with the General Services Department on paper recycling at the GJU

Related Links

https://www.gju.edu.jo/news/symposium-sustainability-gju-15564

https://www.gju.edu.jo/news/workshop-water-treatment-and-polymeric-nano-filtration-4851

https://www.gju.edu.jo/content/gea-gju-participates-seminar-within-german-week-activities-16686

https://www.gju.edu.jo/news/symposium-sustainability-gju-15564

https://www.gju.edu.jo/news/intensive-study-program-sustainability-gju-16333

7.3. STUDENT ACTIVITIES, WORKSHOP AND FIELD TRIPS RELEVANT TO SUSTAINABILITY

Enriching Student Development Through Experiential Learning & Civic Engagement is a core goal of the Deanship of Student Affairs (DSA), which plays a pivotal role in fostering holistic student growth by organizing, facilitating, and empowering a wide range of transformative activities. Through field trips to heritage sites—such as the King Hussein bin Talal Mosque, the Baptism Site, the Sharhabil Bin Hassneh EcoPark, and the Peace Oasis—students engage in immersive cultural and environmental learning. Complemented by hiking and scouting programs, these experiences deepen their connection to nature, strengthen social responsibility, and cultivate respect for local traditions. By promoting environmental stewardship and cultural awareness, these initiatives reinforce both the social and environmental dimensions of sustainability, shaping students into conscientious global citizens.

Beyond experiential learning, the DSA champions youth leadership and global citizenship through platforms like the Model United Nations (MUN) Conference and the Youth Speak Forum, where students engage in critical dialogue and develop solutions for a better future. Cultural preservation is further enriched through events such as Arabic Language Day and hands-on workshops like Creams and Perfumes, which celebrate heritage while fostering creativity and intergenerational knowledge exchange.

Social responsibility lies at the heart of the DSA's mission, as seen in initiatives like the Breast Cancer Awareness Campaign, Iftar for orphans, and Clubs Iftar, which strengthen community ties and promote collective well-being. Additionally, educational empowerment programs, including English language teaching and Student Parliament workshops, equip students with essential skills for civic engagement and leadership.

Together, these diverse initiatives cultivate a culture of inclusivity, active citizenship, and sustainable development, ensuring that students emerge as engaged, empathetic, and empowered leaders ready to contribute meaningfully to society.

8. CARBON FOOTPRINT

8.1. METHODOLOGY

Data was gathered from all relevant departments at the university. Data included electrical consumption, energy usage, university fleet usage, contracted transportation fleet in addition to vegetation. A survey was carried out to estimate the number and types of vehicles used for personal transportation. Emission Factor obtained from https://www.myclimate.org/ and official government figures.

8.2. CARBON FOOTPRINT FORM ENERGY USE, FUEL AND TRANSPORTATION CALCULATIONS

$$CO_2 \text{ (electricity)}$$

$$= \frac{electricity\ usage\ per\ year\ (kWh)}{1000} \times 0{,}537$$

$$= \frac{1{,}199{,}312\ kWh}{1000} \times 0{,}537$$

$$= 644 \text{ metric tons}$$

Annual Electricity Consumption	4,468,312 kWh
Non- Renewable Electricity Consumption	1,199,312 kWh
Electricity CO2 Emissions Factor	0.537
Electricity CO2 Emissions (t)	644.030
Fuel Bus Service	153000 liters
Fuel GJU Fleet	16643 liters
Fuel CO2 Emissions Factor	2.35
Fuel CO2 Emissions (t)	398.66
Electric Cars (personal) CO2 Emissions (t)	400
Conventional Cars (Personal) CO2 Emissions (t)	3200
Hybrid Cars (Personal) CO2 Emissions (t)	1400
Fuel (LPG)	85287.5 kgs (150951.34 liters)
Fuel (LPG) CO2 Emissions Factor	1.59
Fuel CO2 (LPG) Emissions (t)	240

8.3. CARBON SINK

In this study, the carbon sink aspect is also considered. GJU is well vegetated, and its campus is cultivated with various types of trees that serve as a carbon sink; its carbon sink was based on actual surveyed vegetation data. The method for calculating carbon sequestration by trees in urban and suburban settings was developed by the US Department of Energy and was used in estimating the amount of carbon sequestration. This required a detailed survey of plants, plant types and age of all vegetation on the campus. Information on the amounts and types of vegetation on the campus was obtained from the archive of JUST Agricultural Services Unit.

Due to rounding, performing the calculations given in the equations below may not return the exact results shown.

(0.11 [percent of coniferous trees in sampled urban settings] × 23.2 lbs C/coniferous tree) + (0.89 [percent of deciduous trees in sampled urban settings] × 38.0 lbs C/deciduous tree) = 36.4 lbs C/tree

36.4 lbs C/tree × (44 units CO2/12 units C) × 1 metric ton/2,204.6 lbs = 0.060 metric ton CO2 per urban tree planted

As the university has a total of 5430 trees, that results in a CO2 sink of 325 t

8.4. CARBON FOOTPRINT PER FTE

Country	Jordan
Number of FTE	2696
Days worked per year	280
Electricity CO2 Emissions (t)	644.03
Electric Cars (personal) CO2 Emissions (t)	400
Conventional Cars (Personal) CO2 Emissions (t)	3200
Hybrid Cars (Personal) CO2 Emissions (t)	1400
Fuel CO2 Emissions (t)	398.66
Fuel CO2 (LPG) Emissions (t)	240
Carbon Sink	325
Total CO2 Emissions 2023 (t)	5957.69
Total CO2 Emissions per FTE (t)	**2.21**

Thank You

Created by:
Dr. Osama Saadeh
Eng. Iman Al Qudah

Designed by:
Arch. Tala Mukheimer

GJU
الجامعة الألمانية الأردنية
German Jordanian University