

Energy wastage

Revised June 2022

Mutah University

Maintenance and sustainable unit

Mutah University is making many changes and procedures that ensure the rationalization of energy consumption within the university campus through all its operating units. The university has adopted many monitoring stations through a group of executive arms to identify high energy wastage. The table below shows the diesel oil used on the University campus from 2019 to 2022. The developed plans to transform toward the Green University reduced the amount of used oil.

Toward
“Green University-Surplus Energy University”



Table 1: Energy consumption in Mutah University's Faculty and Building.

<i>Buildings Name</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>2022</i>	<i>Reduction (%)</i>
Presidency Buildings	2788	1501	1352	1234	10
Engineering Faculty	55140	34286	23456	18965	24
Science Faculty	15362	8753	7635	6543	17
Nursing Faculty	13139	7013	5432	4329	25
Art Faculty	9830	5023	4556	4789	-5
Business Faculty	12860	5001	3873	2387	62
Law Faculty	8005	4532	4563	4651	-2
Social Faculty	9678	4253	3987	2564	55
Sharia Faculty	7116	3115	2563	1598	60
Educational Science Faculty	8527	4329	1897	2012	-6
Sports Science Faculty	102436	51265	35876	31982	12
Medicine Faculty	33131	20015	17865	14289	25
Pharmacy Faculty	13925	7621	7234	7439	-3
Information Technology Faculty	12053	7459	6341	5498	15
Agriculture Faculty	35132	20148	16742	15439	8
Teaching Halls Complex	100524	69856	55642	49876	12
service buildings	53203	35687	27890	25678	9
Total	492849	289857	226904	196543	15
CO ₂	1345	791	608.1	641	-5
Energy Content (GJ)	18925	11130	8768	7854	12

Mutah University takes some action to reduce the use of traditional energy, such as:

- Mutah University secures all of its electrical power needs by using photovoltaic cells.
- Mutah University uses electric vehicles instead of traditional ones and is forbidden to use conventional vehicles inside the university campus.
- Mutah University has replaced the entire traditional lighting units with energy-saving lighting units.
- Mutah University performs periodic maintenance using a settings control program to control fuel amounts.



Table 2: Energy consumption analysis of each University's Building:

	2021			2022			Reduction 2022 (%)
	Diesel amount (L)	CO ₂ (Ton)	Energy content (GJ)	Diesel amount (L)	CO ₂ (Ton)	Energy content (GJ)	
Presidency Buildings	1352	3.6	52	1297	3.5	52	4
Engineering Faculty	23456	62.9	906	19876	53.3	906	18
Science Faculty	7635	20.5	295	7342	19.7	295	4
Nursing Faculty	5432	14.6	210	4987	13.4	210	9
Art Faculty	4556	12.2	176	3987	10.7	176	14
Business Faculty	3873	10.4	150	3412	9.1	150	14
Law Faculty	4563	12.2	176	3764	10.1	176	21
Social Faculty	3987	10.7	154	2456	6.6	154	62
Sharia Faculty	2563	6.9	99	2789	7.5	99	-8
Educational Science Faculty	2897	7.8	112	3456	9.3	112	-16
Sports Science Faculty	35876	96.1	1386	25671	68.8	1386	40
Medicine Faculty	17865	47.9	690	13459	36.1	690	33
Pharmacy Faculty	7234	19.4	280	5671	15.2	280	28
Information Technology Faculty	6341	17.0	245	6231	16.7	245	2
Agriculture Faculty	16742	44.9	647	16543	44.3	647	1
Teaching Halls Complex	55642	149.1	2150	53876	144.4	2150	3
service buildings	27890	74.7	1078	27890	74.7	1078	0



Mutah University's energy vision is focused on adopting renewable energy sources and implementing energy-efficient measures to achieve net zero energy consumption and minimize carbon emissions on its campus. This strategy unfolds in stages, with the overarching mission being establishing effective energy management, exploring energy conservation opportunities, and utilizing available renewable energy resources with a strong emphasis on electrical energy quality and efficiency. Several key steps have already been taken toward realizing this vision.

The project's central idea involves a comprehensive assessment of power and energy quality profiles across the Mutah University campus. This includes examining harmonic distortion, power interruptions, voltage fluctuations, surges, and other power quality concerns. An essential element of this initiative is redistributing electrical energy to specific areas within the campus where it is needed most. This redistribution, guided by an intelligent control system, delivers a cost-effective, reliable, efficient, and sustainable electricity supply without relying on external energy sources, such as the electrical grid.

Leveraging cutting-edge technology in sensing, communication, control, and visualization platforms, this concept can be implemented as a stand-alone system on a small scale to assess the energy savings it can offer. Additionally, the university has installed thermal solar systems for water heating at the swimming pool and student housing building, reducing the reliance on electrical energy. These systems efficiently heat water, especially on hot days, contributing to reducing electricity consumption.

Mutah University has embarked on a transformative journey, transitioning from a university that consumes energy to an energy-producing and environmentally conscious institution. This transformation into an energy-efficient, high-performance campus began in 2018 and continues to evolve.

<https://www.mutah.edu.jo/en/pfc/Pages/EnergyConservationProgram.aspx>