Times Higher Education Sustainability Impact Ratings

University: Al-Mustaqbal University

Country: Iraq

SDG 7.2: University measures towards affordable and clean energy

7.2.3 Does your university as a body have a process for carbon management and reducing carbon dioxide emissions?

Response: Yes

Al-Mustaqbal University is actively pursuing carbon reduction initiatives through several key objectives:

1. **Sustainable Energy Sources:** The university is investing in renewable energy, such as solar power, to decrease reliance on fossil fuels.
2. **Energy Efficiency**: Implementing energy-efficient technologies in buildings and facilities to reduce overall energy consumption.
3. **Waste Management:** Developing comprehensive waste reduction and recycling programs to minimize landfill contributions.
4. **Green Transportation:** Encouraging the use of public transport, cycling, and electric vehicles among students and staff to lower carbon emissions.
5. **Environmental Education:** Integrating sustainability into the curriculum to raise awareness and promote eco-friendly practices within the university community.

These efforts collectively aim to create a more sustainable and environmentally friendly campus. We will going in details into these objectives.

Al-Mustaqbal University has adopted a significant policy for carbon management and reducing carbon dioxide emission as follows:

1- **Sustainable Energy Resources:**

A- **AL-Mustaqbal University have been adopted a sustainable system for energy production and management. This involve different activities, such as using solar energy, energy storage, wind turbine and hybrid energy systems (wind and solar energy).**







Solar panel on the roof top of bulding



Solar water heating system in the lab of bulding





For more information, please visit:

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



For more information, please visit the websites below:

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

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








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2- Energy Efficiency:

1- Energy Efficient Appliances Usage:

Using efficient appliance devices in the university that uses less power than the old and traditional ones



Installing skylights to allowing sunshiny and natural light flood into the building





Implementation of PV panels for lighting Al-Mustaqbal Center for Energy Research



Solar-Powered Umbrella Charges Electronic Devicee



Efficient flat led lighting

3- Waste Reduction Strategies

Al-Mustaqbal University has implemented comprehensive recycling programs about recycling stations and education campaigns by placing clearly labeled recycling bins next to trash bins in high-traffic areas and educates staff and students on what can and cannot be recycled through workshops and informational materials.

Moreover, AL-Mustaqbal University has arranged events about zero waste by planning events and their assessment to ensure using reusable materials, provide composting options, and minimize usage of single plastics. The assessments are used to evaluate the waste generated at the events and identify areas for improvement for future gatherings.

In addition, our university is serious about waste recycling policy in the suitable strategy. For example, Institutes, faculties, and departments place different types of recycling bins for different stuff, such as paper and plastic and distributed in the offices, laboratories and halls to implement recycling. Basically, efficient w recycling reduces

energy consumption and necessary reduces the methane and carbon dioxide productions in the atmosphere.





Activity on waste treatment:

A visit was made to Al-Hilla Secondary School for Outstanding Students. During the visit, a lecture was delivered on the dangers of plastic waste to the environment and human health, presented by Dr. Tarek Jawad Kaghem, in the presence of the department staff and several teachers. A group of students from various academic levels actively participated in discussing the risks of plastic waste and exchanged ideas to develop effective solutions to reduce the use of plastic materials and promote recycling. At the end of the lecture, simple gifts were distributed to the participating students.





https://uomus.edu.iq/ArSustainability/Arabicdetilsnews.aspx?Id=69

Al-Mustaqbal University has been planning to install systems to captures and stores rainwater from rooftops and building surfaces for reuse in toilet flushing, irrigation, and other non-potable applications. This will significantly reduce using municipal water supplies, especially during the dry or shortcutting seasons. However, filtration and purification processes are required to ensure safety and health requirements achievements. Al-Mustaqbal University has established a compact pre-treatment centralized wastewater facility with a capacity of 120 m^3/day and an efficiency rating of up to 95% as



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Along with t **ops have been consid**

1- **Susta** **partment organize an awareness campaign on ways to conserve water consumption. The**

initiative by the Sustainability Ambassadors in the Medical Devices Technology Department to organize an awareness campaign on water conservation is a significant step toward promoting sustainable practices within the community. The campaign aims to educate individuals about the importance of conserving water, especially in a world facing increasing water scarcity. It could include workshops, informational brochures, and interactive sessions that provide practical tips for reducing water consumption both at home and in professional settings. By engaging students and faculty, the campaign fosters a sense of community and collective responsibility toward sustainability. Educating individuals about water conservation not only helps reduce wastage but also promotes a culture of sustainability with long-term benefits for the environment. This initiative could pave the way for further sustainability efforts, such as energy conservation campaigns or waste management programs, reinforcing the department's commitment to environmental stewardship.



For more information, please visit: https://uomus.edu.iq/NewCol.aspx?newid=65628

2- **Under the supervision of Dr. Mayada Wahid Falaih, M.M. Maryam Mohammed Moussa, M.M. Sally Silan Hussein, and M.M. Banin Mohammed Hilal organized an awareness campaign on the importance of water conservation. Water**

conservation is a crucial environmental issue, as water is essential for life and is used in agriculture and industry.

Ways to conserve water include reducing daily consumption, using water-saving devices, collecting rainwater, fixing leaks, raising awareness, employing modern irrigation techniques, and reusing greywater. Conserving water requires everyone's cooperation to protect this precious resource.



For more information, please visit: https://uomus.edu.iq//NewCol.aspx?newid=62274

3- The Department of Building and Construction Engineering held a scientific seminar titled "Rainwater Harvesting in Urban Areas." This seminar took place at Al-Mustaqbal University taking into account harvesting the rain water in the smart cities for different purpose.

https://eng.uomus.edu.iq/NewDep.aspx?depid=5&newid=25851

4- Green Transportation:

AL–Mustaqbal University has worked on build bike Lanes and Racks by investing in bike lanes and securing special bike racks for promoting cycling. Several activities regarding this aspect have lunched inside the campus as shown in figure below.




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Al-Mustaqbal University had set charging station for charging electric vehicle and bikes to encourage the use of electric transportations systems that reduce the impact of carbon dioxide resulted from using the conventional transportation system (combu



5- Environemental Education:

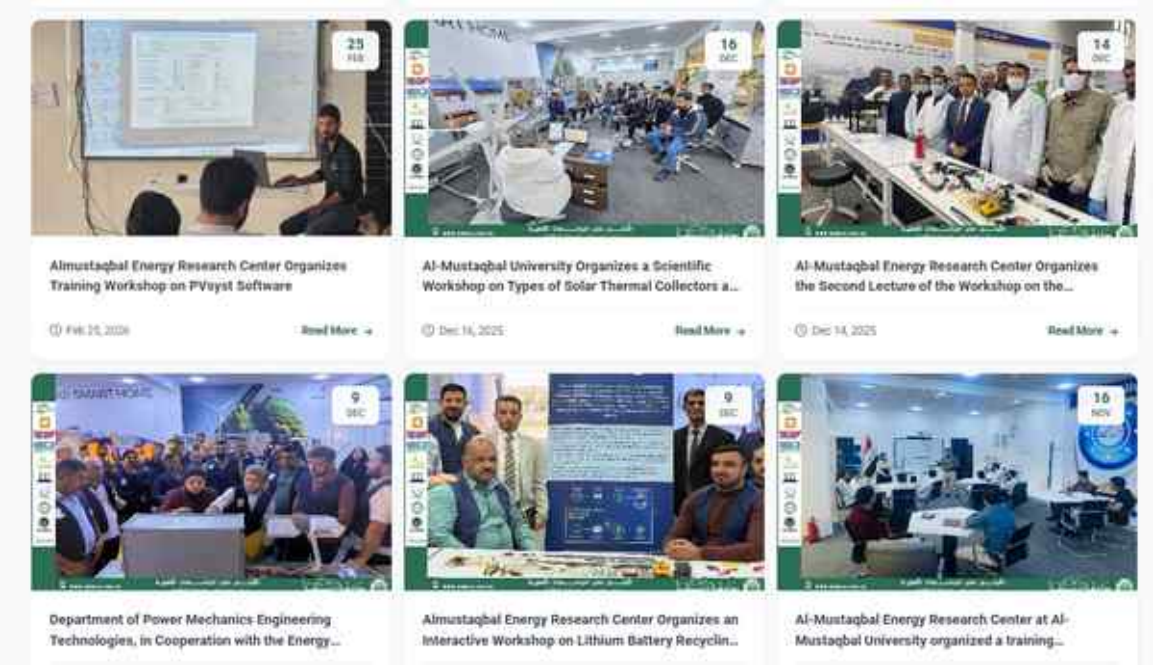
5-1 Conduct Feasibility Studies:

AL-Mustaqbal University has been evaluated campus locations for wind and solar potential, considering factors like wind patterns and sunlight exposure, beside the financial implications of usage the renewable energy projects if compared to the traditional energy sources.

5-2 Integrate Renewable Energy projects and topics into Curriculum:

Several activities has been developed and presented by Al-Mustaqbal University toward the integration of the renewable energy and climate changes aspects, such as developing courses focused on renewable energy technologies and sustainability practices. Hands-On Projects is another example to encourage student involvement in real-life renewable energy projects, such as installing solar panels on campus buildings as shown in figures below.

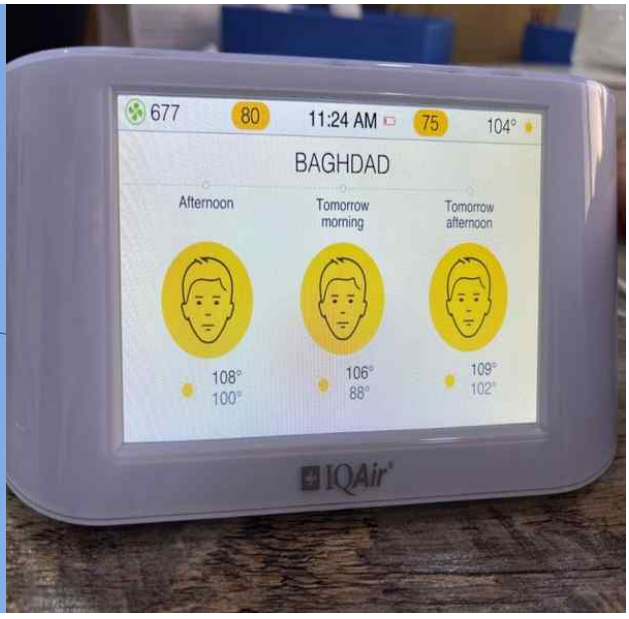
5-2 In addition to tens of activities, for more information, please visit: https://uomus.edu.iq/CollegeEn/News/67/Workshop



https://uomus.edu.iq/CollegeEn/News/67/Workshop

5-3 In additon, a new and up to date indoor and outdoor systems are installed at Al-Mustaqbal Energy Resarch Center for measuring airquality inside and outside the office. The data are being published on line for researchers and interested people. This step is important for serving the community for quantifying the environment where they live as shown below:





For more information, please visit: https://env.uomus.edu.iq/WaterQuality

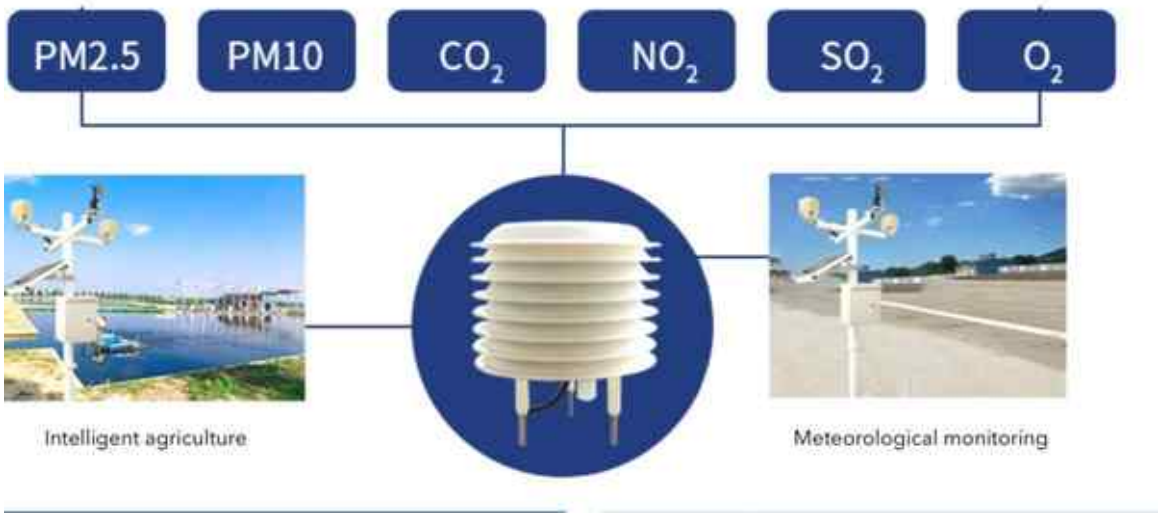
And for air quality: https://www.iqair.com/mx-en/air-quality/iraq/babil/al-hillah

Beside All of the above activities towards reducing carbon emissions, other activities are implemented, some of them are:

1. Carbon Footprint Assessment

1-1 Conduct Comprehensive Audits:

A- Al-Mustaqbal University has frequently performed assessments monthly monitor the in the carbon dioxide changes over time by a date a question center for carbon dioxide collecting date as shown in the Figure below. The date is recorded, collected and saved in a specific storage





B- One methodology has been adapted by Al-Mustaqbal University, the Greenhouse Gas Protocol or ISO 14064 to ensure standardized measurements. Some of the Greenhouses were built inside the campus to reduce the emission carbon dioxide as shown in the figure below.




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AL-Mustaqbal University has launched a specialized platform for monitoring and tracking environmental pollution in Babylon Governorate, intended at providing accurate data on pollution events. This platform pursues to identify pollution types, locations, and to deliver reports for making informed choices to alleviate pollution. Additionally, it supports researchers in their labors to analyze data related to the pollution and environment. This initiative reflects the university's commitment to enhancing scientific research and providing essential support to the community.

Through its ongoing efforts, Al-Mustaqbal University provides this data, enabling government entities, decision-makers, and citizens to share information and report any environmental violations within Babil Governorate.





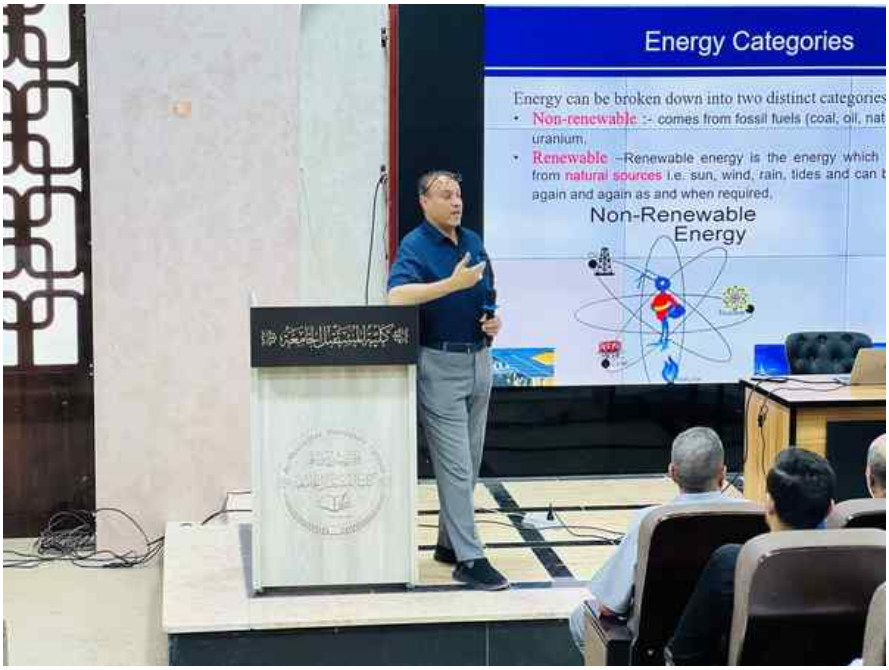


For more information, please refer to Env.uomus.edu.iq

1-2 Engage the Campus Community:

Al-Mustaqbal University has been organizing several workshops for education the campus community about the importance of carbon assessments and let them know about the best means and methodologies used for reducing carbon dioxide. The images below show some of the activities regarding these workshops. In addition, students have been involved as volunteers to assist with data collection and analysis in order to ensure the integrity of the sense of ownership.




Energy Categories
Energy can be broken down into two distinct categories
Non-renewable :- comes from fossil fuels (coal, oil, nat
uranium.
Renewable –Renewable energy is the energy which
from natural sources i.e. sun, wind, rain, tides and can b
again and again as and when required.
Non-Renewable
Energy


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RECOMMENDATION
Countries should support projects and research that study production.
The start of production and use of clean renewable energy on a large scale in countries.
Directing the media to highlight the benefits of the renewable fuel alternative
Encouraging
as well as
ting studies
ontributing
theimplementation
of green ideas on
the ground


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AL-MUSTAQBAL
Sustainability Week
جائزة الابداع والابتكارات للمشاريع الطلابية في مجال الاستدامة
Creativity and Innovations Award for student projects
in the field of sustainability
USM

2. Sustainability Committee

2-1 Establish Clear Governance Structures:

This structure include how AL-Mustaqbal University achieved, diversity, statement mission, meeting schedule, agenda for the future, and documentation process. It will be discussed in details as shown:

B- The university has chosen representatives from different departments and colleges and student bodies to involve more ideas versatile, and comprehensive visions from different sides.







C- Develop Outreach Programs:

Communication: Al-Mustaqbal University used to use its own newsletters, emails, and social media to share sustainability updates and successes.



https://uomus.edu.iq//MUCNewsPaper/paperNumbers.aspx

D- Green Building Standards

Al Mustaqbal University promises to sustainable building practices by following the green building standards, such as LEED (Leadership in Energy and Environmental Design) for all new building, renovations and construction.





E- Planting Policy

Al-Mustaqbal University has planted more than 5000 trees during 202-2-2023 in order to increase the green spaces to help increaser capturing carbon oxide, global warming and climate change and reduce their negative impact on the society.




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F- Posters and Sticks for obligations

Al-Mustaqbal University used clear and strict instructions for increasing and significantly raising awareness among students, staff, and the other university community about all future sustainability goals and other initiatives, such as smoking reduction.





G- Running Projects and Plan for Future

Some of on-going projects regarding sustainability renewable energy are working on for achieving sustainability and reducing carbon emissions at our university, each with varying degrees of progress. Each of these projects will accelerate the future goals set by the university in its strategic plan and policy to limit carbon emissions. Among these goals are:

a) Shifting from petrol systems and diesel fuel system to another eco-friendly, vehicles and buses powered by biofuels and natural gas.

b) Increasing the green spaces to involve a wide space of the campus of our university.

c) Setup and implementing usage of lighting that equipped with sensors in all university buildings. Using automatic lightening systems is going to save energy and reduce carbon emission resulted from energy generators. This setup allows automatic on and off functions based on sunlight, promoting energy conservation and mitigating climate change.

d) Equipping various buildings with modern, energy-efficient technologies, such as smart windows that allow natural light while maintaining a cool indoor environment, thereby reducing reliance on air conditioning.

e) Collaborate with ministry of electricity to build efficient, affordable and cheap solar panels which in turn reduce the carbon.

f) Working on design and build Methane and carbon capturing station to manage them suitably.

g) Encouraging the students and faculty to launch an efficient geothermal energy projects that may reduce the dependence on other sources of energy that used fossil fuel.

h) Encouraging the usage of the sustainable transportation system until getting the sustainability goals of transportation.

i) Planning of sustainable urban planning.

j) Implementation of Zero carbon constructions, houses, buildings and storages.

k) Encourage of design and build of small – scale Photovoltaic (PV) Cells for low energy requirements systems, such as sensors for monitoring systems.

l) Design and Sizing of Small – Scale Photovoltaic (PV) Cells powered Reverse Osmosis (RO) for Water Supply in Remote Locations(

(17) (PDF) DESIGN AND SIZING OF SMALL – SCALE PHOTOVOLTAIC (PV) CELLS POWERED REVERSE OSMOSIS (RO) DESALINATION SYSTEM FOR WATER SUPPLY IN REMOTE LOCATIONS (researchgate.net).)

m) Evaluation of solar Assisted Absorption Cooling System for High Ambient Temperature Conditions.

n) Lunch a hybrid energy station for energy generation and work on developing and designing a prototype for marketing to help society to get cheaper sources.

o) Protect the plants from illegal logging by corporations with other government departments for securing this goal.

p) Increase the diversity of using the Green roof that eventually leads to reduce the carbon dioxide emission and generation of oxygen leading to enhance air quality. Additionally, the quality of life and give the human beings within the campus an open space. Thus, green roof reduces the heat-island effect, reduce carbon footprint, reduce the global warming and climate change.

q) Ensure using roof-mounted solar panels that reducing the dependence on non-renewable energy source and reduces the buildings carbon foot-print.

r) Transition to the modern Zero Emission Vehicles (ZEV) Policy on Campus.

11- Reporting and Accountability

11-1 Develop a Reporting Framework:

The reporting process adopted by the university includes the standard metrics and the annual reports. The established standard metrics is used to for track progress, such as energy usage, emissions reductions and waste diversion rates. A sample of calculation is presented at the end of this file. The University used to publish annual reports about the sustainability highlighting the achievements of the university, challenges and problem encountered need to be addressed, and future goals. It is worthy to mention that faculty and students are involved in the reporting process in order to ensure the diversity and integrity of the process. In addition, the university lunched several forums for discussing progress of sustainability and gathers more information and efficient feedback from both on-campus and off- campus community. Finally, for improvement purposes, the university always uses the insights gained from the reviewers for refining and achieving the critical targets of reducing carbon emissions.

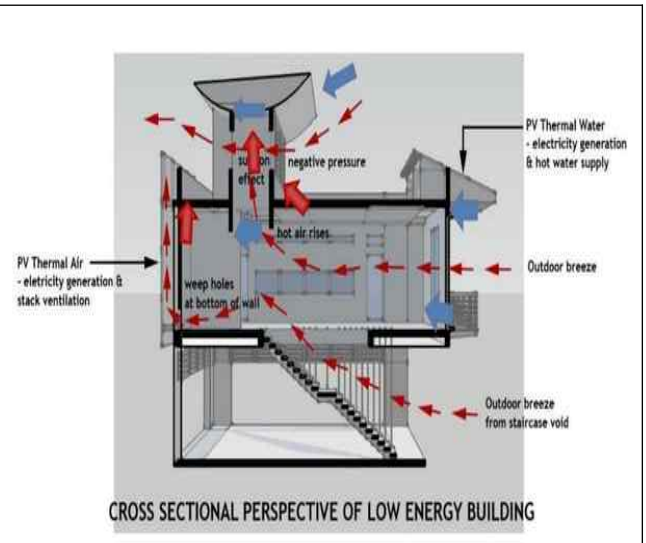
Finally, Al -Mustaqbal University has adopted a series of core values for carbon management. These include a statement of concern for sustainability and the relationship with the environment. On that basis a University Environmental Policy has been developed that is reviewed regularly by the Environmental Strategy Committee. The Policy states that:

In achieving excellence in teaching and research, Al -Mustaqabl university aims to manage its activities, buildings and estates to promote environmental sustainability, to conserve and enhance natural resources and to **prevent environmental pollution**, to bring about a continual improvement in its environmental performance.

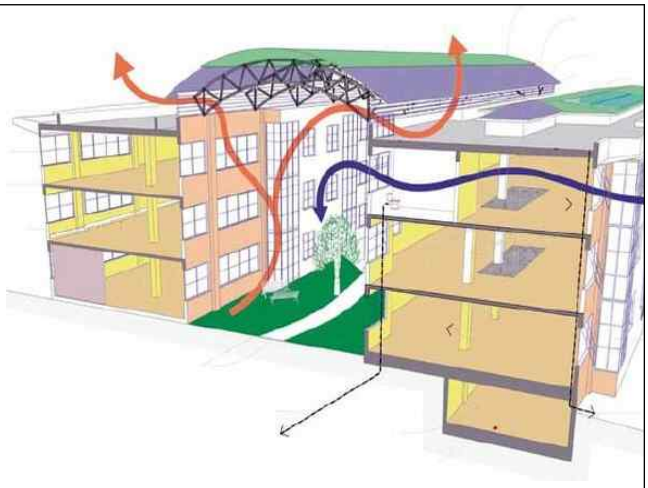
The University will comply fully with environmental legislation and officially approved codes of practice, and will make continued efforts:

- to promote **sound** environmental management policies and practices in the work of all, Departments, and other units ;
- to **increase awareness** of environmental responsibilities amongst staff and students;
- to work with other agencies locally, nationally, and internationally **3to** promote appropriate environmental policies;
- to implement policies and procedures that contribute to a **reduction in the University's carbon footprint;**
- to minimise **waste and pollution**, and to operate effective waste management procedures;

- to reduce the consumption of fossil fuels;
- to reduce water consumption;
- to promote a purchasing policy which will give preference, as far as practicable, to those products and services which cause the least harm to the environment;
- to avoid use, wherever possible, of environmentally damaging substances, materials, and processes;
- to maintain the grounds and buildings of the University Estate in an **environmentally sensitive way;**
- To have regard to environmental factors as far as practicable in respect of the growth of the University and the integration of new developments into the local environment.
- To encourage modes of **transport** by staff and students which minimise the environmental impact.
- To communicate with interested parties on issues relating to the Environmental Policy including contacts in the immediate neighbourhood, and the regional, national, and global community.

	
Green Building Implementation - Overview Green Technologies implemented at the Environmental Campus Birkenfeld (Al-Mustaqbal University, Iraq)	Cross section of the Green Building Implementation - Overview Green Technologies implemented at the Environmental Campus Birkenfeld (Al-Mustaqbal University, Iraq)





The simple design makes it possible for the building to function as a chimney, where warm air is drawn from the ground floor and through the engineering buliding areas, and then escapes under the sides of the vaulted roof, ensuring comfortable temperatures in the classroom and air circulation throughout the building.

Below are a sample of calculations of the carbon emmisions:

Carbon footprint in 2024/2025 = 650.12 metric tons

Number of persons: (20010+12+1140)=21162

Carbon footprint per person =(650.12/(20010+12+1140)=0.0307 metric ton per person

Sample of Calaculations of CO_2

1- CO_2 (electricity)

A- 2018/2019

= 278.14 metric tons

B- 2019/2020

Em=
= 103.43 metric tons

C- 2020/2021

Em=
= 172.5 metric tons

D- 2021/2022

Em=
= 233.45 metric tons

E- 2022/2023

=
= 264.81 metric tons

F- 2023/2024

EM =

= 367.8 metric tons

F- 2024/2025

EM =

= 467.04 metric tons

CO_2 (bus)

=
= 75.6 metric tons in (2023/ 2024)

=
= 118,8 metric tons in (2024/ 2024)

2- CO_2 (cars)

= 95.04 metric tons in (2018/ 2019)

= 38.4 metric tons in (2019/ 2020)

= 21.6 metric tons in (2020/ 2021)

= 16.8 metric tons in (2021/ 2022)

=
= 24 metric tons in (2022/ 2023)

=
= 38.4 metric tons in (2023/ 2024)

=
= 57.6 metric tons in (2024/ 2025)

3- CO_2 (motorcycle)

=
= 6 metric tons in (2023/ 2024)

=
= 6 ,72 metric tons in (2023/ 2024)

CO_2 (total) in (2022/ 2023)
= 264.11 + 54 + 24 + 6 = 348 metric tons
Carbon footprint in 2022/2023 = 348 metric tons

CO_2 (total) in (2023/ 2024)
= 367.8 + 75.6 + 38.4 + 6 = 487.8 metric tons
Carbon footprint in 2023/2024 = 487.8 metric tons

CO_2 (total) in (2024/ 2025)
= 467.8 + 118,8 + 57,6 + 6,72 = 650,12 metric tons
Carbon footprint in 2024/2025 = 650,12 metric tons

CO_2 (total) in (2023/ 2024) per populations
=487.8/20376=0.0239 metric ton/person

CO_2 (total) in (2024/ 2025) per populations =650,12/**21162**=0,0307 metric ton/person

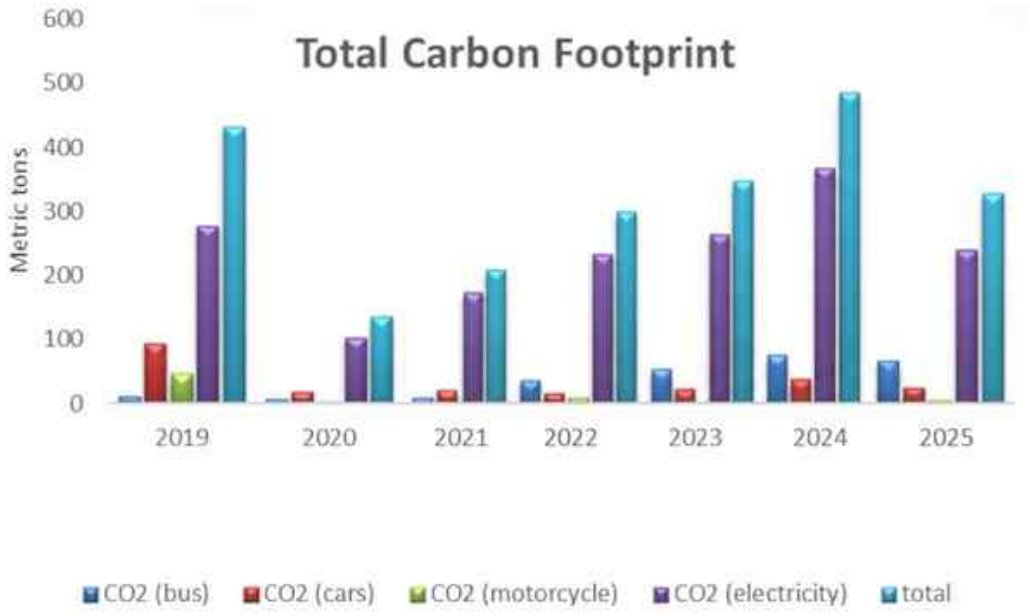


Figure 1 comparison of total carbon footprint in Al Mustaqbal University from 2019 to 2025