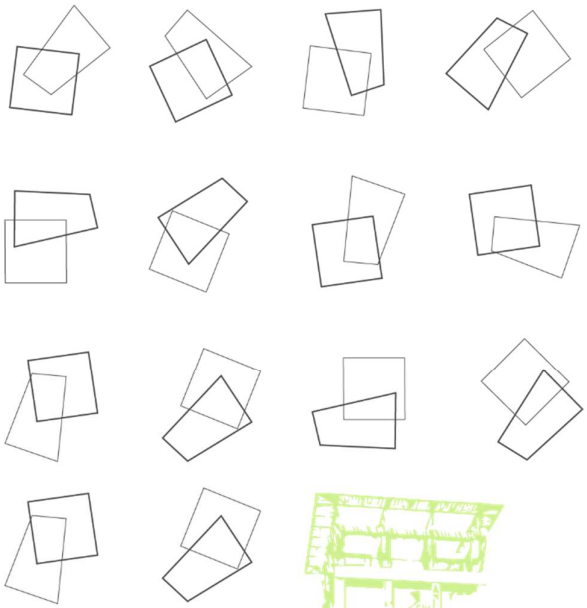

Sustainability Report

2022-2023

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 2022-2023 academic year. As the first 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.

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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 in Jabal Amman and houses the School of Architecture and Built Environment and the Graduate school.

Figure 2: Mushaqar Campus.

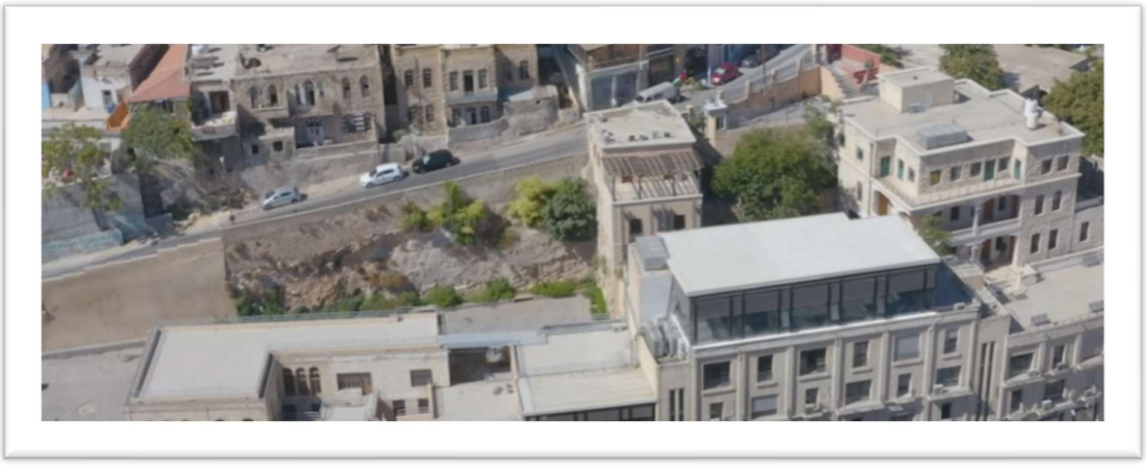

Figure 3: Jabal Amman Campus.

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, library, sports hall, nursery, health clinic, parking garages, and green spaces. Total area in the main campus is 200,000 m² while the total area in Jabal Amman (second campus) is 3729 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 m² Usage: adminstrative building.	Area: 1137 m² Usage: academci building.

Building C	Bulding D
	
Area: 3266 m² Usage: academci building.	Area: 1370 m² Usage: adminstrative building.

Building G	Bulding H
	
Area: 1520 m² Usage adminstrative building.	Area: 1020 m² Usage: academci building.

Building M	Daret Othman (Jabal Amman campus)
	
Area: 2246 m² Usage: academci building.	Usage: academci building.
Health care center	Engineering labs
	
Area: 269 m² Usage: Health care center.	Area: 430 m² Usage: Engineering labs.
Building F	Sports hall
	
Area: 1346 m² Usage adminstrative building.	Area: 3185 m² Usage: Sports hall.

Building E	Building L
	
Area: 1385 m² Usage: adminstrative building.	Area: 1651 m² Usage: Libraary.

Bank Building	Nursery
	
Area: 460 m² Bank Building.	Area: 267 m² Nursery.

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

Building Name	Land Usage (m2)	Total Built Area (m2)
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 dep	170	170
Maintenance Dep	150	150

Table 1. Building Area and Land Usage

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 shows 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	41	**25**
Open Space	86	**43**
Built Area	41	**20.5**
Roads and Pathways	21	**10.5**
Total Area	200	**100**

Table 3. Type and Number of Plants

Type of Plant	Number of Plants	Percentage (%)
Forest Trees	4812	**89.5**
Olive Trees	9	**1.6**
Ornamental plants and trees	559	**10.4**
Total Plants	5373	**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 following:

1) The university has 378 support staff, which work 40 hours a week, for 49 weeks a year. This is considered as the Equivalent Full Time Employ (FTE).

$$\text{Staff FTE} = 378$$

2) The university has 300 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 is 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:

$$\text{Faculty FTE} = 300 \times (32/49) \times (22/40) = 107.76$$

3) 164 faculty taught during the 2022 summer semester. The summer semesters 9 weeks including examination, with average enrollment of 4.5 credit hours. Contact per week is assumed 15 hours/week.

$$\text{Summer Faculty FTE} = 164 \times (9/49) \times (15/40) = 11.3$$

4) The university has 3496 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.

Student FTE = 3496× (32/49) × (30/40)= 1712.33

5) About 60% (2505) of the students enroll for the summer semester. The summer semesters 9 weeks including examination, with average enrollment of 7 credit hours. Contact per week is assumed 21 hours/week.

Summer Student FTE= 2505× (9/49) × (21/40)=241.6

Then the university's FTE = 2451

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 2022 is summarized in the table below. No diesel was used during 2022.

Table 4. LPG Consumption

Date	Amount (kg)	Amount (litter)
03/01/2022	6000.4	10620.18
06/01/2022	5499	9732.743
15/01/2022	9559.2	16918.94
22/01/2022	6842.2	12110.09
26/01/2022	4002.3	7083.717
01/02/2022	5999.1	10617.88
06/02/2022	7999.1	14157.7
13/02/2022	7998.4	14156.46
23/02/2022	6285.1	11124.07
01/03/2022	7502.3	13278.41
12/03/2022	7999.9	14159.12
Total	75687	133959.3

2.2. ENERGY EFFICIENCY MEASURES

GJU intends to increase Energy Efficient by using more energy saving appliances. All new purchases and installation 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 largest buildings on campus, area that is covered by LED lighting accounts for 20% of the campus-built area. Older buildings are being retrofitted as well.

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 CO_2 through PV generations and smart campus initiative. This includes.

- Energy Efficiency Program
- Program to change 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 3,369,940 kilowatt-hours during the 5th year of operation (Nov 2021- Oct 2022), covering 74% of the campus's electrical energy needs. Detailed generation per month for 5 years of operation, starting in November 2017 is shown in the table below.

Table 5. 5 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".

Figure 11: PV System car park.

Figure 12: PV system rooftop installation.

Figure 13:PV carpark.

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 back 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.

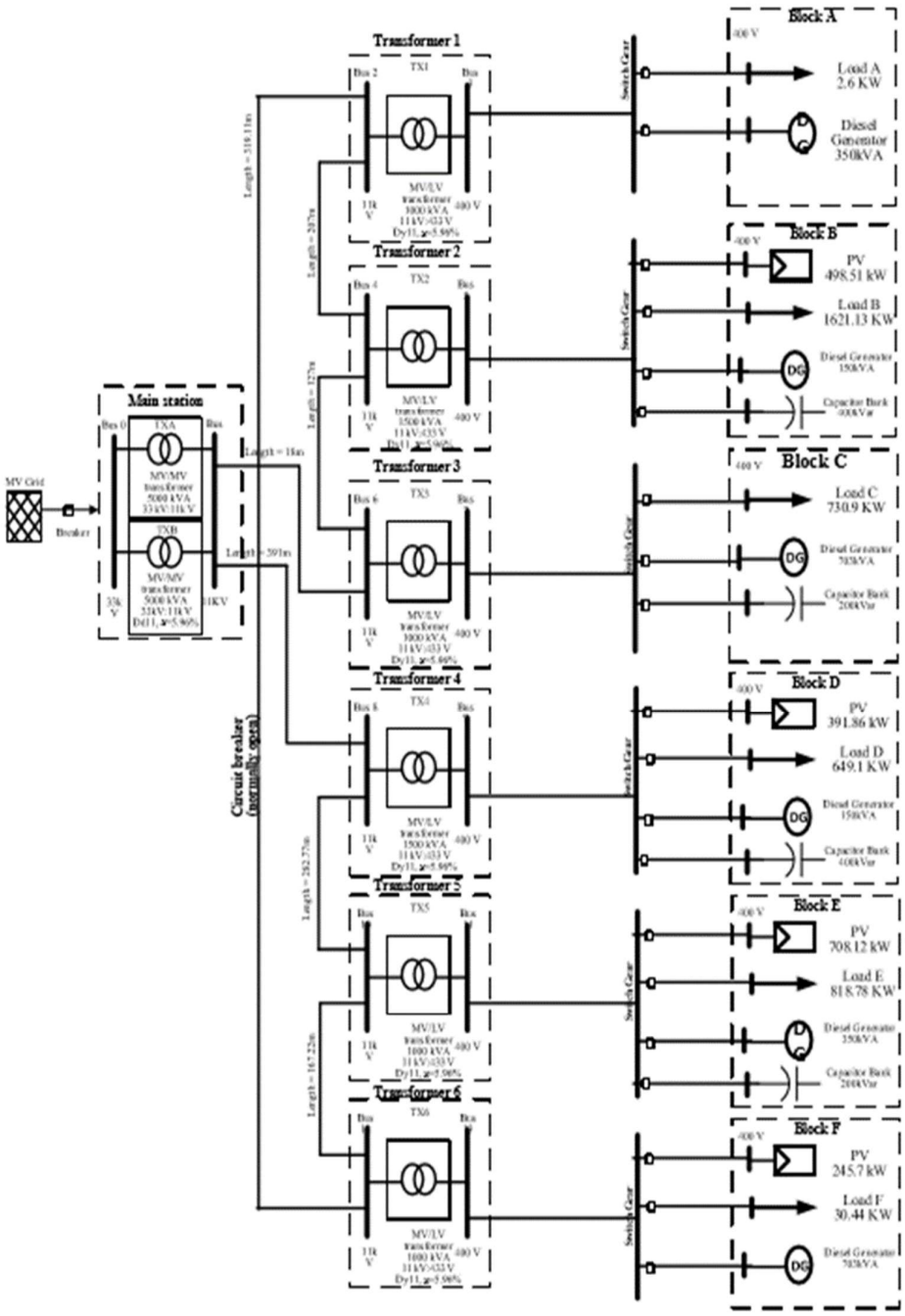

Figure 15: GJU Electrical one line diagram

The Table below details monthly Energy Bills.

Table 6. Monthly Electric Bills

Electric Bill Main Campus								
Meter Number	Month	Period	Imported Energy	Energy Exported	Billed Energy	Previous Balance	Balance	(JOD) Bill
20168000167	1	22/12/2021-21/1/2022	54780	6770	0	106000	57990	75.53
	2	22/1-21/2/2022	39500	20340	0	57990	38830	60.25
	3	22/2-21/3/2022	33520	22050	0	38830	27360	54.27
	4	22/3-21/4/2022	26610	62070	0	27360	62820	47.36
	5	22/4-21/5/2022	23270	61450	0	62820	101000	44.02
	6	22/5-21/6/2022	63070	26050	0	101000	63980	83.82
	7	22/6-21/7/2022	48060	38810	0	63980	54730	68.81
	8	22/7-21/8/2022	91820	25200	11890	54730	0	3027.41
	9	22/8-21/9/2022	105950	14190	91760	0	0	23488.26
	10	22/9/-21/10/2022	76350	13260	63090	0	0	16119.14
	11	22/10-21/11/2022	32740	28930	3810	0	0	899.85
	12	22/11-23/12/2022	40090	23910	16180	0	0	4073.92
Meter Number	Month	Period	Imported Energy	Energy Exported	Billed Energy	Previous Balance	Balance	in JOD Bill
20168000168	1	22/12/2021-21/1/2022	169030	11090	103170	54770	0	26472.3
	2	22/1-21/2/2022	178430	21070	157360	0	0	40354.34
	3	22/2-21/3/2022	129820	24700	105120	0	0	26932.29
	4	22/3-21/4/2022	108510	97350	11160	0	0	2857.22
	5	22/4-21/5/2022	74730	94860	0	0	20130	95.48
	6	22/5-21/6/2022	95170	61690	13350	20130	0	3404.52

	7	22/6-21/7/2022	89300	77580	11720	0	0	2981.37
	8	22/7-21/8/2022	160330	27280	133050	0	0	34112.88
	9	22/8-21/9/2022	159940	16670	143270	0	0	36728.81
	10	22/9-21/10/2022	138690	15300	123390	0	0	31618.28
	11	22/10-21/11/2023	123020	37530	85490	0	0	21900.21
	12	22/11-23/12/2022	139670	30390	109280	0	0	28007.1

Bill Jabal Amman Campus Electric Bill

Meter Number	Month	Period	Imported Energy	Energy Exported	Billed Energy	Previous Balance	Balance	in JOD Bill
20126000498 changed to 20216006074	1	9/1-8/2/2022	1421415	1444893	23478			6026.152
	2	9/2-8/3/2022	1444893	1466098	21205			5430.626
	3	9/3-8/4/2022	1466098	1498480	32382			8359
	4	9/4-9/5/2022	1498480	1512495	14015			3546.846
	5	9/5-8/6/2022	1512495	1532740	20245			5179.106
	6	22/6-21/7/2022	1532740	1561426	28686			7390.648
	7	9/7-8/8/2022	1561426	1592202	30776			7938.228
	8	9/8-8/9/2022	1592202	1619321	27119			6980.094
	9	9/9-8/10/2022	2	10614 + old meter balance	20293			5191.682
	10	9/10-8/11/2022	10614	29481	18867			4818.07
	11	9/11-10/12/2022	29481	54769	25288			6500
	12	11/12-12/1/2023	54769	93529	38760			10030.036

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,
- presence sensors in the bathrooms and hallways.
- video surveillance/CCTV,
- indoor environment (thermal comfort and air quality),
- and lighting (Illumination, low power lighting)
- energy, water (sanitation).

The total built area on site is 20543 meters, while the total area is 53710 meters.

As most GJU buildings are considerable new, all construction considered sustainable measure during construction. This includes Double glaze 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.

Building (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 contains also a 60kVA UPS system. On the other hand, building of (B, C, H, I) contains a 10kVA UPS system.

Figure 16: Building (C) BEMS.

3. SOLID WASTE

3.1. UNIVERSITY WASTE MANAGEMENT

GJU is contracted with a private company to remove waste. The current schedule is three trips a week. Weekly waste produced is approximately 28 tons. Waste is taken to the Al Ghabawi Landfill.

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 letters and promoting soft copy distribution.
4. Emphasizing double-sided printing to conserve paper.
5. Ensuring that all marketing giveaways are eco-friendly.
6. Creating awareness about sustainability through the created logo, email signatures, and creating the website.

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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 Truck. The source of is chosen based on availability.

The well is 450 meters deep, 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, and which supplies the water network to the buildings and other demands.

Figure 20: Water Tank

The total amount of water used from the water authority is shown in the table below:

Table 7. Water Bills

Billig Period	Amount m^3
19/7/2022-5/9/2022	6498
23/10/2022-5/12/2022	6346
21/1/2023-12/3/2023	7450
25/4/2023-7/6/2023	9125

4.2. RAINWATER HARVESTING

The university takes advantage of four areas to harvest rainwater. As shown in the figure. Areas1, 2 and 3 are soil areas, while area 4 is for all buildings.

Figure 21: Water harvesting areas.The total Soil areas are 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 may be stored in the harvesting tank.

No submetering is currently installed to meter treated water and rainwater harvested.

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 m³, while the output grey tank can hold up to 400 m³. 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.

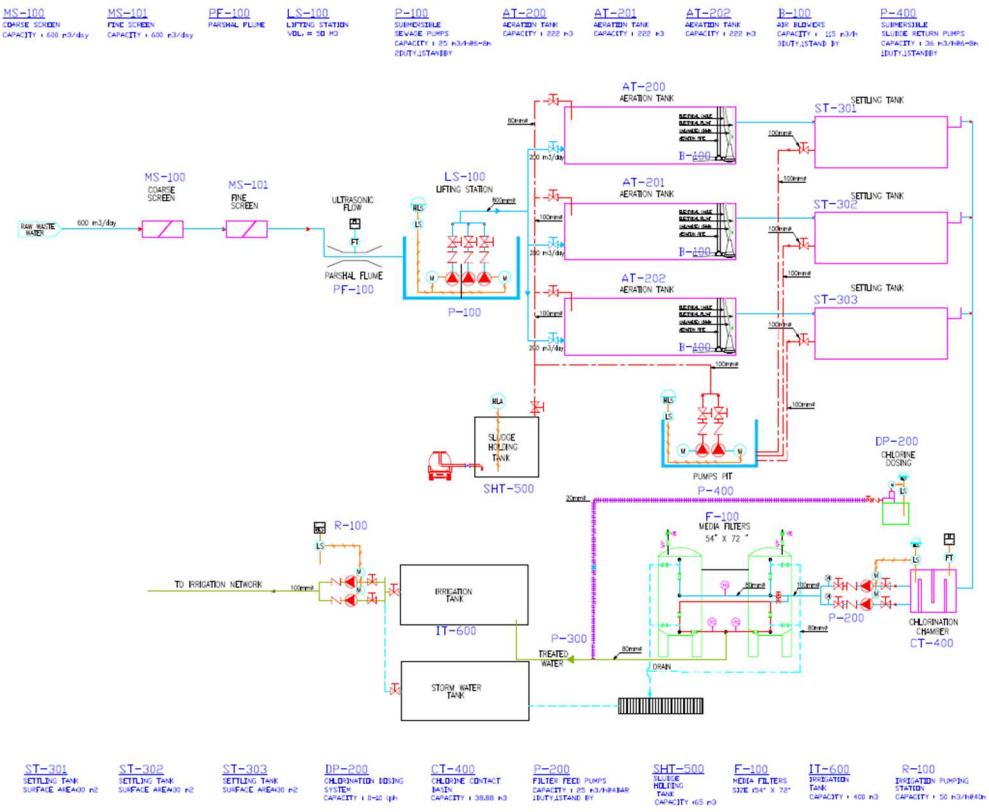

Figure 22: Wastewater treatment plant schematic.

In this system, gray water and harvested water are kept in segregated tanks. However, during heavy rainstorms, rainwater may enter the sewage system causing stress on the treatment plant, requiring removal with sewage tanks. The amount of sewage removed in 2022 was 8200 m³, which was contracted through tendering process. This is composed of 410 trips using a 20m³ sewage tanks.

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**
Total	884	480	713	768	**580**

The university has an annual contract 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

مسار الخطوط وطول المسار								
خط الاستشارات (32كم)	الجامعة الاردنية (الاستشارات)	مستشفى الاسراء	مقابل مستشفى الجامعة	دوار الواحة (حبيبة)	دوار الكيلو(جسر المشاة)	السابع (دوار السيفوي)	كازية جولف (السابع)	
خط عريفة مول (34كم)	عريفة مول	بعد دوار المشاغل	المدينة الرياضية(بنك الاسكان)	الداخلية(مجم ع بنك الاسكان)	الدوار الرابع	دوار عبدون	تاج مول	
خط السلط (50كم)	مثلث جامعة البلقاء	جسر المغاريب	مثلث المدينة الرياضية	مجمع المناصير	جسر الدبابنة	اشارة عين الباشا	دوار ام النعاج	دوار الكمالية
حط التطبيقية (36كم)	دوار التطبيقية	دوار الاميرة بسمة	صويلح(محم ص الشعب)	الدفاع المدني	دوار خلدا	حدائق الحسين (جسر المشاة)	دوار الشعب	البنك التجاري (جسر المشاة)
خط مرج الحمام (18كم)	مرج الحمام(دوار البرديني)	مرج الحمام(اشارة الكنيسة)	كازية السلام					

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

Table 10. Number of Passengers Transported

Number of outgoing passengers	Number of incoming passengers	Number of Buses	Date	Day
745	762	18	10/12/2023	Sunday
737	758	18	11/12/2023	Monday
750	769	18	12/12/2023	Tuesday
712	720	18	13/12/2023	Wednesday
459	487	13	14/12/2023	Thursday

To better understand daily commute distances, the university conducted a survey to 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. Commuter Destinations

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

GJU's Vehicle

Usage	fuel in year	km in year	Fuel Type	Condition	Year	Model	*Manufactures*
Daily Use	1582.113	14211	Gasoli 90 ne	CC1800	2008	C200	*Mercedes*
Delegates	242.455	1557	Gasoli 91 ne	CC3199	2008	VEANO	*Mercedes*
Daily Use	488.952	5590	Gasoli 90 ne	CC1800	2006	Vectra	*Opel*
Daily Use	1632.27	9495	Disel	CC4164	2006	costar	*Toyota*
Daily Use	2138.603	12206	Disel	CC4164	2006	costar	*Toyota*
Daily Use	1569.175	16174	Disel	CC2494	2006	his	*Toyota*
Daily Use	2257.752	12884	Disel	CC4164	2006	costar	*Toyota*
Daily Use	2177.864	21023	Disel	CC2500	2009	L200	*Mitsubishi*
Daily Use	698.116	3269	Disel	CC2800	2012		*IVECO*
Health Clinic	64.019	316	Gasoli 90 ne	CC2700	2014	HIS	*Toyota*
Daily Use	1184.167	11315	Disel	CC2494	2015		*Toyota*
Daily Use	1350.177	12169	Disel	CC2500	2015	L200	*Mitsubishi*
IPO	0	0	Disel	CC2200	2015	Ranger	*Ford*
Daily Use	1236.548	10460	Disel	CC2500	2013	Navara	*Nisan*
Maintenance	199.28	53.6	Disel	.....	2011	Forklift	*EP-t20*
Daily Use	704.805	12934	Gasoli 95 ne	CC1800	2019	Corola	*Toyota*
President	4203.445	26665	Gasoli 95 ne	CC1991	2020	E200	*Mercedes*

5.3. PARKING AREAS

Total parking area = 34500m² (main campus) + 2165 m² (Jabal Amman) = 36665 m²

Figure 23: Student parking area.

Figure 24: Faculty parking area.

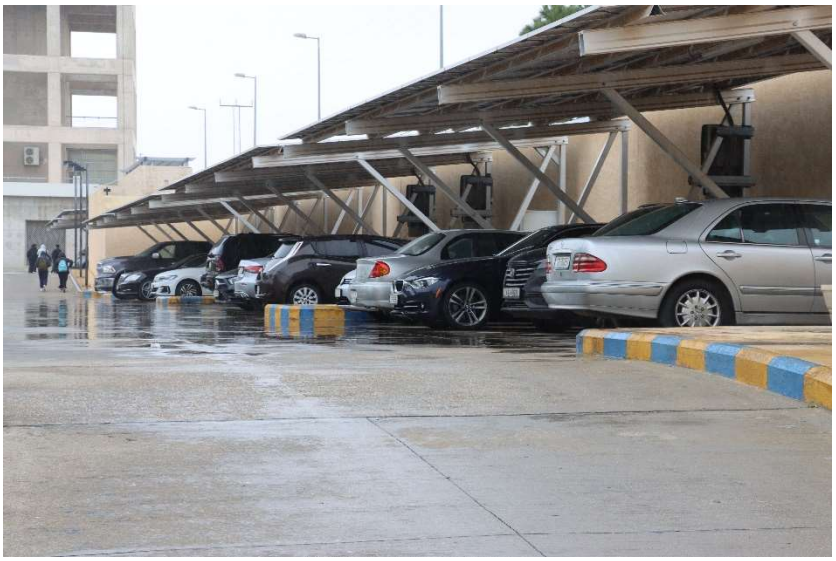

Figure 25: Parking area.

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 started plans to purchase Electric Vehicles, which will be charged from the PV system. In addition, offering EV charging services is also being investigated.

6. EDUCATION AND RESEARCH

6.1. COURSES AND PROGRAMS RELATED TO SUSTAINABILITY

Most degree programs at the university offer course that are related to sustainability, but the following are degree that are directly related to sustainability.

- Social work (well-being and quality of life)
- Energy Engineering
- Civil and Environmental Engineering.
- Hydrogen Technology Engineering
- Master's degrees of Sustainable Buildings
- Master's degree of Environmental and Renewable Energy Engineering
- Master degree of Humanitarian Water, Sanitation and Hygiene (WaSH)

A complete list of all courses offered related to Sustainability can be found at the GJU GO Green Website.

https://www.gju.edu.jo/content/sustainability-teaching-17058

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. The DSR is committed to enabling GJU 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) is to support the growth and excellence of graduate studies, with a goal to become among the best internationally reputable institutes for graduate studies.

The main mission of the International Projects Office (IPO)is to provide administrative support for faculty at GJU, promoting the university abroad, and successfully execute the projects that are funded by international programs and agencies.

Through these three entities, the university produces a wealth of research output **average per annum over the last 3 years of 355** publications, training the next generation of researchers in addition to managing many internationally funded research projects. The Total research fund in 2022 exceeded a million USD in external funding, in addition to 925 thousand of GJU funding.

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 promoting work towards sustainability at GJU, by involving students in real life exercises. Our main objective is to spread awareness towards Sustainability within the GJU community. Our Vision is fill in sustainability in education and future careers at the German Jordanian university. Our Mission is promoting learning and working towards sustainability at the German Jordanian University along with conducting sustainability in all aspects and specialties to provide the knowledge and skills needed.

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

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 used to estimate the number and types of vehicles used for personal transportation. Emission Factor obtained from https://www.myclimate.org/ .

8.2. CARBON FOOTPRINT FORM ENERGY USE

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

$$= \frac{electricity\ usage\ per\ year\ (kWh)}{1000} \times 0{,}703$$

$$= \frac{1{,}484{,}204\ kWh}{1000} \times 0{,}703$$

$$= 1043.395 \text{ metric tons}$$

Annual Electricity Consumption	3,369,940 kWh
Non- Renewable Electricity Consumption	1,484,204 kWh
Electricity CO2 Emissions Factor	0.703
Electricity CO2 Emissions (kg)	1043395

8.3. CABON FOOTPRINT FROM TRANSPORTATION

Fuel (Diesel Bus Service)	153000 liters
Fuel (Diesel) CO2 Emissions Factor	2.35
Fuel CO2 (Diesel BUS Service) Emissions (t)	359.550
Electric Cares (personal) CO2 Emissions (t)	400
Conventiaonal Cars (Personal) CO2 Emissions (t)	3200
Hypbrid Cars (Personal) CO2 Emissions (t)	1400

8.4. CARBON FOOTPRINT FORM FUEL USE

Fuel (Diesel GJU)	21852.975 liters
Fuel (LPG)	133959.3 liters
Fuel (Diesel) CO_2 Emissions Factor	2.35
Fuel (LPG) CO_2 Emissions Factor	1.59
Fuel CO_2 (Diesel GJU) Emissions (t)	51.354
Fuel CO_2 (LPG) Emissions (t)	212.995

8.5. 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 CO_2/12 units C) × 1 metric ton/2,204.6 lbs = 0.060 metric ton CO_2 per urban tree planted

Aa the university has a total of 5373 trees, that results in a CO_2 sink of 322 t

8.6. CARBON FOOTPRINT PER FTE

Country	Jordan
Number of FTE	2451
Days worked per year	280
Electricity CO_2 Emissions (t)	1043.395
Electric Cares (personal) CO_2 Emissions (t)	400
Conventiaonal Cars (Personal) CO_2 Emissions (t)	3200
Hypbrid Cars (Personal) CO_2 Emissions (t)	1400
Fuel CO_2 (Diesel GJU) Emissions (t)	51.354
Fuel CO_2 (Diesel BUS Service) Emissions (t)	359.550
Fuel CO_2 (LPG) Emissions (t)	212.995
Carbon SInk	322
Total CO_2 Emissions 2022 (t)	6345.294
Total CO_2 Emissions per FTE (t)	2.588

9. TARGETS AND GOALS AND CHALLENGES

9.1. GOALS AND TARGETS

- Become Carbon Neutral by 2035.
- Reduce electrical energy consumption.
- Increase Renewable energy generation.
- Reduce LPG consumption.
- Reduce Solid waste generated.
- Reduce Water consumption.
- Reduce Water use for irrigation.
- Increase Treated wastewater use for irrigation was.
- Increase Campus vegetation.
- Increase water harvesting.
- Reduce fuel consumption.
- Reduce the number of single occupancy car journeys.
- Increase PV supplied electric vehicles and transportation systems.
- Increase research output.
- Increase outreach programs.
- Increase Funded Research projects.

9.2. CHALLENGES

- Limited renewable energy integration due to regulations.
- No energy submetering.
- Cost of upgrading existing heating and cooling systems to more efficient systems
- No current waste sorting mechanism
- No water submetering.
- No water treatment measurements
- No water harvesting measurements.
- Commuter school with little influence on transportation means.
- Limited number of responses to behavioral surveys.

Thank You

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