

Template for Evidence(s) UI GreenMetric Questionnaire

University : Alexandria University
Country : Egypt ...
Web Address : <https://alexu.edu.eg/>

[2] Energy and Climate Change (EC)
[2.5] Renewable Energy Sources in Campus



Solar Energy Center at the Faculty of Agriculture (Alexandria University)



Windmill and Solar Panels (Solar Energy Center at the Faculty of Agriculture - Alexandria University)



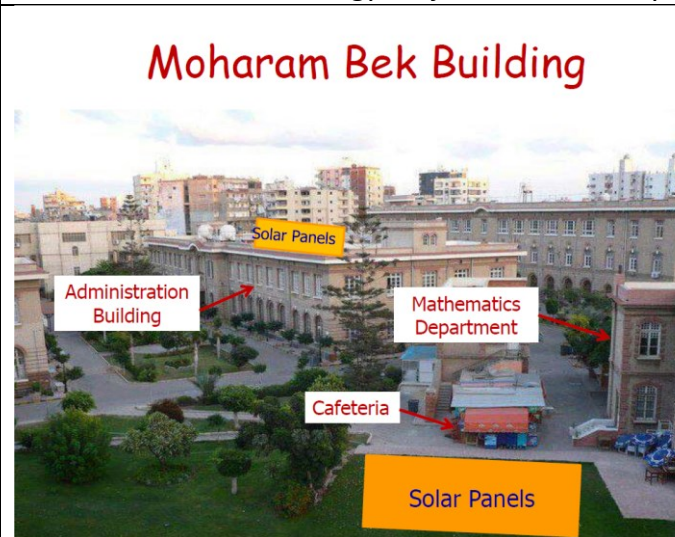
Solar Energy Center at the Faculty of Agriculture (Alexandria University)



Solar Energy Center at the Faculty of Agriculture (Alexandria University)



BIPV Façade Brise-Soleil System
Solar Energy Project at the Faculty of Science (Alexandria University)



BIPV Roof Pergola, Faculty of Science in Moharram Bek (Alexandria University)



BIPV Garden Pergola, Faculty of Science in Moharram Bek (Alexandria University)



Med-algae
Production of Biodiesel from Algae

Regional Mediterranean Centre for Bio-Production
ReMed-Bio

MED-ALGAE Project

Visitors, Stakeholders & Media
29 March 2014

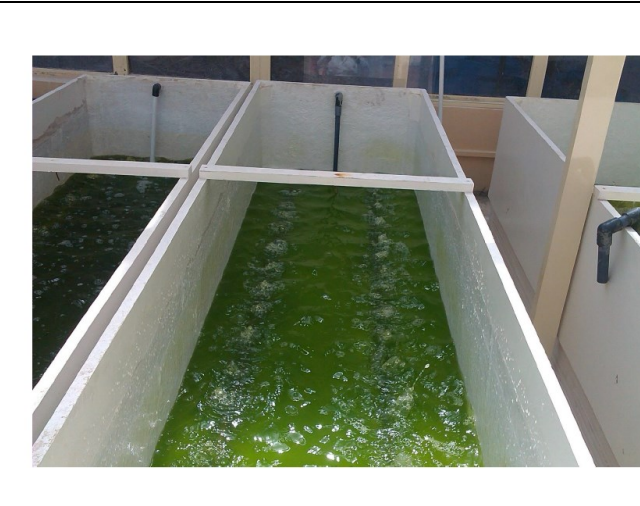
Project funded by the EUROPEAN UNION

ENPI CBCMED



Production of Bio-Diesel from Algae in Selected Mediterranean Countries: Med-Algae Project (Faculty of Science, Alexandria University)

Algae Cultivated in Flat Panel Photo-Bioreactor, Med-Algae Project (Faculty of Science, Alexandria University)



Seawater tank outside the chamber, Med-Algae Project (Faculty of Science, Alexandria University)

Open Ponds with running algal cultures, Med-Algae Project (Faculty of Science, Alexandria University)



Solar photovoltaic with a capacity of 220 kilowatts on the 2000 m² roof top of the building of the Mechanical Engineering Department at the Faculty of Engineering



Description:

The Faculty of Agriculture has 2 renewable energy centers and on center at the main building of the University.

1) The renewable Energy Center in Wadi El-Natroon.

There are two units from the network:

- 7 kw hybrid unit for photovoltaic cells and 5 kw for air turbine.
- 50 kw hybrid unit for photovoltaic cells and 50 kw for air turbines (under maintenance).

They are all used in student training and research for graduate students and faculty members.

2) The renewable Energy Center at the Agriculture Research and Experiments Station in Abis Campus.

- The capacity of the center is 130 kw/h connected to the electricity grid.

3) The renewable Energy Center at the main building of the University.

- The capacity of the center is 20 kw/h connected to the electricity grid.

System Application	Solar System power kWp	Air Turbine power	Energy (kWh)
Wadi El-Natroon 1, Photovoltaic cells	7		7000
Wadi El-Natroon 2, Photovoltaic cells	50		50,000
Wadi El-Natroon 1, Air turbines		5	5000
Wadi El-Natroon 2, Air turbines		50	50,000
Abis Campus			130
University Main building			20
	Total Power (kWp)		112,150



Solar Energy Center at the Faculty of Agriculture (Alexandria University)

The services provided by the center:

- 1) **Research and development:** Encouraging applied research on renewable energy at AU and through collaborations with other national and international universities. Development of hybrid systems in renewable energy and its uses in water pumping and water desalination and development of remote and desert areas. Development of research in energy from biomass and waste. Development of thermal uses of solar energy.
- 2) **Consultations:** Various consultations in renewable energy systems, especially hybrid systems, drying and solar heating.
- 3) **Education and Training:** Supporting the renewable energy education at AU. Developing and delivering courses, e-learning, workshops, training courses, and conferences on various renewable energy systems.
- 4) Serving the Egyptian community by providing all renewable energy information to the public.

Equipment at the center:

- 1) The center has many devices for different applications of renewable energy.
- 2) A hybrid system to generate electricity from the sun with a capacity of about 130 kilowatts.
- 3) E-learning courses on the site.

The Faculty of Science:

Research Project: Development and implementation of decentralised solar-energy-related innovative technologies for public buildings, in the Mediterranean Basin. One of the most important outcomes of the project was the generation of solar photovoltaic energy with a capacity of 49,620 kilowatts per year.

System Application	Number of modules	Solar System kWp	Energy (kWh)
BIPV façade brise-soleil	120	17.28	26350
BIPV garden pergola	90	8.1	
BIPV roof pergola	30	4.1	
Total Power (kWh)			49,620

The Faculty of Science:

Research Project: Production of Bio-Diesel from Algae in Selected Mediterranean Countries: Med-Algae Project.

The project objective is to explore:

- 1- The development of microalgae-based biodiesel production and other valuable products in six Mediterranean countries (Cyprus, Egypt, Greece, Italy, Lebanon and Malta).
- 2- The current level of technology, the relevant market structure, and the governmental and environmental boundaries will be mapped in the participating countries, in order to identify the most promising strategies in each country.

Studied Strains *Chlorella* sp was chosen to be the common examined strain between the partners. In addition, native algal strains from each participant country were isolated and identified.

Both *Chlorella* sp and locally isolated microalgae have been examined under lab and out-door scale.



University administration building

The project of "supplying, installing and operating the photovoltaic solar plant with a capacity of 20.1 kW above the administration building of Alexandria University in Shatby was launched by the Arab Renewable Energy Company, on 2/14/2020. The capacity of the station per month is 20.1 kW, while the capacity consumed from the building is 255 kW / month, meaning that the station provides within 8% of the total monthly consumption. Total Solar energy per year = **241.2 KWh**.

Higher Institute of Public Profession

The Institute has two initiatives to exploit solar energy at the Institute through two units of photovoltaic cells (50 watts each) that are currently installed and are exploited to provide the electrical energy necessary to operate the Ultra-Filtration unit located in one of the laboratories of the Department of Materials Science for educational purpose. Moreover, five units of photovoltaic cells (260 watts each) were installed to operate the discussion room at the Institute and to provide it with sufficient energy for lighting purposes and to operate its display device. Total Solar energy per year = **360 KWh**.

Renewable sources in electricity production project in cooperation with the European Union in Alexandria University buildings in 2023-2024

- In light of the keenness to rationalize energy consumption in university buildings and the general trend to increase the percentage of reliance on new and renewable sources in electricity production, and in cooperation with the European Union, the European Union funding was accepted for a project to transform some buildings of Alexandria University into green buildings by reducing energy consumption in addition to constructing Electrical power stations powered by solar energy on the roofs of some qualified faculty and institute buildings suitable for this purpose.
- Accordingly, three buildings belonging to the university's faculties were chosen as a first stage to study the feasibility of applying the project to them in terms of the building's ability to bear the weight of solar stations to produce electricity, as well as studying the spaces available for building these stations and the extent of those spaces' exposure to solar radiation throughout the day. The opportunities available to reduce reliance on usual energy sources were also studied in terms of using more efficient lighting, increasing reliance on natural lighting during the day, and reducing the building's air conditioning loads.
- After research and review, the specialized scientific programs will be developed in the Faculty of Engineering, the Faculty of Education building within the Literary faculties Complex, and the Manchester Building in the Faculty of Medicine, which were chosen due to the recent construction of these buildings and their ability to accommodate the proposed development in terms of the electrical load network and the development of air conditioning systems and water heating systems used in laboratories and bathrooms.
- These buildings were visited and their suitability for the project was evaluated. The current electricity consumption and the possibility of covering these loads with electricity generated from solar energy were studied. The roof areas facing south and suitable for establishing solar stations were inspected and raised. The available roof area in the Specialized Scientific Programs Building at the **Faculty of Engineering**, Alexandria University, was 2,400 square meters. It can be used to create a solar station with an area of 1,000 square meters with a capacity of **120 kilowatts**, so that the station will be able to generate **360 megawatt hours** of electricity annually. As for the **Faculty of Education** building, the total area of the building was 4,000 square meters, and the appropriate spaces for building the station accommodate 1,000 square meters of solar cells with a capacity of **120 kilowatts**, so that the station is capable of generating **360 megawatt hours** of electricity annually, and for the Manchester building at the **Faculty of Medicine**, 1,200 square meters is capable of accommodating a solar power station with an area of 800 square meters. With a capacity of **96 kilowatts**, the station is capable of generating **288 megawatt hours** of electricity annually. These



stations also contribute to reducing carbon dioxide emissions by a total of approximately 214 tons annually. The total expected cost of the project is about 300,000 euros.

- The time to recover the capital was estimated through providing the electricity consumed in the three buildings for approximately seven years from the date the stations entered service at full capacity, considering the periodic maintenance necessary to continue the station's operation with the greatest possible efficiency. Detailed reports were also prepared for each building and submitted to the general coordinator of the project, for review and to take the necessary steps to start this vital project, which is an important step in strengthening the efforts of the Egyptian state towards switching to renewable energy and reducing dependence on fossil fuels that have a negative impact on the environment.

New European Union Project for Renewable energy production (Solar panels)

No	Location	Production (in kWh)
1	Faculty of Engineering	360,000
2	Faculty of Education	360,000
3	Faculty of Medicine	288,000
	Total	1,008,000

The Faculty of Engineering

The implantation of the new Solar Station is completed. The implementation of the solar photovoltaic panels was performed in December 2022 with a capacity of **220** kilowatts on the 2000 m² roof top of the building of the Mechanical Engineering Department at the Faculty of Engineering.

Alexandria University have generalized this initiative in some of the faculties of Alexandria University in gradual stages.

The total Renewable energy production per year in Alexandria University

No	Renewable Energy	Production (in kWh)
1	Solar panel	57,150 + 49,620 + 241.2 + 360 + 220 = 107,591.2
2	Windmill	55,000
3	New Solar panels in 2023-2024	360,000 + 360,000 + 288,000
	Total	1,170,591.2

Fab Lab Project (Faculty of Engineering, Alexandria University)

The overall goal of the project is to develop the circular and creative economy model by creating an innovation place equipped with machines Low Tech in Alexandria is hosted by Alexandria University. This place will play a role in creating local dynamism Transversal to become a crossroads between different audiences and actors from different backgrounds. To connect waste collection Plastic and its evaluation. Horizons Solidarités and the University of Corsica, in partnership with their peers in Alexandria, based on their experience in Fab Lab Corte, conduct experiments on recreating value for plastic in Alexandria. The goal is to connect all actors from assembly through training to development and dissemination.

The scope of work in the project

- Environment, climate, and energy
- Education, social aspect, and research



These goals will be implemented through the establishment of a FabLab within Alexandria University, which is a space for innovation. Derives place this innovation is energized by a generation that has innovative ideas in the fields of environment, citizenship, and culture. This revival is embodied in women and the men who are partners in the project. The high skills of Alexandria University and Senghor University, Francophone operator in Alexandria, ensures the long-term commitment of their students and the sustainability of the local dynamism. Implementation benefits from facilities Headquarters provided by Alexandria University Project Engine. VSI contributes to the unification of links between regions. Project depends on the Alexandria Business Association (ABA), a trade organization that invests in creating startups in the circular economy and selling finished products. A multi-representative consortium from both sides of the Mediterranean could be formed from these dynamics that will support the project over time.

The French side confirmed that the Fab Lab at the University of Corsica in France has become a very successful experiment on the economic and environmental levels, and is considered one of the most important strategic projects in France and receives the attention of the French Presidency and the Mediterranean region. The French side explained that it seeks to benefit from the expertise of Alexandria University, and that they are fully prepared. To provide full support for the project and coordinate with the relevant authorities in France for the success of this experiment, which will benefit both sides on the environmental, economic and environmental levels.

Led by the South Region and its partner Alexandria Governorate, this project aims to be part of an inter-regional dynamic with the participation of the **Corsican community**. This project is part of the “Zero Plastic Waste” regional strategy in the Mediterranean. It is also part of the dynamics of the memorandum signed on September 5, 2022 between the region and IUCN Med on the occasion of the World Nature Congress in Marseille, which aims to develop joint actions for the benefit of a Mediterranean region without plastic. On the other hand, this project is part of the context of the twenty-seventh session of the Conference of the Parties held in Egypt. It joins the global effort undertaken by the Egyptian state in order to effectively combat the effects of climate change. Its realization in Alexandria makes it possible to structure a permanent cooperation with the governorate around a symbolic project that will, in the long term, enhance the social impact of research and university cooperation. In addition, this project promotes decentralized cooperation between the three regions.

Indeed, supporting this project will highlight the role of the region, Alexandria Governorate, and Corsica in supporting innovative solutions to adapt regions to changing Climate. The strategy is based on four pillars: **digital communication in three languages, the production of digital communication media intended for the general public, organizing competitions for artists and architects from the two countries to enhance the innovative role Fab Lab, and discussions of ideas supported by all partners as a regional facilitator**. In addition, a dedication ceremony for the Fab Lab will be held in the presence of elected officials, governors, university presidents, and will be followed by the symposium in Alexandria is a continuation of COP 27, which was held in November 2022.

A system for monitoring and evaluating the project will be developed by members of the steering committee with the support of specialists. The monitoring and evaluation system will include the quantitative, qualitative, and financial components of the project. It will make it possible to measure the effectiveness of this place of innovation as a driver of sustainable and inclusive development at the local and Mediterranean levels. Indicators for this monitoring and evaluation system will be identified and validated by the Steering Committee at the beginning of the project to verify throughout the implementation period whether the results are consistent expected meets set goals. Answers will need to be provided to the items specified in the reference system approved by the Steering Committee.

Link for Fab Lab Project

https://www.instagram.com/ecofab_alexandria/

<https://alexu.edu.eg/index.php/en/important-news/9096-president-of-alexandria-university-inaugurates-the-fab-lab-for-reusing-plastic-peca>



Additional evidence link: <https://alexu.edu.eg/index.php/about-us-ar>

Link for LED lighting:

https://alexu.edu.eg/index.php/?option=com_content&view=article&id=5935&catid=21&lang=ar-AA

Link for Solar Energy:

https://alexu.edu.eg/index.php/?option=com_content&view=article&id=5936&catid=21&lang=ar-AA

Link for Sustainable Development: <https://alexu.edu.eg/index.php/en/sustainable-development>

<https://alexu.edu.eg/index.php/en/2015-11-24-10-38-07/ranking?id=6011>

<http://sustainability.alexu.edu.eg/>

Link for Green University:

https://alexu.edu.eg/index.php/?option=com_content&view=article&id=5932&catid=21&lang=ar-AA

VICE PRESIDENT
Community Service & Environment Development

Renewable Energy and Water Desalination Activities at Alexandria University

Renewable Energy Center (REC) site is a host of different RE technologies and different RE-Desalination technologies. The site "East of EL-Gaar Village" at Wadi El-Natrocn has both predictable wind energy as well as an abundance of sunlight. Thus, this is a natural application for a hybrid system. The modular hybrid power supply concept proposes the coupling of all sources of energy, storage media and loads on the AC-side.

The Center Goals are to:

- Remove the knowledge barriers against the installation of RE systems in Egypt.
- Enhance the utilization of renewable energy.
- Develop educational and e-learning program about renewable energy.
- Educate students, graduates, public and key stakeholders in Egypt and the Arab world on the various sources of renewable energy and its successful applications.
- Build the infrastructure necessary to develop, install and maintain renewable energy applications.
- Present a show case or a model for the successful utilization of renewable energy in Egypt.
- Continue excellence in all of our educational programs.

Advantages of the Modular Hybrid RE systems:

- Simplicity in System Design
- Expandable, can be run autonomously or be connected to a larger grid
- Offer higher reliability and supply security
- Lower power cost for the consumers
- Production of AC single phase or three phase
- The AC-side structure provides standardization, quality assurance and serial production
- The coupling on the generation technologies on the AC side offers the possibility of placing the generators far apart from each other (distributed generation).


REC site is planned to be a host of different RE technologies and different RE-Desalination technologies such as:

- Hybrid RE technologies(solar, wind, biomass, Hydrogen and fuel cell)
- Hybrid Desalination technologies (RO, MSF, NF,.... Etc)
- Different types of solar cell technologies (thin film, Mono crystalline, Polycrystalline cells)
- Different solar energy technology (PV, CSP, Solar water heating systems, solar dryers)
- Solar Greenhouses.

Activity:

- Hybrid System at Wadi El-Natroon, Egypt (HYRESS system).
- Innovative Renewable Energy (RE) Driven - Multi Stage Flash (MSF) System with Salts Precipitator and Nano Filtration (NF) Feed Water pre Treatment (RE-NF-MSF).

Sincerely,



Prof. Said Mohamed Allam
Vice PRESIDENT
Community Service & Environment Development
Alexandria University