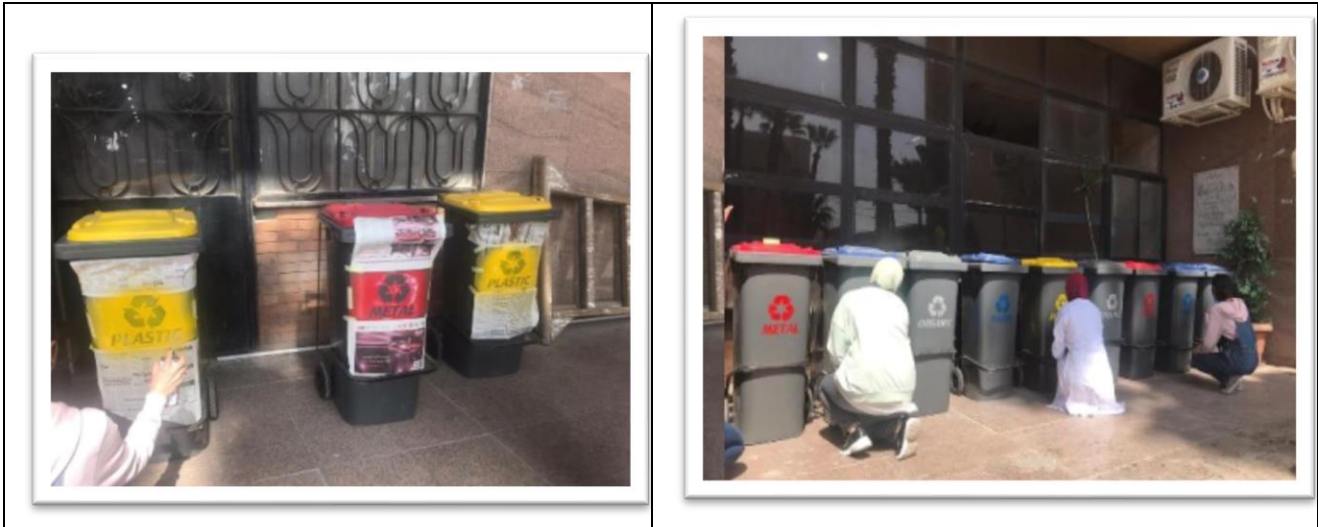


Alexandria University Program towards Net Zero

1 Waste recycling



Recycling Program for University Waste (Alexandria University, Egypt)



Recycling of plastic waste at the Faculty of Science (Alexandria University, Egypt)

**Description:**

Alexandria University developed the initiative of "separating and recycling waste", which aims to protect the environment, maintain the cleanliness of colleges and develop environmental awareness within the framework of the concepts of green economy and sustainable development to achieve the vision of Egypt 2030.

1-The University applied a strategy in all its faculties to segregate the waste into special containers for plastic, papers, glass, and metal objects.

2- The University set an initiative for waste recycling in all faculties with a set of labeled containers for waste segregation distributes in each faculty.

3- The University set initiative for increasing the awareness about Purchase Recycled Products: It is important to buy products made from recycled materials to strengthen the market for recyclables.

4-The University developed an initiative with the governorate (Alexandria Youth alliance) to participate with us in waste management initiative.

5-The University has a contract with Nahdet-Misr Company (the official company in the governorate for waste disposal) for collection and recycling.

6- The University is trying to develop an initiative as a student project with Titan® Company for manufacturing of MDF sectors using university collected waste for maximal benefit from this waste.

7- University students at the Faculty of Science initiated a student project for plastic recycling.

Our recycling program aims to recycle waste by separating it from the source into:

- Organic waste and food residues.
- Plastic waste and plastic bags .
- Mineral waste and carbonated water cans.
- Paper waste

This allows the recycling and utilization of as much of the waste as possible instead of disposing of it in landfills, which will eventually lead to its burning and the consequent pollution of the environment and the increase in emissions of greenhouse gases. Our university promotes maintaining the campus environment in clean condition using high quality non-toxic detergents and cleaning materials.

**Reduction of Paper and Plastic use on Campus**



Program for separation of Paper, Plastic, aluminum cans, glass and organic waste in Campus (Alexandria University, Egypt)	Plastic recycling machine at the Faculty of Science (Alexandria University, Egypt)
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**Program 1:** Development of electronic archiving system; the university faculties and the main campus are moving toward the electronic archiving system to reduce paper consumption.

**Program 2:** University decrees to reduce the use of paper in the campus:

2.1: The president decree to use the e-mails for communications inside the campus and between the university main campus and all the other campuses.

2.2: In the situations, the university or any of its faculties need to print the official documents; this has to be on recycled paper (2 faces copy).

2.3: The University formulated a community for administrative reform to minimize the administrative processes and decrease the use of papers except in who are relevant to financial process.

**Program 3:** Digital transformation toward electronic exams to reduce paper consumption.

**Program 4:** Digital transformation toward electronic course to reduce paper consumption and books printing.

**Program 5:** Electronic administration of student courses by about 50% instead of written administration to reduce paper consumption.

**Additional evidence link:**

<https://www.alexu.edu.eg/index.php/en/community-development-and-environmental-affairs/6435-alexandria-university-initiative-to-separate-and-recycle-waste>

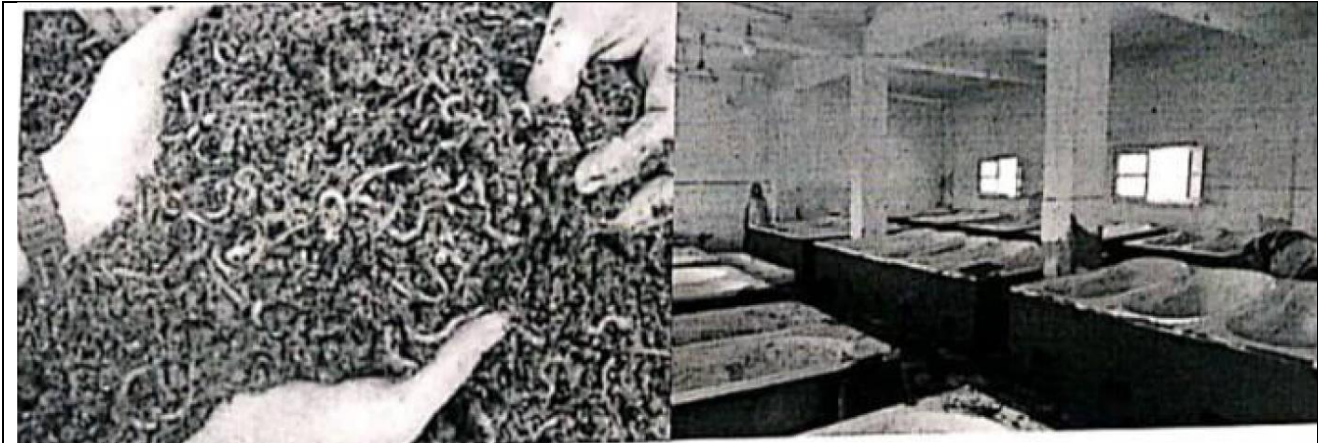
**Additional evidence link:**

<https://www.alexu.edu.eg/index.php/en/community-development-and-environmental-affairs/6435-alexandria-university-initiative-to-separate-and-recycle-waste>

### 3. Reduction of Organic Waste Treatment



Leaves and organic waste were treated for the vermi-compost to produce organic fertilizers to use in the Campus gardens (Alexandria University).



The Faculty of Agriculture recycles 100% of its organic waste (Alexandria University).

### Description:

#### 1- The strategy of the Faculty of Agriculture for the recycling of organic waste:

The Faculty of Agriculture recycles 100% of its organic waste through the following procedure:

- Utilization of the treated agricultural byproducts in farm animals feeding.
  - Utilization of the treated agricultural byproducts for the vermi-compost to produce organic fertilizers.
  - Utilization of the treated agricultural byproducts through a special insect (black soldier) to produce organic fertilizers and protein sources.
  - Mass production of active Biochar from agricultural waste to remove any water impurities or pesticides residues.
- 2- The organic waste in Alexandria University is handled according to the contract with Nahdet Misr company. All organic wastes are collected in organic waste containers. Then the company collects these waste bags and delivers it to waste treatment facility for processing.
  - 3- In addition, the University students at the Faculty of Science initiated a student project for organic waste recycling. Leaves and organic waste were treated for the vermi-compost to produce organic fertilizers to use in the Campus gardens (Alexandria University).

**Additional evidence link:** <https://www.alexu.edu.eg/index.php/en/community-development-and-environmental-affairs/6435-alexandria-university-initiative-to-separate-and-recycle-waste>

#### 4. Inorganic Waste Treatment



Recycling Program for both materials and equipment with metals and derivatives (Alexandria University, Egypt)

#### Description:

#### 5. Disposal of Inorganic Waste

The University follows the Egyptian laws associated with disposal of hard materials waste No. (6) for the year 2009 and No. (9) for the year 1982 concerning with environment protection. Alexandria University has a yearly contract with **Alexandria Governorate Hazardous Waste Management (NASERIA)** for the disposal of Inorganic Waste (attached a copy of the Contact).

1- In general the hard material waste in the University is divided into two types including:

- **Non-medical waste:**

Products which are collected and stored in a far place in the faculties which are then removed to a general dump for recycling.

Heavy metal: Heavy metal waste consists of both materials and equipment with metals and derivatives.

Examples: Batteries, amalgam, broken mercury thermometers.

- **Medical waste:**

Medical waste consists of several different subcategories that should all be dealt with in the same way:

Potential infectious waste includes all waste items that are contaminated with or suspected of being contaminated with body fluids.

Examples include:

Blood and blood products, used catheters and gloves.

2. Inorganic Wastes are collected in separate containers labelled for inorganic waste. The garbage bags are collected daily by Nahdet Misr company for processing.
3. Batteries and other E-wastes are collected separately inside Alexandria University Campus and are delivered for special treatment by Nahdet Misr company. The E-Material are never trashed into a regular trash.

## **6. Recycling of Solid and Electronic Waste in the Faculties and Institutes of Alexandria University**

According to the decision of Alexandria University to transfer all solid waste to institutes, colleges, hospitals and university cities of the University at the Agricultural Research and Experiments Station in Abis as a central storehouse for the collection of iron priests (Wood - Iron - Alumetal - Computers - Projectors - Photocopiers - Printers - Fire Extinguishers - Doors - windows - wires, lighting poles, electric panels.....etc.), which are considered valuable solid waste worth recycling.

Recycling of solid waste is a good investment project, and with the increase of environmental awareness worldwide, the demand of recycled materials will rise. Alexandria University can save production and energy costs and reduce the negative impacts that the extraction and processing of virgin materials has on the environment.

Recycling old devices saves energy. It also means that fewer raw materials need to be drawn from nature to create new devices. Reusing old devices prevents e-waste by keeping it out of landfills.

**The environmental aspect:** The process of recycling solid and electronic waste mainly contributes to reducing the percentage of pollution of all kinds, by reducing the accumulation of waste, which contribute greatly in pollution of the environment due to the release of polluting gases and toxic elements in the air, water, and land. The process of recycling solid and electronic waste contributes in reducing the impact of human activity on the planet Earth.

**Economic aspect:** The process of recycling solid and electronic waste play an important role in the reduction of economic expenditures, helping countries to meet the challenges related to the high prices of raw materials such as oil and coal. Recycling reduces the reliance on the export of the primary resources of many industries, thus reducing the cost of production. Which result in lower bill of taxes, customs duties, insurance premiums, transportation. On the other hand, the recycling process helps in reducing the consumption of natural raw materials used in different industries. Accordingly, the Energy consumption for manufacturing and production processes will be reduced.

### **The disposal Program**

- A specialized committee is selected including a member from the Engineering Department, according to the devices or tools under investigation.

- In case the devices are not useful, the committee recommends that the items will be transferred to the Agricultural Research and Experiments Station in Abis.
- Recycling warehouses are divided into sections according to the type of materials being recycled, for example: Calculators, printers, wood, Aluminum, etc
- Working teams are selected from the university faculties' maintenance units to benefit from these solid and electronic waste.
- 

**Additional evidence link: Maintenance Unit for lab apparatus and electronics:**

[https://alexu.edu.eg/index.php/?option=com\\_content&view=article&id=5912&catid=21&lang=ar-AA](https://alexu.edu.eg/index.php/?option=com_content&view=article&id=5912&catid=21&lang=ar-AA)

**7.Toxic Waste Treatment**



**Description:**

The biohazards, medical hazards, and toxic chemical compounds are handled by a **special contract** with **Nahdet Misr for Modern Environmental services** company, which process these wastes according to the Egyptian law number 6 for year 2009 and low number 9 for year 1982. (attached Contract copy)

- **Medical waste:**  
 Medical waste consists of several different subcategories that should all be dealt with in the same way:  
 Potential infectious waste includes all waste items that are contaminated with or suspected of being contaminated with body fluids.  
 Examples include:  
 Blood, blood products, used catheters and gloves.

**8.Sewage Disposal**



The sewage water will be treated and reused in the irrigation of green areas in the project (Alexandria University)



The irrigated water supplied to the fish farm at the Agriculture Experimental Research Station of the Faculty of Agriculture is recycled to irrigate the crops, vegetables, and fruits of the land farm.

**Description:**

**Elements of Green Building Implementation as Reflected in all new construction and renovation policies in the new buildings in Abis campus:**

- The area of the project is 160 acres, a general site for educational buildings, and 120 acres are complementary activities. The percentage of green areas and lake is about 52% in addition to 25% streets and lanes.
- Water-saving plots are used, which will reduce water consumption by about 30%. The sewage water will be treated and reused in the irrigation of green areas in the project.





- Rainwater is collected in the main lake and used for irrigation.
- The use of plants with few water rationed plants to reduce irrigation needs in addition to absorbing quantities of rainwater to reduce the severity of rain spells.

### **Sewage Disposal and recycling**

- Providing a sewage treatment plant at the university to make it suitable for irrigating green areas and gardens inside the university campus.
- The irrigated water supplied to the fish farm at the Agriculture Experimental Research Station of the Faculty of Agriculture is recycled to irrigate the crops, vegetables, and fruits of the land farm. The recycled water is rich with natural fertilizers and enhances the crops production.
- In addition, the water recycling in Fish Aquaculture of the Faculty of Agriculture, Alexandria University: The water sewage of the Aquaculture of the Faculty of Agriculture, Alexandria University which consist of eight ponds (one acre and quarter/each) in Abis region. Alexandria University used the recycled water for crops culturing in the adjacent agriculture research center in Abis.
- The use of biochar produced from Agricultural waste and waste Forests in residual removal chlorpyrifos pesticide Imidacloprid is from water agricultural drainage. Cooperation project between the Egyptian Academy of Research Science and Technology and the Czech Academy of Sciences.

### **Additional evidence link**

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

**Link for Green University:**

[https://alexu.edu.eg/index.php/?option=com\\_content&view=article&id=5932&catid=21&lang=ar-AA](https://alexu.edu.eg/index.php/?option=com_content&view=article&id=5932&catid=21&lang=ar-AA)

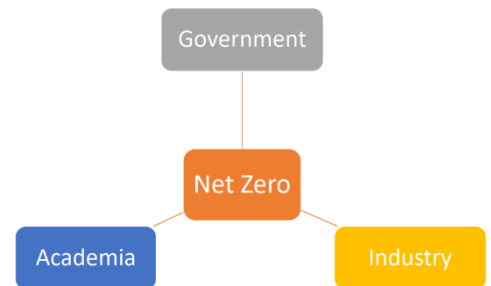
Document prepared by Prof. Sherine Khattab



## A Road Map

### Towards Net Zero Emissions through Synergy Between Academia, Government and Industry

- Roadmap Towards Net Zero Emissions
- Alexandria University Climate Change Strategy Map
- Alexandria University Climate Change Projects
  - Green Hydrogen
  - Electric Vehicles
  - Alexandria Water and Energy Services Company (AWESCO)
  - Suez Canal Impact on Shipping Emissions
  - Egypt as an International Energy Hub and Enhancing its Energy Mix
  - Egypt as a World Hub for Electronics Design and Manufacturing
  - Coastal Protection and Flood Management for Alexandria Governorate
  - Alexandria Sustainable Development Center of Excellence (ASD)
  - Alexandria Center for Greener Blue Economy



## ALEXANDRIA UNIVERSITY COP27 STRATEGY MAP



## Activity 1 SCOPE2

Alexandria University is working with its partners from Academia and industry to transform Kima Fertilizer company to a green company for the production of Ammonia. The hydro power plant technology

## Activity 2

Alexandria University is working with its partners from Academia and government and private sectors to develop a powertrain control system to support group transportation buses.

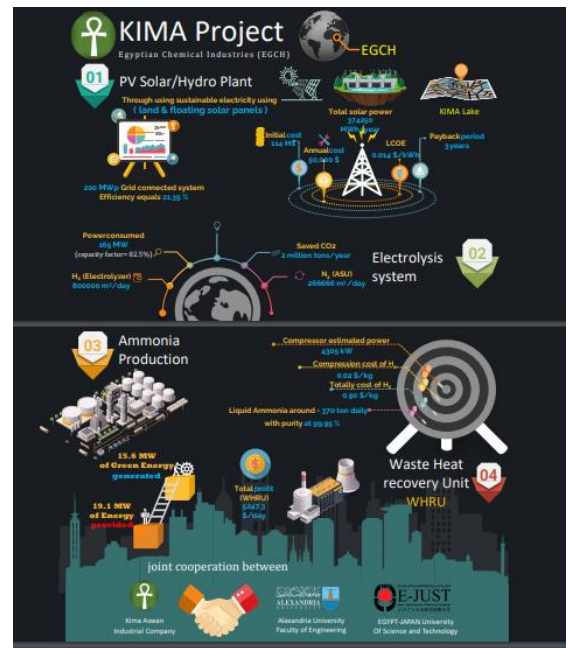
### DECARBONIZATION OF THE FERTILIZER INDUSTRY EGYPTIAN CHEMICAL INDUSTRIES - KIMA

- Hybrid renewable energy production from solar power/hydro power.
- Green hydrogen production by water electrolysis.
- Pressurized tank design for green hydrogen storage.
- Green ammonia production from green hydrogen.



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**Featured In**



### AN ELECTRIC POWERTRAIN FOR CITY BUS TRANSPORT VEHICLES

- The goal of the project is to develop a configurable powertrain control system that can support different categories of transportation buses.
- The developed powertrain will be used to convert a 12m bus into a fully electric bus.
- The project is sponsored through ITIDA – Ministry of Communications (5 million EGP).
- Project delivery date is February 2023.

**Sponsor**

**Industrial and Academic Partners**

## Activity 3 SCOPE1

Establishment of an Energy service company owned by Alexandria University to operate in the field of energy and water resources. The company will include members from stakeholders who contribute to the high energy consumption. The main objective of the company is to reduce the carbon footprint and implementing the concept of Energy performance contracting

### Mission & Vision

- ✓ To make Egypt's Built Environment & Industry a leading example of Energy Efficiency
- ✓ Help Alexandria to be a Green & Sustainable City
- ✓ Lower the carbon footprint of the Region
- ✓ Introduce and implement the concept of Energy Performance Contracting



Blower Door Model



Combustion Analyzer



Duct Blaster System



Thermal Infrared Camera

Energy Audit Team

### Project outlines

Alexandria University is planning to establish an "ESCO" Energy Service Company to operate in the fields of Energy and Water Resources under law 23 y2018

The company will be owned by Alexandria University with members of the board from several reputable stakeholders

Simply define the current energy profile for buildings or industrial activities, propose energy retrofitting techniques with acceptable payback times.


These studies will be used to convince funding agencies to fund the proposed optimization strategies in order to reduce overall energy consumption and carbon footprint and will be paid back by energy savings from utility bills over the time indicated by the study. AWECO will act as the third party for all Energy contracting practices.

## Activity 4 SCOPE2


Alexandria University work collaboratively with the Suez Canal Maritime transport to reduce the impact of Suez Canal due to carbon emissions. The main goal of the project is to reduce the emissions nationally and globally.


### SUEZ CANAL IMPACT ON THE REDUCTION OF SHIPPING EMISSIONS

- Maritime transport is the backbone of international trade and the global economy.
- Over 80% of the volume of international trade in goods is carried by sea (UNCTAD, 2018).
- Suez Canal is a strategic nexus for global supply chains and among the world's most significant trade chokepoints.
- 18,880 vessels passed via SC in 2019 with a total deadweight of about 1 billion tons.
- That represents about 10% of the world's trade volume passed via SC.
- The distance saved reached about 10,000 miles (18,000 Km) on certain voyages which contributes to immense fuel and emission savings, in addition to the contribution to the global economy.



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## Activity 5: Energy Hub SCOPE1

Alexandria University is working nationally to establishing Egypt as an international energy hub to secure energy from multiple sources. The main aim is to reduce emissions and logistics of energy transportation.

### EGYPT AS AN INTERNATIONAL ENERGY HUB AND ENHANCING ITS ENERGY MIX

#### International Energy Hub

- › Establishing Egypt as an international energy hub between the current producers in Asia and the industrialized countries in Europe to reduce the costs, emissions and the logistics of energy transportation.
- › Securing energy for Egypt from multiple sources.
- › Trade income.
- › Increased ship movement with possible addition of services
- › Effective utilization of Egypt LNG resources (2 plants)

#### Enhancing Egyptian Energy Mix

- The future energy strategy should be based on a balanced energy mix of all sources of energy.
- Innovation and Investment into reducing the harmful emissions from fossil fuels to make them cleaner.
- Efficiency of existing energy systems should be increased by a combination of technological solutions, improvement of building codes and implementation of regulations and effective audits

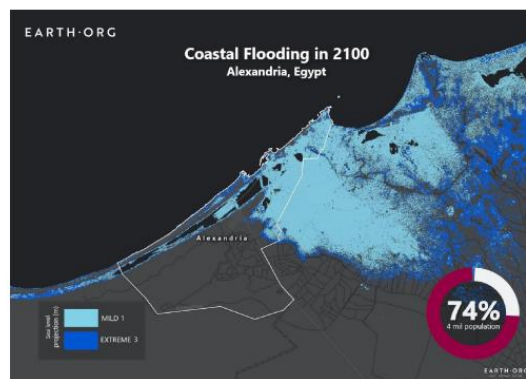
## Activity 6 Coastal Hazards SCOPE3

A Road Map for

1)creating a reliable risk assessment map for

Alexandria that involves identifying the study area along the coastline of Alexandria, 2)Providing the local authorities and policy makers with updated data for the vulnerable areas subjected to flooding. 3) Accurate prediction and enabling readiness facing sea-level-rise under extreme events. 4) Increase the public awareness of the sea-level-rise and extreme events. 5) Preparing a hydrodynamic model resulting in selection of the appropriate needed coastal and shoreline protection structures. 6) Use of permeable pavement to reduce the risk of flood in a pilot area in Alexandria

### CLIMATE CHANGE AND ITS EFFECT ON ALEXANDRIA DUE TO SEA LEVEL RISE



- Several studies conducted regarding the vulnerability of Alexandria Governorate, indicated that in the event of a rise in sea level of half a meter, it is expected that 30% of the city will be inundated, which will lead to displacement of nearly 1.5 million people or more, 195,000 jobs will be lost, and land and property losses estimated to be \$30 trillion.
- Results of 0.5m SLR scenario in Alexandria predicted losses of 45% of recreational areas, 13% of residential area, 12% of industrial area, 30 % of the services, and 21% of tourism attractions, if no precautionary actions are taken.

## Activity 7. SCOPE3 Building Materials, Construction, Infra Structure, Industry, Energy & Resources

**Aims to :** Provide a hub to cooperate with relevant industry, & research entities to provide access & dissemination of needed knowledge & practices & adaptation of appropriate technologies.

- o Partner with government, industry to help overcome resourcing challenges, towards greener technologies & sustainable strategies.

**Stakeholders:** Manufacturing companies of cement, concrete, steel, ceramics, bricks, asphalt; petro-chemicals, fertilizers, gases, textiles, paper...etc.

- o Building & construction sector.
- o Transportation & energy sectors.
- o Ministries, government agencies & code development entities

**ALEXANDRIA SUSTAINABLE DEVELOPMENT CENTER OF EXCELLENCE (ASD)**  
 Green Campus – Alexandria University



**SOLE**  
High Energy efficiency for the public stock Buildings in Mediterranean



Project funded by the  
**EUROPEAN UNION**

**Industrial and Academic Partners**






Establishment of a 200 kW solar power plant in the Faculty of Engineering – Alexandria University

## Activity 8 SCOPE3: Alexandria centre for greener blue economy

**ALEXANDRIA CENTER FOR A GREENER BLUE ECONOMY**

**THE BLUE ECONOMY**



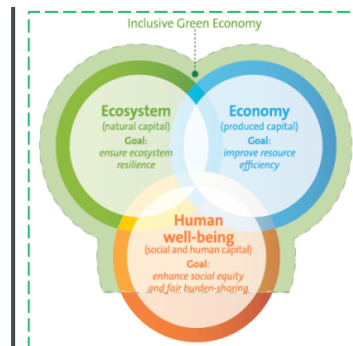
Blue Economy - Definition

Sustainable use of ocean, sea and river resources for:

- o Economic growth.
- o Improved livelihoods.
- o Job creation.
- o Mitigation of the impacts of climate change.
- o Meeting the food needs of a growing global population.

Blue Economy - Challenges

- o Frequent flooding.
- o Marine pollution.
- o Lack of trained personnel.
- o Over-exhaustion of resources.
- o Lack of regional cooperation.



Green Economy - Definition

Low carbon, resource efficient and socially inclusive economy in which growth is driven by investment in:

- o Infrastructure and assets that allow reduced carbon emissions and pollution.
- o Enhanced energy efficiency.
- o Prevention of the loss of biodiversity and ecosystem services.

Blue Economy vs Green Economy

- o Green economy tends to focus on sectors of energy and transport, while blue economy tends to focus on marine and coastal resources.
- o Both incorporate climate change mitigation and adaptation strategies.
- o Regional cooperation in implementation of both types of economies would lead to prosperity growth for all countries involved while preserving their resources.

**Vision**

Towards a greener blue economy for the benefit of the citizens of all Mediterranean countries

**Center Services**

<b>Research</b>	<b>Training</b>	<b>Consultation</b>
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- o Ten scholarships offered by Alexandria University to graduate students from the Mediterranean Region.
- o Scholarships to be also offered by partner Euro-Mediterranean Universities.
- o Strategic partnership with ASCAME and scholarship offering with scheduled start date of Spring 2023.

**Mission and Goals**

- o Conduct studies about the challenges of merging green economy requirements into blue economy applications.
- o Offer solutions to assist in the development and sustainability of resources that comply with standards of efficiency, effectiveness and prosperity.
- o Achieve just distribution of wealth among successive generations of our region.
- o Formulate strategies to mitigate and adapt to the negative effects of climate change and reduce the emission of greenhouse gases.
- o Incorporate cultural, civilizational and social aspects within the sustainable blue economy strategies.

**Strategic Partners**

