Times Higher Education Sustainability Impact Ratings

University: Al-Mustaqbal University

Country: Iraq

SDG 7.2: University measures towards affordable and clean energy

7.2.4 Does your university as a body have an energy efficiency plan in place to reduce overall energy consumption?

Response: Yes

The major target of the plan can be summarized in the following points.

1. Reduction of electrical bills.
2. Reducing the pollution to our environment.
3. Achieving a reduction in the energy consumption on the conventional sources of energy by 85% in 2030.

A- Campus energy emissions of the Al-Mustaqbal University originate from direct energy consumption of electricity used for cooling system and lighting. To determine the carbon footprint associated with the use of electricity on campus, the amount of electricity in kWh was multiplied by the CO2 emissions factor obtained from DEFRA method (Department for Environment Food and Rural Affairs, UK) and GHG Protocol Website.

The annual electricity consumption of Al-Mustaqbal Campus for the year 2019 and 2025 are 331120 kWh/year and 468612 kWh/year respectively and GHG emissions in CO2-eq from electricity consumed on Al-Mustaqbal campus range from about 278.14 tons CO2-eq in 2019 to about 467.980tons CO2-eq in 2024 as shown in Table 1.

Table 1: Electricity consumption and GHG emissions for the years 2019 and 2025

	2019	**2023**	**2025**
Electricity(kWh/year)	331120	314422	467432
GHG (kg CO2-eq)	278.14	264.81	510.25

The transportation emissions cover emissions from commuting to and from Campus of Al-Mustaqbal University. Emissions from staff and students vehicles, shuttle between campus and Babylon city center and official travels are considered into the calculations.

Total carbon footprint of the Al-Mustaqbal University Campus can be seen in Table 2. It shows that the activities in year 2024 release about 487.8 tons of CO2-eq emissions, with about % 76 of those emissions related with the consumption of electricity for cooling. Commuting of students to campus is the second most carbon source activity.

Table 2: Total GHG emissions in kg CO_2-eq

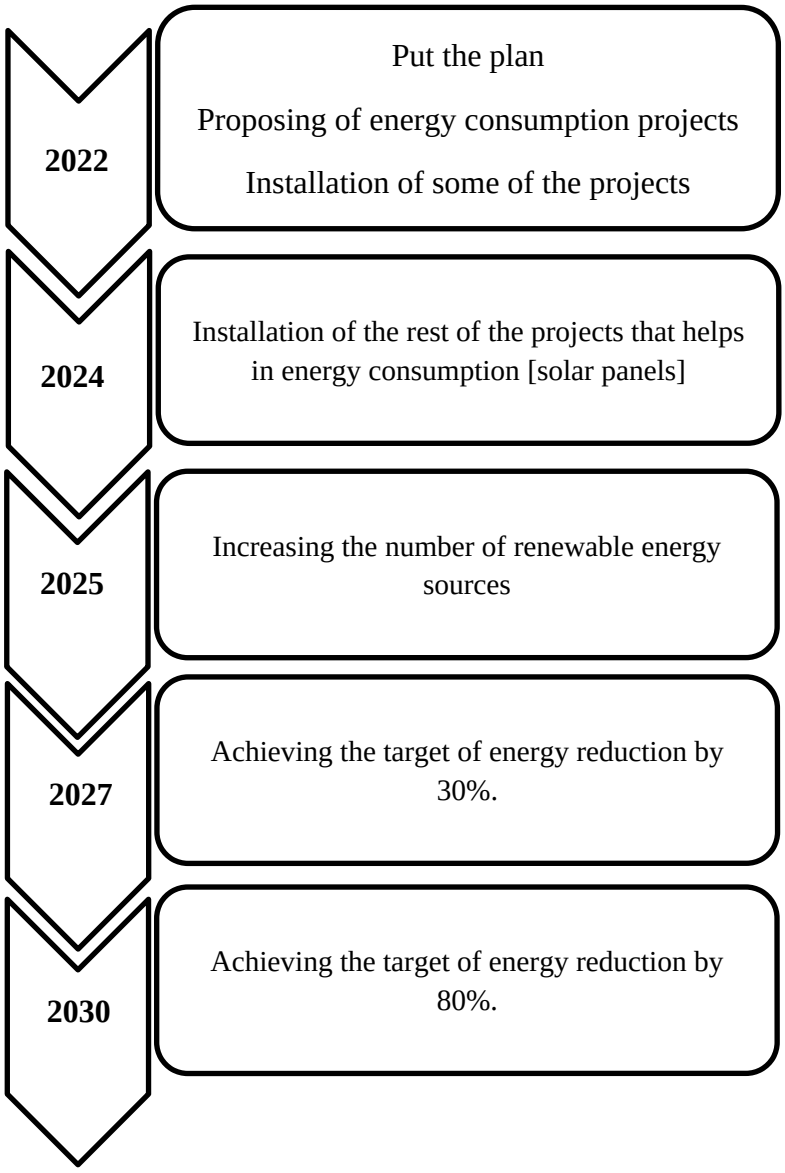
	2019	**2024**	**2025**
Electricity	278.14	367.8	391.45
Transport	111.848	120	118,8
GHG (kg CO2-eq)	390.03	487.8	510.25

However, as pioneers of research and science, it is vital for higher education institutions to lead the shift towards sustainable development. Sighting this, Al-Mustaqbal University is leading the Iraqi higher education institutions towards sustainability.

The carbon footprint reduction policy stands on six fundamentals that require full commitment from staff and students to be fully achieved by 2030.

B- Plan Milestone

The milestone would be prepared to be within three years starting from 1-8-2022 – 1-10-2030.



Proposed Installation of Solar Powered Street Lights

		August 2023 – July 2024											
	Activity	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	Sponsor and Fundings												
4	Preparation of material												
5	Starting installation solar street lights												
6	Evolution of the findings												
7	Maintenance												

Proposed Installation of Solar Powered Electricity to Buildings

1- Medical Building

		2024											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

2- Administration Building

		2024											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

3- Engineering Building

		2024											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

4- Pharmacy Building

		2024											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

5- Dental Building

		2025											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

6- Student club

		2025											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

7- Nursing building

		2025											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

8- Sport Building

		2026											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

9- Human Building

		2026											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

10- Security Building

		2026											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

11- Document Building

		2027											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

12- Energy Research Center Building

		2027											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

13- Al Hussan Mosque Building

		2027											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

14- Art and Humanities Building

		2027											
	Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Entry the proposal of project to college counsel												
2	Planning and design												
3	2nd Floor												
4	Preparation of material												
5	Starting installation solar cells												
6	Grand Floor												
7	The rest of the buildings												

C- Methodology to reduce the energy consumption

Several projects and sources are already built on the campus of Al-Mustaqbal University along with some strategies to manage and control these sources to increase energy efficiency. Below are some of the projects related to renewable energy.

1- Solar Heaters on Shopping Book Center:

The university plans to install solar heaters on Shopping Book Center roofs to provide hot water during the cold weather. By attaching solar energy, the university aims to reduce the electricity bills and decrease overall electrical energy consumption, **as illustrated in Figure 1**

2- Innovative Solar Water Heating Projects:

The department of Air Condition and Refrigeration Techniques Engineering has announced several industrial projects intended for improving water heating through solar technologies. These include the use of solar collectors (solar evacuated tube collectors), parabolic solar dish, plane solar collectors) **as shown in Figures 2-4**. Most recently, a solar dish collector has been equipped with a solar tracking system to optimize the efficiency of water heating process.

3- Roof-Mounted Solar Panels:

Plans are running to install roof-mounted solar panels on the main administrative buildings and the main restaurant, **as indicated in Figure 5**. This not only enhances the aesthetic appearance of the buildings but also improves to energy savings.

4- Solar Panels on Medical Buildings:

Solar panels have been installed on the medical buildings roofs as well, as shown in **Figure 6 and Figure 7**. The installation has also created job openings, and research projects and studies related to it, as illustrated in. Additional solar panels have been mounted at the main entrance for lighting as shown in **Figure 8**, and in green areas for mobile charging during social activities, such as Women day, University day, and Book day, **as shown in Figure 9.**

5- Wind Generators:

The university installed two horizontal-axis wind generators for low energy requirements of the electrical energy, such as lighting purposes. This initiative will contribute to push the sustainability and energy generation and provide a good starts for lunching projects in field, as **shown in Figure 10.**

6- Integration of Solar Energy with HVAC Systems:

Given the higher demands of the electrical power required for HVAC devices in the Iraqi climate, our university succeeded to connect the technology of solar energy with HVAC systems. This methodology helps achieving two primary goals: to directly supply the renewable energy for different system operation and for minimizing emissions resulted from using the conventional sources of energy. This integration, on the primary levels, enhanced the overall efficiency of the energy system on the campus besides developing environmental sustainability.

Based on these plans and advancements in using renewable energy sources on the campus, Al-Mustaqbal University is captivating significant stages toward reducing energy consumption and encouraging the use of renewable energy sources. This broad approach chains sustainability goals and enhances the educational milieu, given that faculty and students with a model of modern energy usage. Finally, using renewable resources on the campus provides significant learning opportunities for students and even faculty. Several faculty and student projects have emerged, concentrating on the application and optimization of renewable energy skills. For illustration, students are designing solar panel connections for campus buildings, leading research on energy competence, and rising advanced solutions for attaching wind energy. These hands-on projects raise a deeper thoughtful of sustainable practices and allow students to contribute to a green and sustainable future. Few of the projects and researches by faculty and students can be found below: Research areas about solar and wind energies:

The above mentioned plan had been motivated our researchers to use them to published articles in journals and conferences in the field of renewable energy such as:

1- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85208315221&doi=10.1016%2fj.energy.2024.133594&partnerID=40&md5=72df99a36b432058fecea57ba3938066

2- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85209642043&doi=10.1016%2fj.csite.2024.105514&partnerID=40&md5=4a58088384b376a910c730ecf5eda0d7

3- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85209580294&doi=10.1016%2fj.energy.2024.133850&partnerID=40&md5=deb7c2222ce502c49af42247f55cae07

4- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85206991419&doi=10.1016%2fj.energy.2024.133482&partnerID=40&md5=fe9c2d5e0265b113028a7279d1ad6ad2

5- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85209239149&doi=10.1016%2fj.csite.2024.105492&partnerID=40&md5=44511e82d6147389eda4655d3d32859f

6- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85203865832&doi=10.1016%2fj.energy.2024.133043&partnerID=40&md5=b25caf7a8743f6d1702e6cc0846bdff5
7- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85201380579&doi=10.1016%2fj.energy.2024.132593&partnerID=40&md5=30682e31620ebb08153b73f5ecd71f98
8- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85203024196&doi=10.1016%2fj.psep.2024.08.047&partnerID=40&md5=a94cb72dfa8560af5502dc02ce4cdc3f
7- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85205684162&doi=10.1016%2fj.csite.2024.105210&partnerID=40&md5=4b0f12032781b17737b980883aaa0625
8- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85205006494&doi=10.1016%2fj.est.2024.113871&partnerID=40&md5=537583c845e9271e356f095325b5b932
9- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85201490998&doi=10.1016%2fj.energy.2024.132703&partnerID=40&md5=30e022a1698ded91f0bce2127404a195
10- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85205498067&doi=10.1016%2fj.csite.2024.105228&partnerID=40&md5=e9b4527f7273be6b68aee3635b58d3f4
9- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85199110454&doi=10.1016%2fj.envres.2024.119526&partnerID=40&md5=f8e2c4b5a73192cc7ae80d6b15fb2c18
10- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85205542654&doi=10.1016%2fj.est.2024.113966&partnerID=40&md5=020f44e53a3ddd0fbb0618a029dace73
11- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85207804715&doi=10.1016%2fj.csite.2024.105343&partnerID=40&md5=3c329e1f76a19c329d9769549ce41008
12- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85199271754&doi=10.1016%2fj.psep.2024.07.062&partnerID=40&md5=4b394ffb757c79af3bfa23992ebdddc2

11- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85200816067&doi=10.1016%2fj.psep.2024.07.068&partnerID=40&md5=fba108d478113989c5146533a32a9424
12- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85193900146&doi=10.1016%2fj.desal.2024.117756&partnerID=40&md5=b3e0b6065ff1b24a0127a6571a66affd
13- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85200240954&doi=10.1016%2fj.psep.2024.07.091&partnerID=40&md5=bbacd091a61875602aa8a74d183adea4
14- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85203245427&doi=10.1016%2fj.rineng.2024.102823&partnerID=40&md5=6885ecb0d422129b40f8c1e3228911c4
15- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85201201158&doi=10.1016%2fj.renene.2024.121119&partnerID=40&md5=57d2e1ff1c290927b4c205df28908b2e
16- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85202290341&doi=10.1016%2fj.csite.2024.105028&partnerID=40&md5=cf34b4daf6edd8db18ee04b5da6db2bc
17- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85193904323&doi=10.1016%2fj.csite.2024.104585&partnerID=40&md5=1d6279c45137561d6bf2f5ee03003d15
18- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85194490319&doi=10.1016%2fj.psep.2024.05.110&partnerID=40&md5=64bf3be3384f8b32e3b5874aadfbeafd
19- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85193068082&doi=10.1016%2fj.csite.2024.104538&partnerID=40&md5=4bc1e7e0e7b21325c6423060ba36750a
20- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85194035332&doi=10.1016%2fj.csite.2024.104555&partnerID=40&md5=3bb990a6e230c70e2f8790ab56451d87
21- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85193001750&doi=10.1016%2fj.csite.2024.104485&partnerID=40&md5=59314ec45b1b1f83ec09fdf1b5cd95d1

22- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85192177563&doi=10.1016%2fj.psep.2024.04.116&partnerID=40&md5=55281208a7ade643001e2f98eaee6f80
23- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85193245839&doi=10.1016%2fj.csite.2024.104511&partnerID=40&md5=ec4015e8f63b3dab6223af95b7bca583
24- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85192749248&doi=10.1016%2fj.psep.2024.04.118&partnerID=40&md5=e209a68ace58d0b4b3510a644f52edad
25- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85194151524&doi=10.1016%2fj.csite.2024.104597&partnerID=40&md5=6b8949468837e8abc8888376e6efead0
26- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85192106324&doi=10.1016%2fj.est.2024.111880&partnerID=40&md5=52a1dc9c0cf7b3de528fe8f5a8e4acb2
27- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85193599897&doi=10.1016%2fj.heliyon.2024.e31244&partnerID=40&md5=19ee6c277325b6582e746f89376e51a0
28- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85193205887&doi=10.1063%2f5.0203755&partnerID=40&md5=035419445f4bdc39d75102550d5f06df
29- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85189077725&doi=10.1016%2fj.csite.2024.104298&partnerID=40&md5=5ded569ea90054873c6aa0dbab22a2ff
30- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85186955205&doi=10.1016%2fj.est.2024.111104&partnerID=40&md5=49714b81716302b7bb286cb9dea4e40c
31- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85189368424&doi=10.1016%2fj.csite.2024.104319&partnerID=40&md5=9ba82b8b985034c73266177e6252131a
32- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85189109607&doi=10.1016%2fj.csite.2024.104308&partnerID=40&md5=23cbc1cca1bd74d42056b6350d744d75

33- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85188251658&doi=10.1016%2fj.csite.2024.104238&partnerID=40&md5=49a89b7cd69a699318ab20fb3372bc99

34- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85185840528&doi=10.1016%2fj.csite.2024.104135&partnerID=40&md5=d09c729b0b668bfe092d05d33eac80bc

35- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85188861429&doi=10.1016%2fj.csite.2024.104291&partnerID=40&md5=3d4211d8ff467b4fd081589c064735db

36- https://www.scopus.com/inward/record.uri?eid=2-s2.0-85197848282&doi=10.1016%2fj.csite.2024.104708&partnerID=40&md5=fc3566bd206d8a45b0cf68168a5cf278

For more researches and projects, the respected reader is referred to the main website of Al-Mustaqbal University to explore tens of researches and projects achieved by faculty and students.

Some of key innovative research and projects related to energy efficiency and conservation are presented alongwith website in table below:

Project title	Project link
Solar dish collector: case study in Iraq	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_9242312.pdf
Performance study of water pump working by solar energy	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_91843490.pdf
An Experimental Study into Thermal Performance of Heating System Combined with Solar Heater	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_9229316.pdf
Design and implementation of air speed measuring device (ANEMOMETER)	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_9182636.pdf

Experimental study of a cooling system based on energy recovered from automobile exhaust gases	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_7120485.pdf
Experimental Study of Double Pipe Heat Exchanger	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_7269321.pdf
Design and implementation of wireless controller For air conditioning unit using Raspberry Pi	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_72657103.pdf
Experimental Study the Mechanical Properties of Nano Composite Materials by Using Fiber Glass and Nano Boron carbide/ Epoxy	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_91743723.pdf
Convective Heat Transfer in a Circular Tube with Short-Length Twisted Tape Insert	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_91825440.pdf
Numerical investigation Of Adding A Personal Ventilation System As combined with a Hybrid Ventilation System During Isolated Office Rooms	https://www.uomus.edu.iq/Projects/Projects/WameedMUCProject_2022_92028547.pdf
Design and Fabrication of Parabolic Trough Solar Collector for Thermal Energy Applications	https://uomus.edu.iq/Projects/Projects/WameedMUCProject_2021_7315301.pdf



Figure 1. Use the solar water heater on the roof of the shopping book center



Figure 2. Solar evacuated tube collector



Figure 3. Parabolic collector



Figure 4. Solar dish collector



Figure 5. Roof Mounted Solar Panels on the administration building and the main restaurant.



Figure 6. Solar panels on the medical building





Figure 7. Studies on solar panels of medical buildings



Figure 8. Solar Panels on the main entrance



Figure 9. Using of the Solar Panels for multipurpose use (mobile charging)



Figure 10. Wind energy systems

In additon, There are 7 innovative programs which they can be summarized:

Programme No.1 Establishement of Al-Mustaqbal Energy Research Center

The establishment of the Al-Mustaqbal Energy Research Center is indeed a noteworthy innovation in the realm of energy and climate change initiatives, positioning Al-Mustaqbal University as a leader in sustainable development. This center embodies the university's commitment to advancing research and fostering solutions that address global energy challenges. The main goals of the cneter are:

A- Research in Renewable Energy:

The Al-Mustaqbal Energy Research Center is dedicated to pioneering research in renewable energy technologies, such as solar, wind, and bioenergy. By focusing on cutting-edge advancements, the center aims to develop efficient and cost-effective solutions that can significantly reduce carbon emissions and enhance energy sustainability.

B- Interdisciplinary Collaboration:

One of the center's key strengths is its emphasis on interdisciplinary collaboration. Researchers and scholars from various fields—including engineering, environmental science, and policy studies-work together to create holistic solutions that tackle the complexities of energy production and consumption. This collaborative approach not only enriches the research output but also fosters a culture of innovation.

C- Community Engagement:

The center goes beyond academic research by actively engaging with the community. It organizes workshops, seminars, and outreach programs to educate the public about sustainable practices and the importance of transitioning to renewable energy sources. This commitment to community involvement ensures that the benefits of research extend to society at large, inspiring action and awareness.

D- Impact on Education and Research:

For students at Al-Mustaqbal University, the Energy Research Center offers invaluable opportunities to participate in hands-on research projects. This experiential learning not only enhances their academic experience but also prepares them for future careers in the rapidly evolving energy sector. Faculty members, too, benefit from the center's focus on innovation, enabling them to contribute meaningfully to the field of sustainable energy.

In conclusion, the Al-Mustaqbal Energy Research Center stands out as one of the innovative programs created by Al-Mustaqbal University, significantly contributing to the discourse on energy and climate change. Through its comprehensive approach to research, collaboration, and community engagement, the center is poised to make a lasting impact on both local and global scales, driving the transition toward a sustainable energy future.

A hundred of activities regarding scientific research, interdisciplinary collaboration, community engagement, and impact on education and research have been implemented by the center. For more information about these activities, please visit:

https://uomus.edu.iq/UnitsAndDivisionsEn/Index/67

Programme No 2. Renewable Energy Transition Program

Al-Mustaqbal University have launched programs to transition their energy systems toward renewable sources. The programs initiated to shift away from the fossil fuels energy toward renewable energy sources like solar and wind. The programs included, system designed, controls units and managements.



Solar panel on the roof top of building



Solar water heating system in the lab of building





For more information, please visit:

https://uomus.edu.iq/En/EnNewCol.aspx?newid=28117



For more information, please visit the websites below:

https://www.uomus.edu.iq/NewDep.aspx?depid=2&newid=4749

https://uomus.edu.iq/NewDep.aspx?depid=2&newid=23834

Program No. 3 Energy Efficiency campaigns

Al-Mustaqbal University run energy efficiency programs to reduce energy consumption in the building. These programs include incentives, standards, and educational efforts to promote efficient practices.

3.1 Education Program:

Al-Mustaqbal University had education material for the undergraduate level giving to our students in the energy conversion and management, renewable energy, environmental affair to raise their awareness foe the global warming and the energy consumption.

3.2 Schedules Workshop And Awareness On The Energy

Al-Mustaqbal University organized several awareness campaigns on the importance of renewable energy. The campaigns have focused on society and our students.

Some of these activities are:

A- Al-Mustaqbal Energy Research Center proudly inaugurated its first training course titled "**Concepts and Foundations of Renewable Energy**." This event marked a significant step in promoting knowledge and awareness of sustainable energy practices among participants from various disciplines.

The course attracted a large and diverse audience, including students, professionals, and faculty members, all eager to deepen their understanding of renewable energy. Dr. Azhar Mohsen Abd, a respected expert in the field, delivered an engaging and comprehensive lecture that set the tone for the training series.



For more information, please visit:

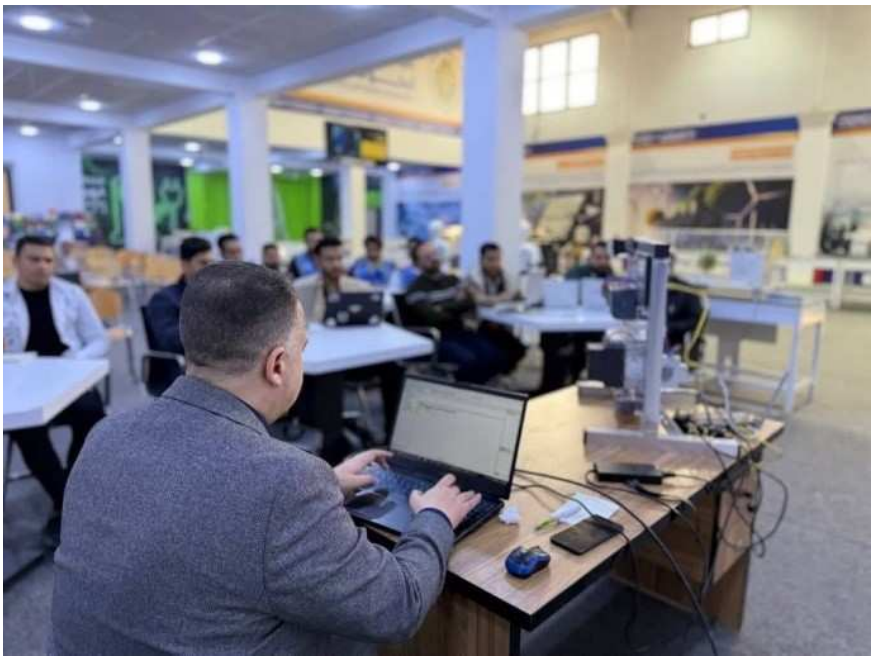
B- The College of Engineering and Engineering Technologies holds the third Clean Energy Forum.

Under the patronage of the President of Al-Mustaqbal University, Prof. Dr. Hasan Shakir, and under the supervision of the Dean of the Faculty of Engineering and Engineering Technologies, Assistant Prof. Dr. Azhar Mohsen Abdel, on the occasion of World Clean Energy Day, and within the university s initiatives to promote the Sustainable Development Goals, especially Goal 7 (Clean and Affordable Energy). In collaboration between the Faculty of Engineering and Engineering Technologies - Department of Power Mechanics Technology Engineering- Energy Research Center.



https://uomus.edu.iq/En/Units/Details.aspx?UnitID=19&NewsID=1091

C- The first practical training course specialized in modern industrial control using programmed logic controllers (PLC) and HMI screens - Level 1for controlling renewable energy systems, concluded in cooperation between Al-Mustaqbal University Energy Research Center and Babylon University-Faculty of Engineering.



For more information, visit:

https://uomus.edu.iq/En/Units/Details.aspx?UnitID=19&NewsID=1124

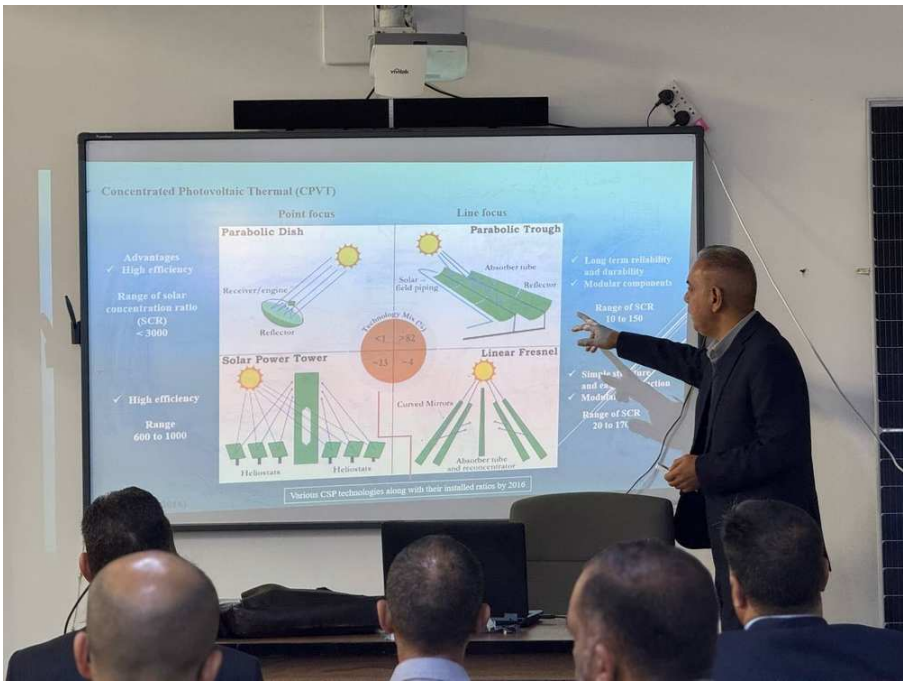
D- Workshop on Energy Harvesting: Al-Mustaqbal Energy Research Center, in coordination with the Deanship of the Faculty of Engineering and Engineering Technologies at Al-Mustaqbal University, organized a workshop and lecture on energy harvesting. M. Dr. Zainab Shaker Radif in the presence of the Dean of the College Dr. Azhar Mohsen Abd, Director of the Center and a number of professors of the University of Kufa. The lecture focused on the basic methods used to harvest energy from its various sources, especially harvesting energy from vibrational motion using besoalectic materials, which convert kinetic energy into electrical energy. This workshop promotes awareness on energy harvesting techniques, encourages cooperation between universities and research centers, and supports scientific research in the fields of renewable energy.



For more information, please visit:

https://uomus.edu.iq/En/Units/Details.aspx?UnitID=19&NewsID=1137

E- Al-Mustaqbal University, in cooperation with the Deanship of the Faculty of Engineering and Engineering Technologies at Al-Mustaqbal University, organized a workshop and lecture on the use of solar collector. The event was attended by the Dean of the and many faculty members from the University of Kufa. Hosted by A. M. Dr. Fayez Abdul Muslim to provide a specialized lecture on the use of solar cylindrical reflectors in the heating process, focusing on various heat exchangers.



For more information, please visit:

https://uomus.edu.iq/En/Units/Details.aspx?UnitID=19&NewsID=1139

https://uomus.edu.iq/UnitsAndDivisionsEn/News/67?newsCategory=News&page=19

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/97611

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/97201

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/98677

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/97195

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/96544

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/105707

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/96532

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/105705

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/105653

https://uomus.edu.iq/UnitsAndDivisionsEn/NewsDetails/105646

https://uomus.edu.iq/UnitsAndDivisions/NewsDetails/105645

F- An awareness campaign on waste recycling.

Waste recycling is important in biomass systems as it considered as a renewable energy sources. For example, the Department of Building and Construction Engineering held a scientific seminar titled "Recycling Beverage Containers." This seminar took place at Al-Mustaqbal University.

There are many workshops that have been completed by the university to teach their students, as attached in the following links:

1- **Conference " The Third International Conference on the Future of Sustainable Energy" Kicks Off at Al-Mustaqbal University**

https://uomus.edu.iq/CollegeEn/Details/95607

2- **Workshop about Ozon and carbon emissions**

https://uomus.edu.iq/NewDep.aspx?depid=2&newid=28859

3- **SCIENTIFIC SEMINAR ON THE IMPORTANCE OF HYDROELECTRIC ENERGY**

https://uomus.edu.iq/NewDep.aspx?depid=2&newid=15977

4- **TRAINING WORKSHOP ON MEASURING DEVICES FOR SOLAR ENERGY SYSTEMS**

https://uomus.edu.iq/NewDep.aspx?depid=2&newid=16048

5- **PRACTICAL WORKSHOP FOR STUDENTS OF THE FOURTH STAGE ON THE PARABOLIC TYPE SOLAR HEATER SYSTEM**

https://uomus.edu.iq/NewDep.aspx?depid=2&newid=16606

Programme No. 4 Climate Adaptation Initiatives

Al-Mustaqbal University launched climate adaptation programs to address the impacts of climate change such as raise the awareness about air pollution and its impact on public's health due to the rising in temperature.

Some of the activities regarding this program are:

A- (The Importance of Afforestation in Improving the Environment)

On the occasion of National Afforestation Day, March 12, the College of Engineering / Department of Chemical Engineering organized an awareness and guidance campaign to spread the culture of caring for green spaces within the college. The campaign included distributing awareness posters in the college corridors with a group of college students from different departments and levels. This campaign comes in accordance with the ministerial directives to make March 12th National Afforestation Day. The university students carried out this educational awareness campaign on the importance of afforestation in the university environment in particular and in Iraq in general.



For more information, please visit: https://uomus.edu.iq/CollegeEn/Details/81320

For more information, please visit: https://uomus.edu.iq/NewDep.aspx?depid=6&newid=62943

More activities regarding climate change can be found by visiting the websites below

https://uomus.edu.iq/NewCol.aspx?newid=81790

Some of the activities that support the ongoing policy for carbon reduction:

https://uomus.edu.iq/NewDep.aspx?depid=6&newid=85842

https://uomus.edu.iq/NewDep.aspx?depid=2&newid=79309

https://uomus.edu.iq/NewDep.aspx?depid=2&newid=79507

https://uomus.edu.iq/NewDep.aspx?depid=18&newid=83027

https://uomus.edu.iq/NewDep.aspx?depid=18&newid=62912

Programme No. 5 Clean Energy Research And Development

Al-Mustaqbal University invest in research and development programs to advance clean energy technologies, such as advanced battery storage, carbon capture, full cell and hydrogen production and next generation solar panels.



Thermal performance assessment for an array of cylindrical Lithium-Ion battery cells using an Air-Cooling system - ScienceDirect)
https://doi.org/10.1016/j.apenergy.2023.121354)
Numerical investigation on cooling cylindrical lithium-ion-battery by using different types of nanofluids in an innovative cooling system -ScienceDirect
(https://doi.org/10.1016/j.csite.2023.103097)

A novel air-cooled Li-ion battery (LIB) array thermal management system – a numerical analysis - ScienceDirect (https://doi.org/10.1016/j.ijthermalsci.2023.108327)

Simulation of CO2 capture from natural gas by cyclic pressure swing adsorption process using activated carbon :(https://doi.org/10.1016/j.chemosphere.2023.138583)

Efficient Cooling System for Lithium-Ion Battery Cells by Using Different Concentrations of Nanoparticles of SiO2-Water: A Numerical Investigation. (https://doi.org/10.3390/sym15030640)

Programme No. 6 Community Based Sustainability Initiative

Al-Mustaqbal University have implement a local communities and innovative sustainability programs such as community solar projects, urban green air quality monitoring.





Cleaning and maintaining solar energy systems in Babel province.

Program No. 7 Circular Economy Initiatives (Waste Management And Recycle)

Al-Mustaqbal University planning to promote a circular economy aim to reduce waste and extend the life of products and materials through recycling, reusing and remanufacturing.