SUSTAINABLE DEVELOPMENT GOALS

University of Bahrain Climate Action plan 2023-2024

13 CLIMATE ACTION

www.uob.edu.bh/sustainability

13 CLIMATE ACTION

CLIMATE ACTION

Take urgent action to combat climate change and its impacts

The University of Bahrain (UOB), with its strong dedication to research, education, and community involvement, is leading the charge in combating climate change. Strong action against climate change and its effects is urgently needed, and UOB is in line with Sustainable Development Goal 13 (SDG 13). The institution is committed to sustainability and climate resilience, guided by Bahrain's National Renewable Energy Plan. The University of Bahrain is expected to achieve carbon neutrality in 2027, upon the completion of the project and its becoming operational in Q3 2026. In order to meet the climate goals the Kingdom committed to at COP26, namely a 30 percent reduction in emissions by 2035 on the path to net-zero emissions by 2060, Bahrain revealed its National Energy Strategy, a transparent, credible, and responsible approach.

Bahrain unveils National Energy Strategy to achieve net zero emissions by 2060

This report outlines the university's energy use, climate change research, and preparations for coping with the effects of climate change. It also shows the university's efforts to inform and educate the general public about the significance of taking action.

Low-carbon energy use

The university is committed to quantifying the amount of low-carbon energy utilized on campus in order to support our commitment to sustainability. This entails evaluating and measuring the overall amount of energy produced by low-carbon or renewable sources, such solar, tracking annual electricity use, and figuring out the carbon footprint in relation to the university's population. This establishes its contribution to the total energy usage of the university.

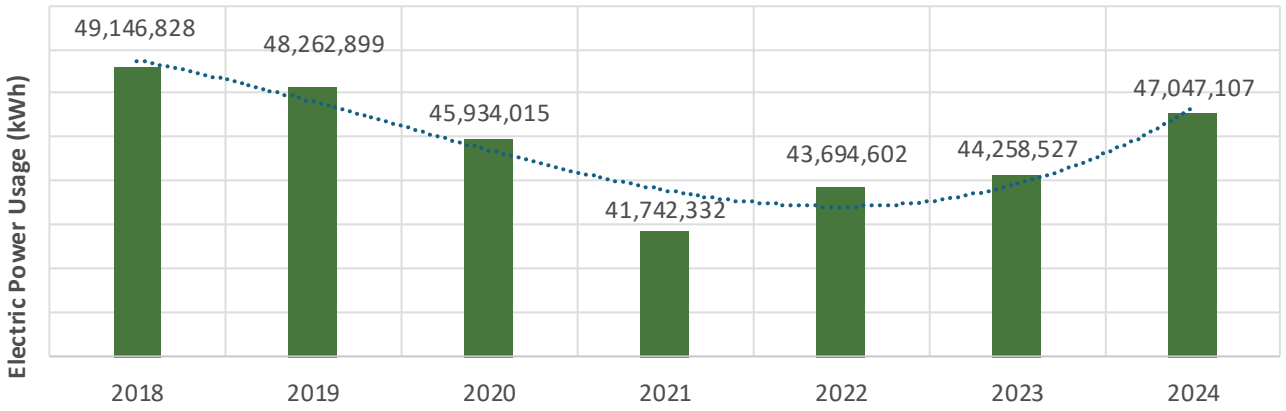
- **Low-carbon energy tracking**

Within the Sakhir campus of the University of Bahrain, transportation (Scope 1) and power use (Scope 2) are the two primary sources of emissions.

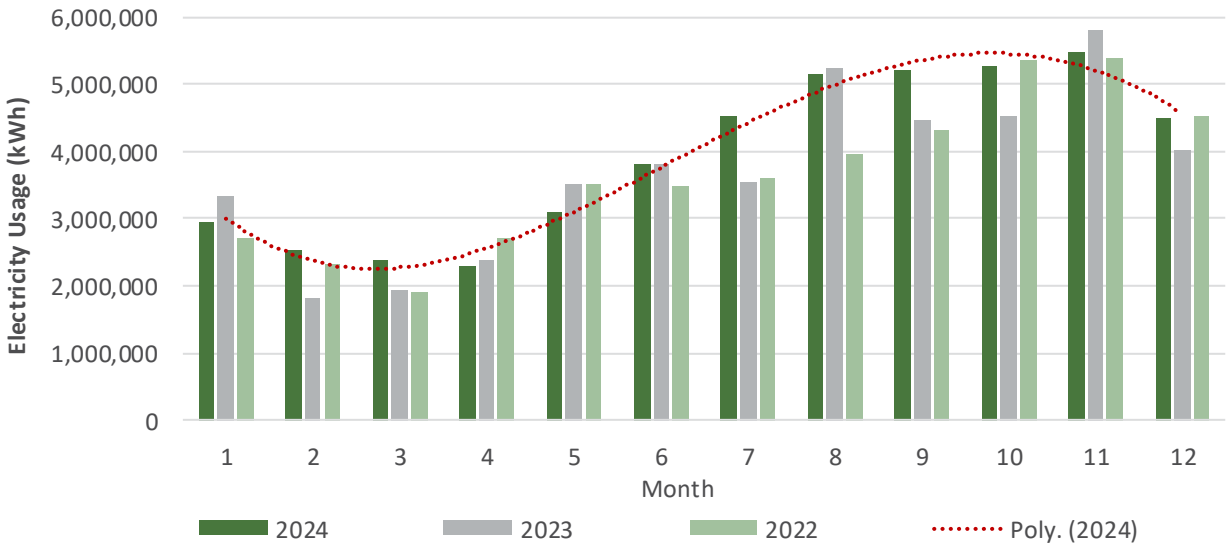
Free shuttle services are offered by the university to move employees and students between buildings and colleges as well as from parking lots to the appropriate buildings and colleges. Students with special needs are also eligible for shuttle assistance. As a result, the fleet of buses on campus is responsible for the transportation emissions included in this report.

Electricity is the total amount of energy consumed in all Sakhir campus facilities during the entire year (2024). The Electricity and Water Authority of Bahrain, the country's water and electricity supplier, generated the electrical bills that were used to calculate the energy usage for 2024.

In the year 2024, the Sakhir Campus used 47,047,107 kWh of power. The main campus of the University of Bahrain in Sakhir uses electricity for lab equipment, lighting, and cooling.



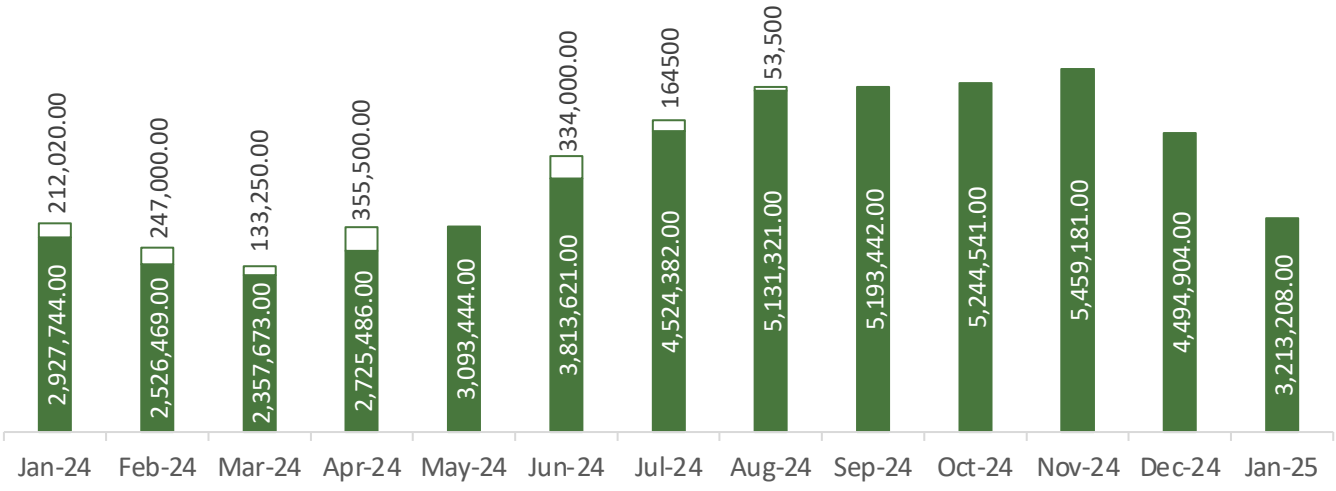
Annual Electricity Consumption in 2018-2024 (University of Bahrain Main Campus, Bahrain)



Monthly Electricity Consumption (kWh) (University of Bahrain Main Campus, Bahrain)

A 6.3% increase in electrical energy usage was recorded in 2024 compared to 2023. However, the electricity used in 2024 was still lower than that in 2019 (pre-CODID-19) by 2.5%.

Considering the university population (27,700 students +1,300 staff) to be ~29,000, the electricity usage is 1,622 kWh/person.



Electricity (kWh)

Electricity consumption (kWh) table:

Month	2021	2022	2023	2024
Jan	2,589,965.862	2,712,180.345	3,317,067	2,927,744
Feb	1,671,678.621	2,310,075.690	1,816,687	2,526,469
March	1,723,723.793	1,907,971.034	1,926,037	2,357,673
April	2,166,824.138	2,698,203.172	2,363,331	2,275,486
May	2,830,221.724	3,482,850.000	3,516,168	3,093,444
June	4,091,584.828	3,474,806.897	3,795,202	3,813,621
July	4,352,988.621	3,583,533.448	3,531,941	4,524,382
Aug	5,206,118.966	3,946,895.034	5,232,102	5,134,732
Sep	4,679,582.069	4,310,256.621	4,442,963	5,193,424
Oct	4,993,696.207	5,344,799.310	4,507,463	5,245,410
Nov	4,228,432.069	5,384,655.517	5,809,203	5,459,818
Dec	3,207,514.828	4,528,375.172	4,000,363	4,494,904
Total	41,742,332	43,694,602	44,258,527	47,047,107

Scope 1: Transportation
The emissions from the university bus fleet are 875.93 tons of CO2 equivalent.

Scope 2: Electricity
The energy consumption of the year 2024 was directly sourced from the electricity bills produced by Electricity and Water Authority in Bahrain, which is the provider of the electricity and water. The total electricity for the Sakhir campus in 2024 was 48,991,978 KWh.

The emissions resulted from the total electricity consumption in Sakir campus are 23,272.69 tons CO_2 equivalent. Total Emissions from scope 1 and scope 2 in 2024 = 24,148.62 tons CO_2 equivalent. Most of the emission is attributed to the electricity consumption of 96.37% .

Contribution of emissions from transportation and electricity consumption

Scope	Source	Emissions (t CO2 e)	Contribution %
1	Shuttles	875.93	3.63
2	Electricity	23,272.69	96.37
Total		**24,148.62**	

• Low-carbon sources

In June 2012, the UOB installed a 'smart' array, with each panel in the array having its own micro-inverter to convert the DC to AC and connect to the grid. Moreover, each PV panel reports on itself (power produced, fault, voltage, and current produced). The array consists of 2,088 PV panels (polycrystalline) with a total area of 3,400 m2 covering a total ground area of nearly 100,000 m2. The PV panels are distributed in 8 rows with 261 PV panels per row. Each panel measures 1.64 m x 0.992 m x 0.35 m, and weighs 18.2 kg, generating a maximum of 240 W under standard test conditions.

The following table presents the actual monthly and total PV electricity production (kWh) from the UOB PV Farm for 2024. PV electricity production in 2024 was 13% lower than in 2023.

The Total Carbon Footprint (CO2 emission in the last 12 months, in metric tons) was calculated as follows:

Date	Actual kWh
Jan	2,927,744
Feb	2,526,469
March	2,357,673
April	2,275,486
May	3,093,444
June	3,813,621
July	4,524,382
Aug	5,134,732
Sep	5,193,424
Oct	5,245,410
Nov	5,459,818
Dec	4,494,904
Total	**47,047,107**

The ratio of renewable energy production divided by total energy usage per year is determined to be at 0.92% as shown in the table below:

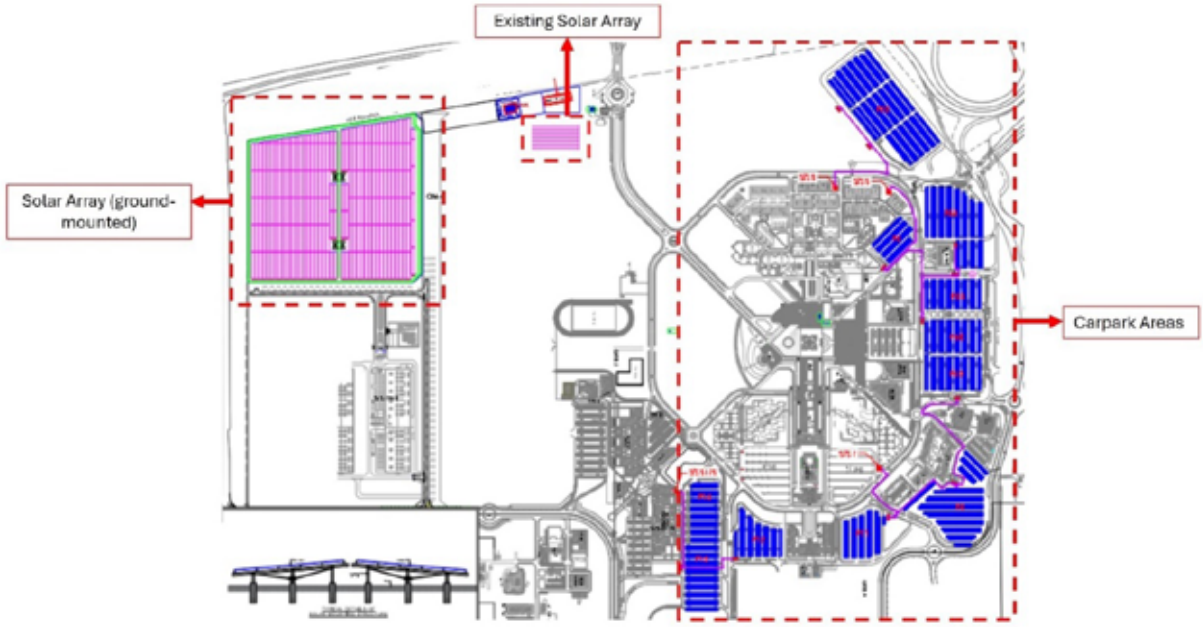
No	Energy	Quantity (kWh)
1	Renewable Solar Energy produced	435,150
2	Total Electricity Consumed	47,047,107
	Percentage	**0.92%**

In addition, as per the university's management plan to equip the buildings with smart technologies and solutions. low-energy technologies and installations are applied in several projects such as the renovation of the toilets in which elements of green buildings are incorporated (Infra-red taps, two-button flush toilets, etc.)

Moreover, the University of Bahrain replaced most of the fluorescent lamps on the campuses with LED ones. Through its awareness of the impact of energy reduction on global warming, all street lighting columns in the parking areas (both the old and the new planned ones) are using LED lamps. Additional energy savings are achieved through the use of Energy Star computers, energy-efficient water heaters, and insulated water pipes. The air conditioning is achieved either by chillers (old buildings), central A/C systems (new buildings), or split A/Cs (classrooms and offices in old buildings that are not connected to the chillers). More than half of the split A/Cs are 6-star rated.

Appliance	Total Number	Total number of energy-efficient appliances	Percentage
Lamps	11308	11000 LED Lamps	97.27%
Split A/C	116	58 6-star rated A/Cs	55%
Average Percentage			**76%**

The Electricity and Water Authority (EWA) plans to establish a solar power plant with a capacity reaching 46.2 MWp on the University of Bahrain campus, aiming to generate approximately 70GWh per year. The university has a vast car park and open land area where EWA intends to develop ground-mounted and car park solar PV systems. This project aligns with Bahrain's commitment to green initiatives to mitigate climate change, as announced by HR the Crown Prince under the directives of HM the King, aiming to reduce Bahrain's greenhouse gas emissions by 30% by 2035 and achieve net zero by 2060. The tender for the project is implemented on a turnkey basis, covering engineering, design, manufacturing, supply of materials, installation, testing, commissioning, and civil and electromechanical works.



Solar Power Farm – Car park and ground-mounted locations

The project is considered one of the largest renewable energy projects implemented at the level of educational institutions in the Kingdom. The project comes as one of the efforts to enhance reliance on sustainable energy sources and achieve Bahrain's renewable energy goals, in accordance with the objectives announced in the *National Renewable Energy Plan*, which aims to increase reliance on renewable energy sources by *20% by 2035*, and with the Kingdom's goal of achieving carbon neutrality by 2060.

The project occupies an area of approximately 280,000 square meters and utilizes the latest technologies for materials, such as photovoltaic panels. It includes the installation of 64,606 photovoltaic solar panels distributed across parking areas (with a capacity of 24.7 megawatts) and on the ground (with a capacity of 21.5 megawatts), bringing the total system capacity to 46.2 megawatts. The system's annual production is expected to approach 70 gigawatt hours, enhancing spending efficiency and directly benefiting the academic institution.

The system will contribute to reducing the University of Bahrain's total electricity bills by approximately one-third annually. It will also contribute to an annual reduction in carbon emissions estimated at 35,000 tons of carbon dioxide, equivalent to the environmental impact of planting thousands of trees annually. An automated solar panel cleaning system has been adopted to ensure continuous efficiency and efficient operation.

When the system is operational in the third quarter of 2026, the university will be able to meet its entire daytime electricity needs through direct consumption of solar-generated electricity, while exporting the surplus to the national electricity grid. This will contribute to reducing reliance on conventional energy sources and enhancing energy efficiency on campus.

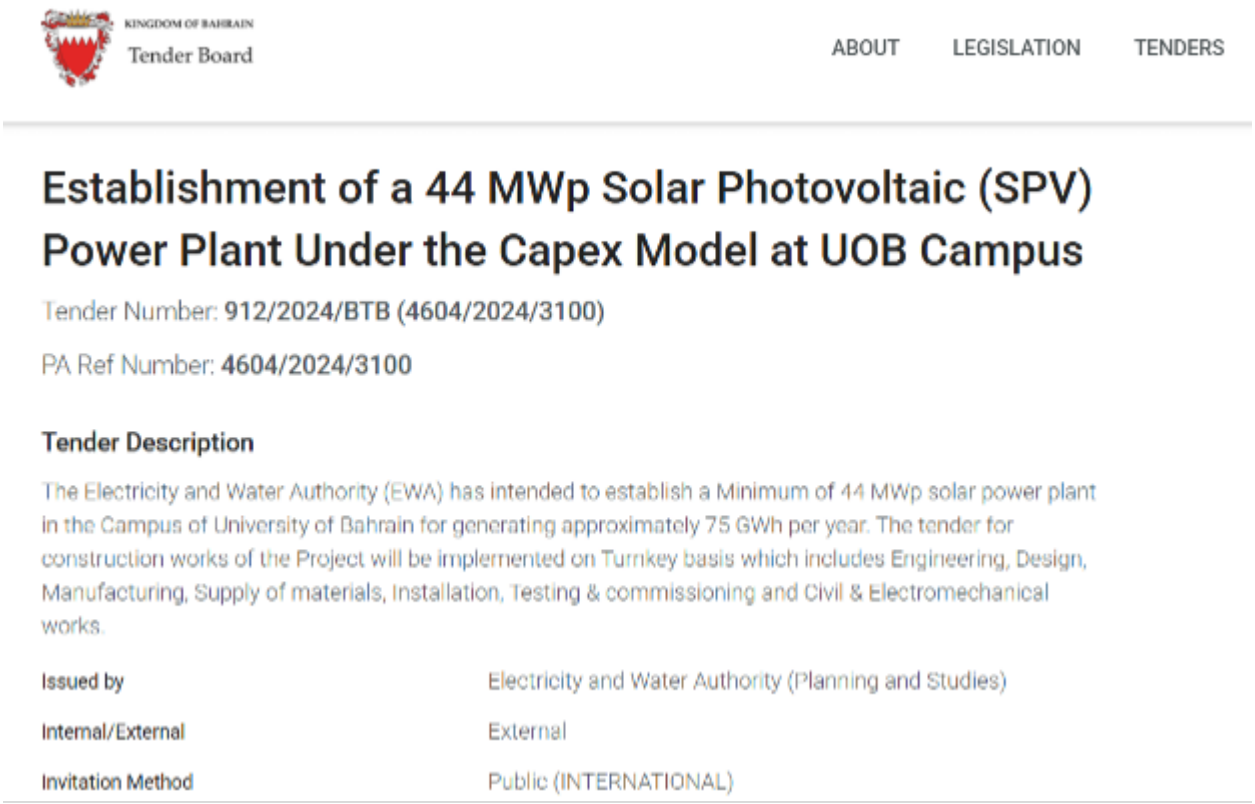
FUTURE PROJECTS

University of Bahrain Solar System Through PPA Scheme

Establishment of a 46.2-megawatt photovoltaic (PV) field on the University of Bahrain (UOB) campus, in alignment with the Power Purchase Agreement (PPA). EWA will serve as the sole investor in this initiative, which involves the Build, Own, Operate, and Maintain (BOOM) model for the solar PV system.

46.2 MWp

Capacity



KINGDOM OF BAHRAIN
Tender Board

ABOUT LEGISLATION TENDERS

Establishment of a 44 MWp Solar Photovoltaic (SPV) Power Plant Under the Capex Model at UOB Campus

Tender Number: **912/2024/BTB (4604/2024/3100)**

PA Ref Number: **4604/2024/3100**

Tender Description

The Electricity and Water Authority (EWA) has intended to establish a Minimum of 44 MWp solar power plant in the Campus of University of Bahrain for generating approximately 75 GWh per year. The tender for construction works of the Project will be implemented on Turnkey basis which includes Engineering, Design, Manufacturing, Supply of materials, Installation, Testing & commissioning and Civil & Electromechanical works.

Issued by	Electricity and Water Authority (Planning and Studies)
Internal/External	External
Invitation Method	Public (INTERNATIONAL)

Electricity and Water Authority (EWA) plans for establishing a solar power plant with a minimum capacity of 44 MWp on the University of Bahrain campus.

Environmental education measures

The University of Bahrain is committed to spreading awareness and knowledge on climate change issues. This includes introducing the scientific causes and effects of climate change to the public and national organizations, as well as mitigation and adoption solutions, mainly energy efficiency and renewable resources. This has been achieved through a set of channels that are described below:

1. Renewable Energy Labs: workshops and training

Renewable energy labs in the University of Bahrain were established in 2018 and aim to achieve quality research collaboration as well as spread awareness to the public and offer advice to national organizations about renewable resources and energy efficiency.

As a part of the renewable energy labs' strategy to spread awareness to the young generation, visits are arranged targeting school students. During these visits, simple experiments and theoretical materials are delivered to school students to encourage them to be involved in climate change actions and renewable energy resources in the future.

- **Key Responsibilities:**

- Enhance national capabilities by developing research and innovation expertise in sustainable energy and water technologies.

- Conduct comprehensive studies of Bahrain's energy network to evaluate its capacity, readiness for renewable energy integration, and opportunities for energy diversification.

- Provide technical consultations and guidance on the design of climate-friendly and fully integrated energy and water systems for Bahrain and the wider region.

- Build public and institutional confidence in solar, wind, and biomass as viable alternatives to conventional fossil fuels.

- Support Bahrain's vision of becoming a regional model for a low-carbon, sustainable economy.

- **Services**

1. Solar PV Testing Lab

- Tests solar panels and provides clients with comprehensive performance reports.

- Offers researchers and organizations access to solar radiation intensity and weather data in Bahrain.

- Facilitates high-quality solar energy research and innovation projects.

- Organizes workshops and training programs on renewable energy system installation and operation.

- Documents: PV Testing Sample Report, Request Form for Solar and Weather Data.

2. The Biomass Lab

- Tests anaerobic digestion (AD) bacteria tolerance for different types of waste provided by local and private organizations.

- Conducts detailed waste composition analyses for research and industry partners.

- Supports biomass and bioenergy research for M.Sc. and Ph.D. students at the University of Bahrain.

- Documents: Request Form for Sample Testing and Data Analysis at the Biomass Lab.

Renewable Energy Labs website

Renewable Energy Labs

2. Environmental education collaborate with NGO

The University of Bahrain (UOB), in partnership with the United Nations Development Programme (UNDP), launched the Sustainable Development Goals (SDGs) Academic Program on September 25, 2024—the first initiative of its kind among regional universities. The program integrates the Sustainable Development Goals (SDGs) into the University's academic framework by embedding sustainability-focused content within English language courses and introducing two specialized courses in environmental science and law.

The launch event was attended by Dr. Mohammed Redha Qader, Vice President for Academic Programs and Graduate Studies, and Ms. Jehan Al-Murbati, Development Program Officer at UNDP. This collaboration reflects UOB's commitment to enhancing environmental education and fostering a culture of sustainability through partnership with global organizations.

As part of the initiative, 20% of English course content is dedicated to SDG-related themes, ensuring that all first-year students engage with sustainability education. Upon completion, participants receive a dual certification from both the University of Bahrain and UNDP, signifying their foundational understanding of sustainability and climate issues.

3.Collaboration Between Industry and Academia to Advance Energy Transformation

The College of Engineering at the University of Bahrain (UoB) organized a panel discussion on "Industry-Academia Cooperation to Advance the Energy Transition", in collaboration with the U.S. Embassy in Bahrain and the Bahrain Center for Strategic, International and Energy Studies.

Several specialists and academics in the fields of unconventional gas and sustainable energy participated in the seminar, which was held on Thursday, May 2, 2024, at the Media Center, and the discussion was moderated by Dr. Muhammad Ali bin Shams, Head of the Chemical Engineering Department at the University.

The discussion emphasized the critical role of collaborative networks between industry and academia in achieving Bahrain's energy transition goals. Participants shared insights on innovative approaches to address challenges in renewable and sustainable energy systems, fostering applied research that aligns with national sustainability strategies. The initiative strengthens UoB's leadership in driving partnerships that connect academic research with industrial application, supporting knowledge transfer and innovation ecosystems.

The College of Engineering at the University of Bahrain organized a discussion panel on "Collaboration Between Industry and Academia to Advance Energy Transformation," in cooperation with the U.S. Embassy in Bahrain and the Bahrain Center for Strategic, International, and Energy Studies (May 2, 2024)

4. Sustainable Energy Educational Programs – College of Engineering

The College of Engineering has launched two M.Sc. programs, one in Renewable Energy Engineering and the other in Sustainable Energy Transition Systems. Such educational programs aim to create a human resources infrastructure in society and industry that is ready for climate action through renewable energy transfer. There are three courses in the First Semester and three courses in the second semester in both programs. During the second year, the students work on their thesis.

M.Sc. in Renewable Energy Engineering

M.Sc. in Sustainable Energy Transition Systems

• **Program Objectives and Structure:**

- Both programs aim to build human resource capacity in renewable and sustainable energy sectors, preparing professionals to contribute to national and regional climate action.

- The curriculum includes three courses per semester in the first year, focusing on renewable technologies, energy systems, and climate-responsive design, followed by a research thesis in the second year.

- Students undertake research projects addressing real-world sustainability challenges, contributing to Bahrain's transition toward clean energy and emission reduction.

Examples of graduate students' thesis topics in the College of Engineering in the past year

The EE Department organized a visit to the solar car parking facility at Dragon City, Bahrain, as part of the Master of Renewable Energy students' thesis work.

5. Sustainable Environment and Sustainable Development Educational Programs – College of Science

The College of Science at the University of Bahrain (UoB) offers advanced graduate programs that directly contribute to climate education and research. These include the M.Sc. and Ph.D. in Environment and Sustainable Development, and the recently launched M.Sc. in Environmental Chemistry. The programs aim to develop scientific expertise and practical competencies in understanding, mitigating, and managing the environmental impacts of climate change.

• Master's Program in Environment and Sustainable Development (ESD):

This master's program at the University of Bahrain directly supports SDG 13.3.1 by strengthening education, awareness, and professional capacity in climate change mitigation, adaptation, and sustainability practices. Established in 2002 with UNESCO's support and redeveloped in 2017 in collaboration with the Prince's Foundation (UK), the program offers two specialized streams: Environmental Science and Development and Sustainable Urbanism.

The program's objectives are to:
prepare graduates for successful careers in the environment and sustainable development fields. It also qualifies students for advanced graduate studies in related disciplines. In addition, it aims to empower graduates to serve the community in protecting the environment and advancing sustainability principles.

Through an interdisciplinary and practice-oriented curriculum, the program cultivates the following learning outcomes:

- Application of advanced environmental and sustainability knowledge.
- Critical analysis and comparison of complex environmental challenges and their solutions.
- Integration of emerging sustainability issues through interdisciplinary methods.
- Mastery of professional research, communication, and ethical academic standards.
- Development of intellectual independence for lifelong learning and continued professional growth.

Courses are delivered by faculty from across the University of Bahrain and experts from the Prince's Foundation, supported by collaborations with governmental and non-governmental organizations. The program combines lectures, case studies, field visits, and research projects focused on real-world issues such as energy, water, waste, and pollution. This approach ensures that graduates are equipped with the knowledge, skills, and leadership capacity to advance Bahrain's and the region's transition toward a sustainable and climate-resilient future.

Master's Program in Environment and Sustainable Development (ESD)

• **Doctor of Philosophy (Ph.D.) in Environment and Sustainable Development (ESD)**

The Doctor of Philosophy program at the University of Bahrain plays a pivotal role in advancing SDG 13.3.1 by fostering high-level expertise, research, and leadership in climate action and sustainability. The program emphasizes the development of sustainable systems that promote environmentally responsible, energy-efficient, and economically viable practices that safeguard human and ecological well-being. Anchored in an interdisciplinary framework, the Ph.D. program engages nearly all colleges within the University of Bahrain and collaborates with international partners such as the United Nations University (UNU), the United Nations Development Programme (UNDP), and the United Nations Environment Program (UNEP). This broad collaboration ensures that graduates are equipped to address the most pressing environmental and developmental challenges locally, regionally, and globally.

The program's core objectives are to
prepare qualified decision-makers, academics, and environmental managers in sustainable development fields. It advances national and international research and knowledge in sustainability. In addition to contributing effectively to the social, economic, and environmental well-being of communities.

Through a rigorous, research-driven curriculum aligned with the UN Sustainable Development Goals 2030, the program enables students to:

- Apply advanced, up-to-date knowledge in environmental and sustainability sciences.
- Critically analyze and propose solutions to complex global and regional sustainability issues.
- Conduct integrated assessments addressing national, regional, and international environmental challenges.
- Examine emerging developments linked to the 2030 Agenda for Sustainable Development.
- Employ advanced qualitative and quantitative research methodologies.
- Design and execute original, high-impact research in environmental and sustainability fields.
- Communicate research findings effectively through professional academic and policy channels.

By combining interdisciplinary instruction, global partnerships, and applied research, the Ph.D. in ESD prepares graduates to become influential leaders driving sustainable transformation and climate resilience in Bahrain and beyond.

Doctor of Philosophy (Ph.D.) in Environment and Sustainable Development (ESD)

• Master of Science in Environmental Chemistry

The College of Science has recently introduced a master's program in Environmental Chemistry designed to equip society and industry with skilled graduates. This interdisciplinary curriculum is designed to advance SDG 13.3.1 by preparing leaders capable of addressing environmental challenges through scientific innovation, sustainable practices, and research-based solutions. As global awareness of environmental and chemical safety increases, this program responds to the growing need for professionals who can balance industrial progress with ecological responsibility.

Developed in collaboration with industry experts, the program provides a two-year interdisciplinary curriculum that equips students with advanced theoretical knowledge and hands-on laboratory experience in environmental chemistry. Students engage in applied research across five key areas: Water Purification and Wastewater Treatment, Air Pollution and Its Control, Treatment of Organic Waste, Environmental Corrosion Monitoring Systems, and Environmentally Friendly and Green Products. The program emphasizes real-world problem solving and industry relevance, ensuring graduates are well-prepared to meet the sustainability and innovation needs of the Kingdom of Bahrain and beyond.

The program's objectives are to:

- Equip graduates with the scientific and analytical skills to address environmental problems.
- Provide advanced laboratory competencies aligned with industrial and organizational demands.
- Foster independent and applied research capabilities.
- Strengthen the ability to translate innovative research ideas into practical market solutions.

Upon completion, graduates will be able to:

- Critically analyze the chemical principles underlying environmental systems.
- Evaluate and apply emerging developments in environmental chemistry.
- Communicate complex scientific concepts effectively to peers and stakeholders.
- Reflect on their skills and progress to support lifelong professional development.
- Develop creative solutions to new environmental challenges through methodological adaptation.
- Systematically assess and synthesize scientific literature to inform sustainable practices.

Through its integration of advanced research, industrial collaboration, and sustainability-driven education, the Master's in Environmental Chemistry empowers graduates to contribute meaningfully to national and global efforts in environmental protection, sustainable industry, and climate action.
Master of Science in Environmental Chemistry

A research and teaching assistant from the College of Science at the University of Bahrain participated in the Third Gulf Chemists Union Symposium, held in UAE in May 2024, with a research paper that was a result of one of several studies he worked on within the M.Sc. program in Environmental chemistry.

6. Undergraduate Academic Program Courses at the University of Bahrain:

In addition to the postgraduate programs, the University of Bahrain offers a variety of courses within the undergraduate academic programs in different colleges and disciplines that contribute to SDG 13:

Bahrain Teachers College

- **Teaching Environmental & Earth Sciences2 (TC2SCT413):**

Introduction to environmental and Earth sciences and their link to sustainable development - Quality of air, climate change, and renewable energy - Water resources, biodiversity, and ecosystems - Waste management, food security, and sustainable consumption - Earth's structure and geological systems - The solar system and space - Environmental problem-solving and data analysis - The development of authentic assessment tools for teaching environmental and Earth sciences.

Since ecosystems are one of the main topics in the course. Students gain an understanding that ecosystems play a vital role in regulating the Earth's climate. By studying their structure and function, they realize how protecting and restoring ecosystems contributes to mitigating climate change. This knowledge empowers them to incorporate climate action strategies into their teaching and to inspire pupils toward environmental stewardship and proactive climate responsibility.

The course is also aligned with other SDGs such as: SDG 4, SDG 6, SDG 7, SDG 11, SDG 12, SDG 15, SDG 17.

- **Teaching Environmental & Earth Sciences1 (TC1SC348)**

Introduction to Environmental and Earth Sciences and their relation to Sustainable Development - Biodiversity, ecosystem changes, and scientific inquiry - Sustainable Development Goals and Education for Sustainability - Air quality, climate change, and renewable energy - Water resources, biodiversity, and ecosystems - Waste management, food security, and sustainable consumption - Environmental problem-solving and data analysis - Earth's structure, rocks, and geological phenomena - The solar system and space - Assessment strategies and addressing misconceptions in Environmental and Earth Sciences. Since ecosystems and climate change are central themes, students learn how ecosystems regulate the Earth's climate and how human actions influence these natural systems. They are trained to teach climate literacy and design lessons that inspire environmental stewardship, aligning education with proactive climate action strategies.

The course is also aligned with other SDGs such as: SDG 4, SDG 6, SDG 7, SDG 11, SDG 12, SDG 14, SDG 15, SDG 17

- **Health, Safety, and Nutrition for Children (TCHL418)**

Introduction to child health, safety, and nutrition - Daily health checks and coordination with caregivers - Common health conditions among children and management procedures - Safety and first aid in school environments - Indoor, outdoor, and digital safety environments - Physical activity and balanced nutrition - Children's emotional and social wellbeing - Environmental hygiene and disease prevention - Emergency response and first aid procedures - Child protection and supporting students exposed to physical or emotional harm - Communication and collaboration with parents, educators, and health professionals - Designing activities promoting health awareness and wellness education.
The course incorporates awareness of how climate change impacts children's health, air quality, and food security. Students explore preventive measures, such as increasing green spaces, improving air circulation, and promoting eco-friendly school environments that support both planetary and human health.

The course is also aligned with other SDGs such as: SDG 2, SDG 3, SDG 4, SDG 5, SDG 6, SDG 10, SDG 12, SDG 16, SDG 17.

- **General Science (TCSC118)**

Examining the importance of environmental conservation, ecosystems, energy and resources, pollution and recycling, biodiversity, the impact of human activities on the environment, and sustainable practices. The topic tackles how different human activities impact the environment, and it promotes sustainable practice to combat climate change.
The course is also aligned with other SDGs such as: SDG 12, SDG 14, SDG 15.

- **Fundamentals of Biology (TC2SC213)**

Ecosystem: Biotic and Abiotic Factors, Ecological Levels of Organization, Niche and Habitat, and Types of Ecosystems. Since ecosystem is one of the topics, it provides understanding to students that ecosystems play a key role in regulating the Earth's climate, so understanding their structure and function supports climate action strategies.

The course is also aligned with other SDGs such as: SDG 13, SDG 14, SDG 15.

- **Teaching Environmental Literacy and 21st Century Learning Skills in Science (TCSC228)**

The course focuses on developing environmental literacy and 21st-century skills.

Students create lesson plans and assignments centred on SDG themes found in school textbooks. A core theme for student assignments, promoting education on climate change mitigation and adaptation.

The course is also aligned with other SDGs such as: SDG 6, SDG 7, SDG 14, SDG 15.

College of Business Administration

• Sustainability Accounting & Reporting (ACC485)

Focuses on sustainability reporting, ESG disclosure, and accountability in business impact.

The course is also aligned with other SDGs such as: SDG 12.

• Environmental Economics & Sustainable Development (ECON351)

Links environmental sustainability with economic policy for sustainable development.

The course is also aligned with other SDGs such as: SDG 15.

• Sustainable Finance (FIN330)

Addresses green investment, ESG financing, and climate-related financial risk.

The course is also aligned with other SDGs such as: SDG 7.

College of Engineering

• Graduation Project I (ARCH 511)

Prepares students to develop a comprehensive architectural program that integrates functional, human, technical, and environmental considerations. Through this course, students engage in research, site analysis, and the application of sustainable design principles, directly linking to several SDGs: SDG 3 – Good Health and Well-Being: By assessing user needs and activities, students design spaces that promote physical, mental, and social well-being. The integration of renewable energy systems and passive environmental controls aligns student projects with climate-responsive and energy-efficient design practices.

The course is also aligned with other SDGs such as: SDG 3, SDG 4, SDG 9, SDG 11, SDG 12.

• Graduation Project II – Design Stage (ARCG 520)

focuses on the design stage of the graduation project, enabling students to express creativity, architectural identity, and critical problem-solving skills while addressing complex design challenges. The course's emphasis on integrating environmental, technical, and social considerations connects to several SDGs: SDG 3 – Good Health and Well-Being: Students design spaces that consider user safety, accessibility, and comfort, promoting overall well-being. Environmental and technical integrations, such as passive design strategies and site-specific responses, address energy efficiency and climate resilience.

The course is also aligned with other SDGs such as: SDG 3, SDG 4, SDG 9, SDG 11, SDG 12.

- **Architectural Design V (ARCG 410)**

develops students' architectural design skills with a focus on housing, integrating technical knowledge, social awareness, and environmental considerations. Through site-responsive housing design, material selection, and building systems integration, students create functional, sustainable, and inclusive residential solutions that address diverse user needs. Integration of site orientation, climate responsiveness, and environmental systems encourages energy-efficient and climate-sensitive housing solutions.

The course is also aligned with other SDGs such as: SDG 3, SDG 4, SDG 9, SDG 11, SDG 12.

- **Vernacular Heritage (ARCG 318)**

Vernacular architecture, defined by its reliance on local resources, cultural context, and passive climate strategies, offers a powerful, time-tested model for sustainability. Studying this tradition moves beyond simple historical analysis; it serves as a foundation for designing modern, resilient, and equitable built environments, directly contributing to the achievement of the UN Sustainable Development Goals (SDGs).

The course is also aligned with other SDGs such as: SDG 4, SDG 9, SDG 11, SDG 12.

- **Highway Engineering**

The Highway Engineering course aligns with several United Nations Sustainable Development Goals (SDGs) by emphasizing the development of safe, efficient, and sustainable transport infrastructure. Furthermore, by incorporating economic and environmental considerations in highway planning and design, the course advances SDG 13 (Climate Action) by encouraging sustainable construction practices and minimizing the environmental impact of transportation systems.

The course is also aligned with other SDGs such as: SDG 9, SDG 11.

- **Traffic Flow and Capacity Analysis**

The Advanced Traffic Engineering course aligns with several United Nations Sustainable Development Goals (SDGs) by focusing on innovative, data-driven, and sustainable approaches to traffic management and system optimization. Furthermore, by promoting sustainable traffic operations and reducing vehicular emissions through efficient system design, the course advances SDG 13 (Climate Action) by contributing to the reduction of the environmental footprint of transportation systems.

The course is also aligned with other SDGs such as: SDG 9, SDG 11.

• **Plant Design Project course (CHENG423)**

Environmental impact assessments and sustainability considerations support climate-conscious engineering.

The course is also aligned with other SDGs such as: SDG 3, SDG 4, SDG 9, SDG 12.

• **Graduation Project Design stage (INTD 411) and (INTD 420)**

Both the Programming and Design Stage courses support the SDGs by encouraging students to apply sustainable design principles in their projects. Through researching sustainable materials and energy-efficient tools, students contribute to SDG 13 (Climate Action), fostering environmentally and socially responsible design practices.

The course is also contributes to other SDGs such as: SDG 4, SDG 7, SDG 11, and SDG 12.

• **Building Construction I (INTA 212)**

This course aligns with the UN Sustainable Development Goals (SDGs) by encouraging students to explore sustainable and eco-friendly materials, climate-responsive and energy-efficient techniques, and local construction practices. Through this learning, students contribute to SDG 13, promoting environmentally responsible and contextually appropriate building study.

The course is also contributes to other SDGs such as: SDG 4, SDG 11, and SDG 12.

Students from the Electrical Engineering Department visited a government school in Bahrain to observe the rooftop solar PV systems as part of the EENG446 Solar and Wind Energy Systems course.

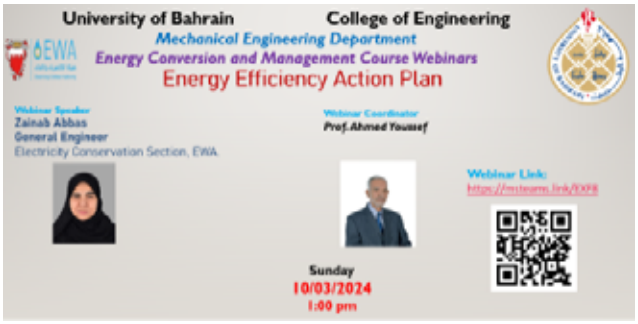
7. Climate Change activities – Seminars

Researchers and faculty at the University of Bahrain are committed to organizing and delivering seminars open to both university students and the public as part of the university's efforts to spread knowledge on sustainability. The follwoing figures present examples of seminars organized by the University of Bahrain and delivered by engineers and scientists from various organizations, including UOB faculty and alumni, to promote a culture of sustainability.

• The Future of Electric Car in Bahrain (March, 2024)

This seminar explored the prospects and challenges of electric vehicles in Bahrain. Delivered as part of the Energy Conversion and Management Course Webinar Series, the session featured Dr. Bijan Majidi as the speaker and was coordinated by Prof. Ahmed Youssef. The seminar provided insights into technological advancements, market trends, and the potential impact of electric cars on regional sustainability and energy consumption.

SDG 17 Alignment: This workshop exemplifies cross-sector collaboration, bringing together university experts and industry leaders to advance sustainable mobility solutions in Bahrain.



• Energy Efficiency Action Plan (March, 2024)

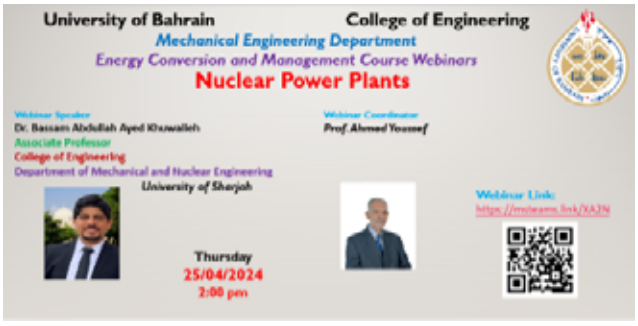
The seminar on energy efficiency was designed to inform participants about strategic approaches to reducing energy consumption and enhancing sustainability. Zainab Abbas, General Engineer from the Electricity Conservation Section at EWA, was the main speaker, coordinated by Prof. Ahmed Youssef. The session covered practical measures and policy frameworks for implementing energy efficiency across various sectors in Bahrain.

SDG 17 Alignment: This initiative highlights collaboration between academia and government agencies, fostering joint action for improved energy management and sustainability.

• Fuel Cell Electric Vehicles (March, 2024)

This seminar, part of the MENG 441: Energy Conversion and Management course, focused on the technology and sustainability of fuel cell electric vehicles. Dr. Shaker Haj from the Chemical Engineering Department at UOB was the speaker, with Prof. Ahmed Youssef as coordinator. The session highlighted the environmental benefits and engineering challenges of adopting fuel cell vehicles in Bahrain.

SDG 17 Alignment: The seminar demonstrates partnership between academic departments and external experts to accelerate the transition to clean transportation technologies.



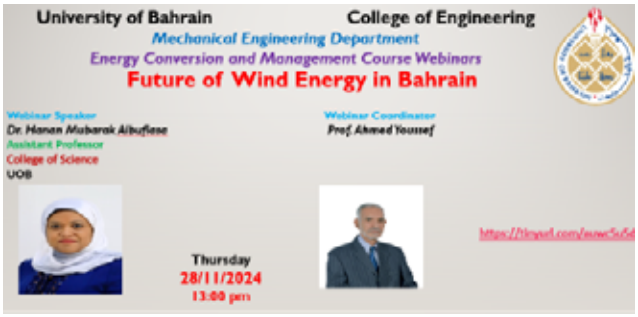
• Nuclear Power Plants (April, 2024)

This workshop focused on the fundamentals and future of nuclear power plants, emphasizing their role in sustainable energy production. Dr. Bassam Abdullah Ayed Khuwalleh, Associate Professor at the University of Sharjah, led the session with coordination by Prof. Ahmed Youssef. The seminar addressed nuclear technology, safety considerations, and its relevance to Bahrain's energy strategy.

SDG 17 Alignment: The event demonstrates international academic partnership, with expertise shared between the University of Bahrain and the University of Sharjah to strengthen regional energy knowledge and policy.

• **Energy Efficiency Action Plan (November, 2024)**
Another session on energy efficiency featured Thanna M. Alrabbea, General Engineer at EWA, as the speaker. Coordinated by Prof. Ahmed Youssef, this seminar reinforced the importance of conservation strategies and provided updated approaches for energy management in Bahrain's public and private sectors.

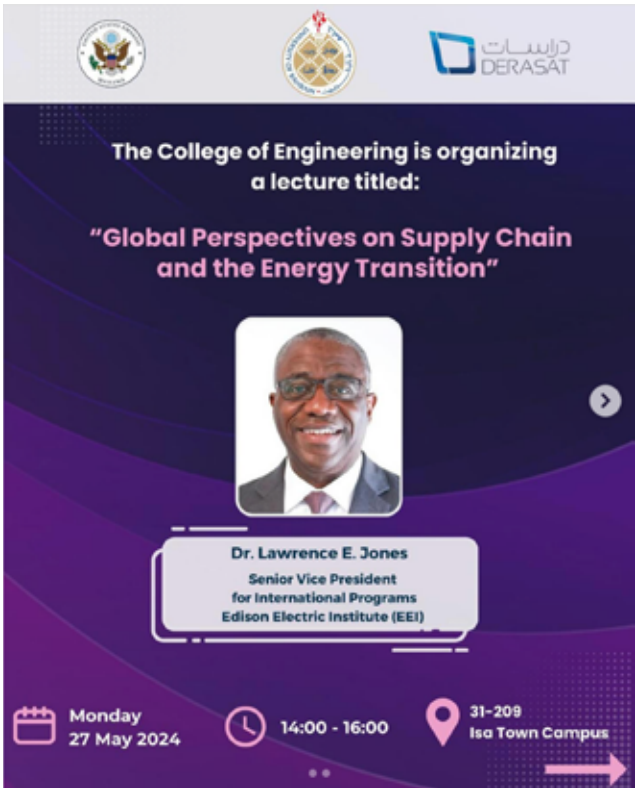
SDG 17 Alignment: This workshop underscores the value of ongoing collaboration between the University of Bahrain and government entities to drive sustainable energy practices.



• **Future of Wind Energy in Bahrain (November, 2024)**This workshop examined the potential for wind energy development in Bahrain. Dr. Hanan Mubarak Albufiasa, Assistant Professor at the College of Science, presented the session, coordinated by Prof. Ahmed Youssef. The seminar discussed technological innovations, feasibility studies, and the integration of wind energy into Bahrain's renewable energy portfolio.

SDG 17 Alignment: The workshop showcases partnerships between university researchers and national stakeholders to promote renewable energy adoption and innovation.

The College of Applied Studies at the University of Bahrain organized an introductory lecture on "Using Solar PV Technology in Electrical Design and Installation" in cooperation with Green Innova (Jun 13, 2024).



The College of Engineering at the University of Bahrain organized a lecture on "Global Perspective on Supply Chain and the Energy Transition" in cooperation with the U.S. Embassy in Bahrain and the Bahrain Center for Strategic, International, and Energy Studies (May 27, 2024).

Faculty members from the Electrical Engineering Department attended the Bahrain Decarbonization Seminar 2024, where Eng. Ahmed Khalid Alqattan presented the 'Bahrain Plan to Reach Net-Zero' organized by the Supreme Council for Environment.

The Electrical Engineering Department organized Solar Appreciation Day 2023, showcasing various student solar energy projects and innovations. The event aimed to enhance student awareness of renewable energy technologies and promote practical learning in the field of solar power systems.

The Electrical Engineering Department organized a technical seminar titled "Real-Time Simulations: What It Is, Where It's Used, and Why It Matters." The session was presented by Dr. Abdulla Abbasi, Director of the Sustainable Energy Section at the Derasat Center, Bahrain. The seminar provided valuable insights into the concept and applications of real-time simulation technologies (RTDS) in energy systems, highlighting their importance in research, testing, and the development of advanced sustainable energy solutions.

EE Department faculty, Dr. Maamar, presented a research article at the 25th Gulf Engineering Forum

8. EE Department organized the technical seminar "Resource Optimization for Green AI Federated Learning for Next-Generation Wireless Networks", presented by Prof. Naofal A-Shahir, Professor, ECE Department, University of Texas, USA.

The University of Bahrain (UoB) hosted the 7th IET Smart Cities Symposium in collaboration with the Institution of Engineering and Technology (IET), United Kingdom, bringing together experts, researchers, and decision-makers to explore the latest innovations and research in smart city development.

In his opening remarks, Dr. Fuad Mohammed Al-Ansari, President of the University of Bahrain, highlighted Bahrain's advanced technological infrastructure, which positions the Kingdom to effectively embrace the concept of smart cities. He reaffirmed the University's commitment to driving innovation and advancing research that supports sustainable and technology-driven urban development.

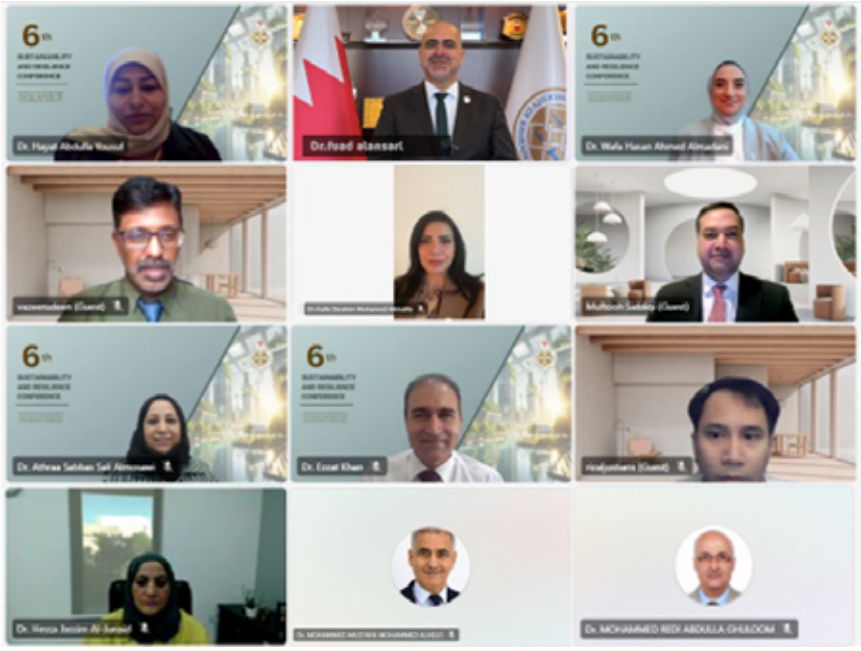
• **Research Significance:**

The symposium showcased 125 research papers, including six keynote presentations, addressing a wide range of topics such as sustainability, transportation, healthcare, education, urban design, robotics, and smart infrastructure.

Dr. Al-Ansari underscored UoB's pioneering role in digital twinning for smart cities, emphasizing its potential to enhance decision-making through data-driven urban planning and management.

The event fostered collaborative dialogue among academia, government, and industry to promote research partnerships and innovative solutions that improve quality of life and support national development goals.

By creating a platform for knowledge exchange, the symposium strengthened UoB's local, regional, and global leadership in smart cities research and sustainable urban innovation.



The 7th Smart Cities Symposium

Commitment to carbon-neutral university

The commitment to a carbon-neutral university is witnessed in the university's initiation of a solar power purchase agreement, where the University of Bahrain will purchase the solar electricity produced by a private company that will build a 46.2 MW solar PV power plant. The University's climate action plan is outlined in the Policy for Energy and Climate Change that establishes the University of Bahrain's strategic approach to improving energy efficiency, reducing carbon emissions, and supporting Bahrain's national vision for a low-carbon economy. It ensures that energy use and climate-related actions across all campuses are sustainable, efficient, and aligned with the principles of environmental stewardship and social responsibility.

Research on climate action

Climate change and sustainability are two of the subjects that the UOB academics and students are actively researching. Examples of research publications in these fields that were published in 2024 are shown below. Compared to the previous year, there have been much more articles written about sustainability and climate change. The publications and contributions are on a global scale, as is evident.

No	Authors	Title	Year	Source title	Cited by	DOI
1	Islam, G.M.N.; Abrar-Ul-Haq, M.; Sankar, J.P.	Social and spiritual factors in building community happiness and wellbeing: The moderating role of education	2024	International Journal of Advanced and Applied Sciences	0	10.21833/ijaas.2024.12.016
2	Al-Taei, S.; Abou Elseoud, M.; Alkhaldi, F.K.	Climate Change-GDP Nexus for GCC Countries: Environmental Kuznets Curve Hypothesis	2024	Sustainability and Climate Change	1	10.1089/scc.2024.0127
3	M. Ishtiaq et al.	Traditional ethnobotanical knowledge of important local plants in Sudhnoti, Azad Kashmir, Pakistan	2024	Scientific Reports	12	10.1038/s41598-024-73431-7
4	Imran, M.; Khan, M.K.; Alam, S.; Wahab, S.; Tufail, M.; Zhang, Z.	The implications of the ecological footprint and renewable energy usage on the financial stability of South Asian countries	2024	Financial Innovation	33	10.1186/s40854-024-00627-1

No	Authors	Title	Year	Source title	Cited by	DOI
5	A.D. Abousoliman et al.	Exploring the relationship between nursing students' knowledge and attitudes towards climate change and their psychological distress: a cross-national investigation	2024	BMC Nursing	9	10.1186/s12912-024-01927-8
6	Sheraz, M.; Sinha, A.; Qin, Q.; Mumtaz, M.Z.	The asymmetric nexus between energy transition and its drivers: New evidence from China	2024	Energy	3	10.1016/j.energy.2024.133236
7	Albalooshi, F.A.	Novel Approach in Vegetation Detection Using Multi-Scale Convolutional Neural Network	2024	Applied Sciences (Switzerland)	2	10.3390/app142210287
8	Permana, D.; Savad Salim, A.S.; Ramli, Y.; Shamansurova, Z.	Analyzing the Impact of Natural Resource Rents, Green Finance and Digital Finance on Environmental Quality: Evidence from Developing Countries	2024	International Journal of Energy Economics and Policy	1	10.32479/ijeep.17147
9	Kaur, C.; Al Ansari, M.S.; Rana, N.; Haralayya, B.; Rajkumari, Y.; Gayathri, K.C.	A study analyzing the major determinants of implementing Internet of Things (IoT) tools in delivering better healthcare services using regression analysis	2024	Bentham Science Publishers	5	10.2174/9789815256680124010022

No	Authors	Title	Year	Source title	Cited by	DOI
11	Saeed, J.; Mehmood, N.; Aftab, S.; Irum, S.; Ashfaq, A.	Unlocking sustainability: the dynamic nexus of organizational support, identification, and green HRM practices in cultivating pro-environmental excellence	2024	Foresight	1	10.1108/FS-03-2023-0037
12	Al Khalifa, F.	Environmental Social Governance Integration in the Gulf Cooperation Council Capital Markets: A Catalyst for Urban Sustainability	2024	Sustainability and Climate Change	0	10.1089/scc.2024.0024
13	Sheraz, M.; Qin, Q.; Mumtaz, M.Z.; Khan, M.H.	Moving toward sustainable goals 7 and 13: An inclusive mechanism to achieve environmental sustainability through digitalization and energy transition in OECD countries	2024	Journal of Environmental Management	10	10.1016/j.jenvman.2024.122288
14	Kosar, N.; Ayub, K.; Gilani, M.A.; Arshad, M.; Imran, M.; Mahmood, T.	Harnessing halides: Comparative study of oxide fullerene modifications for sodium ion secondary battery efficiency	2024	Materials Science in Semiconductor Processing	3	10.1016/j.mssp.2024.108646
15	Alam, S.; Dinçer, H.; Kisswani, K.M.; Khan, M.A.I.; Yüksel, S.; Alsharif, M.	Analysis of green energy-oriented sustainable development goals for emerging economies	2024	Journal of Open Innovation: Technology, Market, and Complexity	8	10.1016/j.joitmc.2024.100368
16	MUNIR, Q.; Lean, H.H.; Teplova, T.; Nazeer, N.	The threshold effect of energy intensity on the emission-growth nexus in Malaysia	2024	Environment, Development and Sustainability	2	10.1007/s10668-023-03600-7

No	Authors	Title	Year	Source title	Cited by	DOI
17	Eweida, R.S.; Najeeb, F.; Khonji, L.M.; Shalhoub, A.A.B.; El-Sayed Mohamed, M.A.; Ibrahim, N.	Looking Back and Moving Forward: A Spatial-Based Pilot Study of Psychological Security and Social Cohesion Among Maldivian Academics amid Climate Change	2024	Sustainability and Climate Change	0	10.1089/scc.2024.0092
18	Bakhsh, S.; Alam, S.; Zhang, W.	Green finance and Sustainable Development Goals: is there a role for geopolitical uncertainty?	2024	Economic Change and Restructuring	11	10.1007/s10644-024-09719-5
19	Ali, M.I.; Dost, S.; Khattak, K.S.; Khan, M.I.; Muhammad, R.	Harnessing the Cloud: A Novel Approach to Smart Solar Plant Monitoring	2024	Future Internet	2	10.3390/fi16060191
20	S. Carlucci et al.	Characteristics of the built environment in the Eastern Mediterranean and Middle East and related energy and climate policies	2024	Energy Efficiency	8	10.1007/s12053-024-10217-w
21	Al-Omran, K.; Khan, E.	Predicting medical waste generation and associated factors using machine learning in the Kingdom of Bahrain	2024	Environmental Science and Pollution Research	5	10.1007/s11356-024-33773-1
22	Alalaiwat, D.; Khan, E.	Post-combustion carbon capture process modeling, simulation, and assessment of synergistic effect of solvents	2024	International Journal of Greenhouse Gas Control	6	10.1016/j.ijggc.2024.104145
23	Hasan, N.; Rizk, C.; AlKhaja, M.; Babikir, E.	Optimisation toward sustainable computed tomography imaging practices	2024	Sustainable Futures	4	10.1016/j.sftr.2024.100176

No	Authors	Title	Year	Source title	Cited by	DOI
24	Hamid, I.; Alam, S.; Baig, I.A.; Jena, P.K.	Nexus Between Institutional Quality and Foreign Direct Investment Inflows: Panel Data Analysis of SAARC Countries	2024	Journal of the Knowledge Economy	7	10.1007/s13132-023-01252-6
26	Ahmed, M.; Aloshan, M.A.; Mohammed, W.; Mesbah, E.; Abdulrahman Alsaleh, N.A.; Ghonaimy, I.	Characterizing Land Surface Temperature (LST) through Remote Sensing Data for Small-Scale Urban Development Projects in the Gulf Cooperation Council (GCC)	2024	Sustainability (Switzerland)	5	10.3390/su16093873
25	Al Moray, N.A.	The Integration of 21st-Century Skills in Grade Eight Mathematics Curriculum	2024	Journal of Curriculum and Teaching	0	10.5430/jct.v13n2p271
27	Alam, S.; Adebayo, T.S.; Said, R.R.; Alam, N.; Magazzino, C.; Khan, U.	Asymmetric impacts of natural gas consumption on renewable energy and economic growth in Kingdom of Saudi Arabia and the United Arab Emirates	2024	Energy and Environment	28	10.1177/0958305X221140580
28	Alkhaldi, F.K.; Abou Elseoud, M.	Assessing the sustainability of gcc economic growth: A proposed theoretical framework	2024	Emerald Publishing Limited	1	10.1108/978-1-83753-106-620241014
29	Koudjina, S.; Kosar, N.; Kpotin, G.A.; Thomas, A.S.; Mahmood, T.; Atohoun, G.Y.S.	Biomass residues purification: elimination of oxygen from oxolane and its monomethylated derivatives through hydrodeoxygenation process	2024	Physica Scripta	1	10.1088/1402-4896/ad2d4d

No	Authors	Title	Year	Source title	Cited by	DOI
30	M. Asim et al.	Sustainable agriculture and the SDGs: A convergence approach	2024	Sustainable Practices for Agriculture and Marketing Convergence	4	10.4018/979-8-3693-2011-2.ch001
31	Alalawi, N.S.; Omar, O.	Towards Greener Campuses: Assessing Pro-Environmental Behaviours in the University of Bahrain Campus	2024	Sustainability (Switzerland)	5	10.3390/su16051869
32	Al Ansari, M.S.	OPTIMIZING WATER DESALINATION: A NOVEL FUSION OF EXTREME LEARNING MACHINE AND GAME THEORY FOR ENHANCED PH PREDICTION - UNVEILING REVOLUTIONARY INSIGHTS	2024	Journal of Theoretical and Applied Information Technology	1	AL ANSARI, D. M. S. (2024). OPTIMIZING WATER DESALINATION: A NOVEL FUSION OF EXTREME LEARNING MACHINE AND GAME THEORY FOR ENHANCED PH PREDICTION-UNVEILING REVOLUTIONARY INSIGHTS. *Journal of Theoretical and Applied Information Technology, 102(3).*
33	Hassan, A.; Dutta, P.K.; Gupta, S.; Mattar, E.; Singh, S.	Human-centered approaches in Industry 5.0: Human-machine interaction, virtual reality training, and customer sentiment analysis	2024		14	10.4018/979-8-3693-2647-3
34	Alfaihani, S.	Linking Islamic Moral Economics and Circular Economy: A Pathway to Sustainability	2024	2024 International Conference on Sustainable Islamic Business and Finance (SIBF)	0	10.1109/SIBF63788.2024.10883876

No	Authors	Title	Year	Source title	Cited by	DOI
35	Alnabulsi, K.; Jreisat, A.	Green Finance on Islamic Financial Markets: A Sustainable Approach to Growth	2024	2024 International Conference on Sustainable Islamic Business and Finance (SIBF)	1	10.1109/SIBF63788.2024.10883851
36	Irfan, M.; Naga Manikanta, C.H.; Gochhait, S.; Allam, Z.	Green and Renewable Energy Impact on Sustainable Indices: Empirical Study on Selected Indian Stocks	2024	2024 International Conference on Sustainable Islamic Business and Finance (SIBF)	0	10.1109/SIBF63788.2024.10883882
37	Rahim, R.; Rathore, H.S.; Rabbani, M.R.; Alam, M.N.	Maqasid Al-Shariah and Green Finance: A Theoretical Framework on Islamic Finance with Sustainable Development Goals for a Greener Future	2024	2024 International Conference on Sustainable Islamic Business and Finance (SIBF)	0	10.1109/SIBF63788.2024.10883847
38	Sultan, M.; Panigrahi, S.	Critical Review of Embedded Insurance: Opportunities, Challenges and Sustainability in the GCC	2024	2024 International Conference on Sustainable Islamic Business and Finance (SIBF)	0	10.1109/SIBF63788.2024.10883872
39	Fathy El Dessouky, N.F.	Sustainable Decision-Making for Sustainable Development Policy: Future Prospects, Opportunities and Challenges	2024	2024 International Conference on Decision Aid Sciences and Applications (DASA)	0	10.1109/DASA63652.2024.10836408

No	Authors	Title	Year	Source title	Cited by	DOI
40	Hasan, S.M.; Ul Haq, M.S.; Badar, A.W.; Qureshi, M.Z.I.; Ali, M.; Salman Siddiqi, M.	Performance Evaluation And Sensitivity Analysis Of A Low-capacity Single-effect LiBr-H2O Absorption Cooling System Using Energy And Exergy Modeling	2024	Journal of Applied Science and Engineering	0	10.6180/jase.202509_28(9).0007
41	Kumar, N.S.; Sahu, T.; Al Ansari, M.S.; Khan, S.A.; Swagatha, J.P.; Infant Raj, I.I.	A Hybrid CNN- GRU Approach with Transfer Learning for Advanced Waste Classification in Support of Environmental Sustainability	2024	2024 International Conference on Intelligent Systems and Advanced Applications (ICISAA)	0	10.1109/ICISAA62385.2024.10828836
42	Almatrook, M.M.; MUNIR, Q.	The Significance of Business Incubators in Fostering the Growth of Start-Ups Towards the Environment and Sustainable Development	2024	2024 International Conference on Decision Aid Sciences and Applications (DASA)	0	10.1109/DASA63652.2024.10836276
43	Farooq, F.; Leong, C.W.; Faheem, M.; Chebab, D.; Nousheen, A.	Non-Renewable Energy, Green Technological Innovation, and CO2 Emissions in South Asia	2024	Pakistan Journal of Commerce and Social Sciences	1	Farooq, F., Leong, C. W., Faheem, M., Chebab, D., & Nousheen, A. (2024). Non-renewable energy, green technological innovation, and CO2 emissions in South Asia. Pakistan Journal of Commerce and Social Sciences (PJCSS), 18(4), 1090-1116.

No	Authors	Title	Year	Source title	Cited by	DOI
44	Alhumaid, F.; Elamir, E.	Skill Factor as a Key Indicator of Digital Dexterity in Emerging Countries: Cluster Analysis Approach	2024	2024 5th International Conference on Data Analytics for Business and Industry (ICDABI)	0	10.1109/ICDABI63787.2024.10800556
45	BinZaiman, F.; Edhrabooh, K.M.; Alromaihi, M.; Al-Shammari, M.	Predicting Environmental, Social, and Governance Scores with Machine Learning: A Systematic Literature Review	2024	2024 5th International Conference on Data Analytics for Business and Industry (ICDABI)	1	10.1109/ICDABI63787.2024.10800444
46	Sultan, W.F.A.; Ghonaimy, I.	Machine Learning's Significance in Improving the Conservation of Traditional Building Facades in Heritage Areas	2024	2024 2nd International Conference on Sustaining Heritage: Embracing Technological Advancements (ICSH)	0	10.1109/ICSH62408.2024.10779626
47	Bahman, N.; Khan, E.; Mahmood, T.	Comparative Life Cycle Assessment of Airport Ground Operations: Environmental Impact of Diesel, Biodiesel, and Electric Sources	2024	Environmental and Climate Technologies	0	10.2478/rtuect-2024-0066
48	Omar, O.; El-Sayary, S.	The Resilience Principles of the Built Environment in Light of Climate Change and the Post-pandemic Era	2024	Urban Sustainability	0	10.1007/978-981-99-8672-9_9

No	Authors	Title	Year	Source title	Cited by	DOI
49	Sharma, A.; Moses, O.; Sharma, R.B.; Gupta, S.	Sustainable Innovation for Industry 6.0	2024	IGI Global	0	10.4018/979-8-3693-3140-8
51	Goswami, S.; Chouhan, V.; Paliwal, L.R.; Sharma, R.B.	Leveraging Industry 5.0 for Achieving SDGs: An Empirical Study on Feasibility, Human-Centered Approaches, and Implementation Barriers	2024	Studies in Big Data	3	10.1007/978-3-031-71213-5_22
52	Al Khalifa, F.	Readiness for transformation towards smart sustainable city models: residents' perspective	2024	Smart and Sustainable Built Environment	2	10.1108/SASBE-05-2024-0178
53	Amin, S.M.; Hashem El-Monshed, A.H.; Khedr, M.A.; Morsy, O.M.I.; El-Ashry, A.M.	Future Nurses in a Changing Climate: Exploring the Relationship Between Environmental Literacy and Climate Anxiety	2024	Journal of Advanced Nursing	2	10.1111/jan.16606
54	Amin, S.M.; Hashem El-Monshed, A.H.; Khedr, M.A.; Awad, A.; Atta, M.	The Association between Emotional Responses to Climate Change, Antenatal Anxiety and Maternal–Fetal Attachment in Primigravida Women	2024	Journal of Advanced Nursing	9	10.1111/jan.16549
55	AlBalooshi, S.; Alfaihani, S.; Ebrahim, R.	Towards sustainable bank bailouts	2024	International Journal of Economics and Business Research	0	10.1504/IJEBR.2024.141496
56	Ghanem, S.; Al-Ammary, J.	Indicators to Measure Smart Education in Bahrain Higher Education Institutions	2024	Studies in Systems, Decision and Control	1	10.1007/978-3-031-62102-4_46

No	Authors	Title	Year	Source title	Cited by	DOI
57	Ali, E.; George, S.	Sustaining Knowledge Sharing Practices in Private Higher Education Institutions in the Kingdom of Bahrain	2024	Studies in Systems, Decision and Control	0	10.1007/978-3-031-62102-4_45
58	Ateeq, A.; Alaghbari, M.A.; Milhem, M.; Alzoraiki, M.; Ateeq, R.A.	Sustainability in the Modern Workplace: A Conceptual Exploration of Eco-friendly Strategies and Corporate Responsibility	2024	Studies in Systems, Decision and Control	0	10.1007/978-3-031-62102-4_8
59	Janahi, F.; Hamdi, H.; Mili, M.	How does energy intensity impact economic growth for the case of a small island country	2024	Natural Resources Forum	0	10.1111/1477-8947.12535
60	Chouhan, V.; Sharma, R.B.; Goswami, S.; Al-Zaimoor, N.; Sharma, A.	EXPLORING THE NEED FOR ENVIRONMENTAL, SOCIAL, AND GOVERNANCE DISCLOSURE STRATEGY FROM THE SHAREHOLDERS' PERSPECTIVE	2024	Corporate and Business Strategy Review	2	10.22495/cbsrv5i3art8

No	Authors	Title	Year	Source title	Cited by	DOI
61	Asad, M.; Sulaiman, M.A.; Ba Awain, A.M.S.; Alsoud, M.; Allam, Z.; Asif, M.U.	Green entrepreneurial leadership, and performance of entrepreneurial firms: does green product innovation mediates?	2024	Cogent Business and Management	43	10.1080/23311975.2024.2355685
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