



## UNIVERSITY OF ANBAR ENERGY AND CLIMATE POLICY



### *Energy and Climate change Policy*

*Develop a policy to ensure that all renovations/new buildings follow energy efficiency Standards*

*University of Anbar has taken significant measures to address the 'United Nations' Sustainable Development Goal 7 for 2030, which focuses on energy and climate change. In response to this goal, the university has implemented various policies aimed at conserving energy and mitigating climate change. These policies include a comprehensive energy consumption reduction program, a renewable energy usage policy, and a greenhouse gas reduction program.*

*To effectively reduce energy consumption, the University of Anbar has adopted a range of initiatives. These initiatives involve increasing the use of energy-efficient appliances, exploring cleaner fossil fuel options, promoting the construction of sustainable green buildings, and making strategic investments in renewable energy sources. To ensure the successful implementation of these policies, the university has established a dedicated Sustainable Development Unit. This unit works diligently to uphold energy conservation guidelines, particularly in designated buildings and actively encourages the adoption of energy-efficient practices and the substitution of renewable energy sources within the university community.*

*University of Anbar is proud to house one of Iraq's largest power plants within its governorate. However, owing to the connecting of the electricity grid to the governorate to the national grid and its commitment to provide specific electricity rations to other regions, scheduled power outages have become a reality for the governorate. As a result, the province's electricity supply, including the University of Anbar campus, is insufficient to meet high demand. To meet this challenge, the University has developed comprehensive plans aimed at generating electricity during planned power outages while also prioritizing energy*

conservation measures. The campus has implemented many energy-saving practices, including the use of ENERGY STAR-compatible devices. These measures include the use of transformer air conditioners in lecture rooms to save energy, the installation of roof fans suitable for Iraq's hot and humid climate to reduce reliance on energy-intensive cooling, and the adoption of LEDs throughout the campus to improve overall energy efficiency. In addition, the University has plans to install solar-powered outdoor lighting. Another aspect considered for energy improvement is the integration of thermal insulation into new buildings, which provides multiple advantages such as employee protection, sound management, improved thermal performance, fire protection, condensation control, and enhanced personal comfort. The University of Anbar is committed to effective energy management and constantly seeks ways to achieve greater energy savings through initiatives such as insulation, LED lighting, and the deployment of sustainable technologies.

### ***Auto on-off lights***

University of Anbar has implemented a smart lighting system in some of its campus buildings. These buildings are equipped with motion and light sensors that intelligently control the lighting based on the presence of movement and the availability of natural light. The corridors, adorned with numerous glass windows, allow ample sunlight to penetrate, prompting the sensors to switch off the lights to conserve energy and extend the longevity of the lamps. However, during evening study hours and throughout the evening, the lights automatically illuminate upon detecting any movement in the University of Anbar's corridors, ensuring a well-lit and conducive environment for students and staff.

### ***Energy Saving Devices***

University of Anbar has implemented a range of energy-saving initiatives to promote sustainability and efficiency across its campus. To ensure an uninterrupted power supply during outages, the university utilizes energy-saving devices such as lights, fans, and cooling systems that are designed to charge during periods of non-use. This stored energy is then utilized when power is cut off, allowing for continuous operation.

## *Diesel Generators*

*Diesel generators are strategically installed in all University of Anbar buildings to serve as backup power sources in case of emergencies. These generators are managed by a dedicated team of professionals who ensure their efficient operation, optimizing electrical energy consumption within the generators' capabilities.*

## *Large Windows*

*The university has also taken steps to maximize natural lighting and ventilation throughout its facilities. By enlarging the size of windows in rooms, corridors, and halls, ample sunlight is allowed to enter, creating well-lit spaces and improving overall air circulation. This not only reduces the need for artificial lighting but also enhances the comfort and well-being of students and staff.*

## *Ventilation and lighting*

*In line with promoting a sustainable environment, the university incorporates internal gardens in all its campuses. These gardens play a vital role in providing natural ventilation, lighting, and warmth, particularly during the winter season.*

## *Cooling system*

*That is specifically designed to operate effectively under the prevailing outdoor conditions in Iraq.*

## *Air pollutant monitoring station*

*Within the College of Science, the university operates an air pollutant monitoring station that holds great significance in monitoring the atmosphere in the Anbar Governorate. As Anbar is renowned for being a city with substantial oil reserves, the emissions resulting from oil refining residues contribute significantly to air pollution. The monitoring station plays a crucial role in assessing the emission of black carbon and its impact on the city's atmosphere. The data obtained from this station*

*serves as valuable information for research conducted by the Department of Ecology in the College of Science.*

### ***Bicycles charging for the Environment***

*For emissions reduction, in addition to reducing the number of parking lots, the University of Anbar has provided a number of Bicycles charging for the Environment for students to move around the campus.*

*The University of Anbar campus has implemented a consistent policy regarding vehicle entry on campus, and the key points of this policy can be summarized as follows:*

*1-In order to enter the university campus, vehicles must obtain a permit from the Permits Department at the University of Presidency. This applies to all vehicles belonging to university employees, including teaching staff, administrators, and technicians, as they undergo a thorough screening process.*

*2-The designated parking areas within the campus are exclusively reserved for university employees, while students are required to park their vehicles in the designated areas located outside the university's colleges.*

*3-Students have the option to utilize the assigned parking areas by paying fees set by the university. This approach aims to optimize resources and encourage students to consider alternative transportation options such as public or private mass transportation.*

*4-The University collects fees from individual renters in exchange for access to the designated parking areas. This step is taken to maximize resources and promote the use of public or private mass transportation, as part of the University of Anbar's resource management strategy.*

*5-To promote sustainable transportation within the campus, the university has established bicycle parking areas near the university dormitories. This initiative plays a crucial role in reducing emissions and encouraging eco-friendly transportation practices.*

*6-The presence of ride-hailing applications, within Anbar Governorate has provided convenient and efficient taxi services for many students and employees. This has resulted in a reduction in the use of private cars on the University of Anbar campus, aligning with the university's goal of promoting sustainable transportation options.*

### ***Direct services in efficient energy***

*University of Anbar has implemented several measures to reduce energy consumption and promote the use of renewable energy sources. These initiatives can be summarized as follows:*

*Significant progress has been made in constructing smart solar buildings at the University of Anbar. These buildings are equipped with 2400-watt solar panels, which generate electricity for lighting, air conditioning (split units), and absorption refrigerators. An energy station has been established on campus, featuring 10 solar thermal water heaters, each with a capacity of approximately 200 kW. These heaters provide hot water for most of the laboratory buildings during the winter season.*

*University of Anbar has plans to install a solar heater on the roof of the shopping book center. This installation will be particularly beneficial during the winter season, leading to a significant reduction in electricity bills and energy consumption. University's Engineering Department has initiated several industrial projects, focusing on the development of renewable energy systems. These projects explore various methods of heating water using renewable energy sources such as solar evacuated tube collectors, flat plate solar collectors, and parabolic solar dish collectors. Notably, a solar dish collector with a solar tracking system has been designed specifically for water heating purposes.*

*Additionally, there is a plan to install roof-mounted solar panels on the administration buildings and the main restaurant building, aiming to maximize energy efficiency and enhance the visual appeal of the campus.*

*Solar panels have already been installed on the roofs of medical buildings, providing renewable energy and contributing to the University of Anbar's sustainable practices.*

*University of Anbar takes pride in being at the forefront of renewable energy adoption within the region. Since the initiative's inception, the university has actively promoted the use of renewable energy sources through workshops, conferences, and various meetings. By showcasing its efforts in utilizing renewable energy, the University of Anbar encourages other organizations and citizens to embrace sustainable practices in energy consumption.*

### ***Smart system***

*University of Anbar has implemented a smart system in certain university buildings that incorporate motion and light sensors. This advanced system automatically switches off the lights in areas where no movement is detected, thereby optimizing energy consumption and extending the lifespan of the lamps. Moreover, the campus buildings are designed with an abundance of glass windows along the corridors, allowing natural sunlight to illuminate the interior spaces. Leveraging this feature, the sensors detect the presence of sunlight and intelligently deactivate the lights, promoting energy efficiency. Conversely, during evening hours and study periods, the smart system detects human movement in the corridors and automatically activates the lights to provide appropriate illumination.*

### ***Green Building***

*To enhance energy efficiency at the University of Anbar, our approach to constructing facilities and centers involves incorporating large windows that facilitate ample sunlight penetration into rooms, corridors, and halls on campus. This design choice not only maximizes natural lighting but also ensures optimal ventilation throughout the buildings.*

### *Using Energy saving devices*

*We employ energy-saving devices such as lights, fans, and cooling systems that utilize a charging mechanism during periods of non-use. This allows us to store energy for later use, particularly during power outages.*

### *LED Lightings*

*To further optimize energy consumption, we have replaced conventional room and laboratory lamps across all University of Anbar buildings with energy-efficient alternatives, including LED lamps.*

### *Convert water into clean energy*

*Many energy reports have called for the need to expand hydropower projects as one of the renewable and clean sources of energy that many countries in the world rely on to play a key role in reducing emissions and achieving carbon neutrality.*

*Typically, power plants from water are located on or near the water source, and the volume of water flow and change in altitude - or decrease, often referred to as head - determines from point to point the amount of energy available in water transport.*

### *Employing the solar energy*

*Furthermore, we have embraced the utilization of solar energy by implementing solar system panels. This initiative significantly reduces our reliance on the national electricity provider and minimizes the consumption of diesel fuel in our generators.*

### *Climate Change*

*It is widely recognized that climate change is one of the most pressing environmental challenges and has significant implications for both the natural world and the economy. If left unaddressed, climate change could drive nearly 100 million people into poverty by 2030. In response to this*

*pressing issue, Anbar University's faculty has been actively proposing solutions.*

*High solutions include the use of exhaust gases from road vehicles for cooling purposes. By reusing these gases, emissions are reduced, thereby conserving energy. In addition, various renewable energy sources have been implemented at the University of Anbar, such as solar and wind power units, to reduce the impact of climate change. The use of renewable energy in lighting and water heating also relieves pressure on the electricity grid, which usually relies on traditional energy sources and contributes to pollution through gas combustion.*

*There are several initiatives aimed at reducing pollution and combating climate change. One notable project involves replacing old air conditioning units with Eco-friendly alternatives. These endeavors are carried out within the University of Anbar's Energy Research Laboratory, which was established to facilitate research and innovation in the field of renewable energy.*

*University of Anbar is also proud of its commitment to reducing emissions and combating global warming. Various measures have been implemented to that end, including the reduction of electricity demand and other sources of CO<sub>2</sub> emissions. Excess electrical power from PV models is exported to further reduce emissions per kW/h (kWh), contributing to the University's efforts to combat climate change. Recognizing that street lighting systems are an important source of emissions, the University of Anbar has embarked on a pilot initiative to replace all street and outdoor lighting with a solar-powered 3-in-1 system, effectively eliminating emissions. This shift is expected to be completed by a target date.*

*Given Iraq's extreme weather conditions, refrigeration and heating are key energy requirements, not only in the country as a whole but also within universities. To address this, the University of Anbar has taken several measures, including the use of high-efficiency refrigeration and heating systems called "inverter systems", which consume less energy while maintaining the same level of efficiency. Moreover, LED lighting is used for indoor lighting systems to reduce power consumption and reduce the need for additional cooling power.*

*University of Anbar actively cooperates with national and international organizations to reduce emissions and promote communities' well-being.*



*They support research and innovation in renewable energy and work on projects that benefit from photovoltaic technology, such as water filtration, desalination, solar heating, and cooling systems.*

### ***Low Carbon Energy***

*The solar panel at the University of Anbar generates = 876000 KWh for solar cells panel.*

*There are 4 Renewable Energy Research (RER) in University Of Anbar*

*Solar power produce = 876000 KWh*

*Combine Heat and Power (Heaters) = 525 KWh*

*Wind power produce = 262800 KWh*

*Hydropower produce = 35 KWh*

### ***Biodiesel***

*University of Anbar also undertakes clean energy production projects, such as the utilization of biodiesel and bioethanol as alternative biofuels to petroleum. These initiatives have been spearheaded by the Ecology Department at the College of Science.*

*Among their endeavors is the development of a steam plant for generating clean electrical energy. The primary components of this steam plant include the boiler, turbine, condenser, and pumps, collectively referred to as the steam pi plant. In addition, the university has established a solar thermal power plant that utilizes the sun's radiation to generate steam, eliminating the need for burning fuels. In the provided image, you can observe rows of concentrated solar collectors, which concentrate the sun's radiation onto the water. This process produces high-temperature and high-pressure water vapor that drives the steam turbine, subsequently powering the generator. The station is equipped with auxiliary devices such as a storage tank to store the concentrated heat, a superheated, and other supporting equipment.*

### ***Horticulture Development***

*University of Anbar has joined the Iraq Horticulture Development, a four-year initiative aimed at strengthening the horticulture sector's competitiveness and exploring new opportunities in the value chain. By*

*implementing advanced farming practices and technologies, the program seeks to enhance the performance of the vegetable industry. This will involve the adoption of climate-smart agriculture (CSA) techniques, the establishment of sheltered greenhouses and productive open-field agriculture, the implementation of efficient irrigation systems, and the improvement of post-harvest processes. The overarching goal of this initiative is to enhance the sector's competitiveness, bolster the resilience of market systems, and promote sustainable agricultural methods among the participating organizations associated with the University of Anbar.*

### ***Disaster Early Warning***

*The College of Science at the University of Anbar operates an air pollution monitoring station, which is considered one of the crucial programs for monitoring the atmosphere in the Anbar Governorate. As Anbar is widely recognized for its significant oil reserves, the predominant source of air pollution arises from the emitted gases generated during the process of oil refining. For instance, this monitoring station plays a vital role in investigating the impact of black carbon emissions on the atmospheric conditions of the city.*

*Scopes of carbon neutral  
Extending the Green Areas of the University*

### ***Incubators and greenhouses***

*University of Anbar possesses both incubators and greenhouses for cultivating plants that serve various purposes such as providing food for campus residents, serving as decorative elements, and supplying plants for the university's college gardens.*