13.3.2 University Climate Action plan, shared with local government and/or local community groups

Alexandria University recognizes biodiversity conservation and urban greens as key sustainability strategy components. Aligned with SDG 13 – Climate Action, it continuously maintains land cover, forest area, soil, vegetation, crops, and plants supporting research, education, environmental protection, and social interaction. This program builds resilience, lowers our carbon footprint, and advances global climate change adaptation.

Alexandria University Climate Action plan, shared with local government and/or local community groups, establishes an integrated framework advancing SDG 13 – Climate Action and sustainability across coastal Egypt. Driven by scientific research, empirical data, measurement, monitoring, and remote sensing, our quantitative methodology uses climate models, simulation, and life cycle assessment (LCA) tools for rigorous system analysis, evaluation, and risk assessment. Through this approach, we assess energy utilization, total energy consumption, and the campus carbon footprint across buildings, infrastructure, residence characteristics, and regional transportation fleet vehicles. Replacing legacy fossil fuel sources—including coal, natural gas, and diesel fuel powering diesel engine systems in power plant facilities—the university drives a regional energy transition. Upstream production of cement, metals, materials, and chemicals releases greenhouse gas emissions (CO2 emissions / carbon emissions / gas emissions / co2 / carbon dioxide), methane, and nitrogen, increasing atmospheric concentration, accelerating global warming, and shifting air temperature. These forces threaten local ecosystems, land cover, land, soil, vegetation, forest area, steppes, wetlands, rivers, lakes, glaciers, groundwater, and water resources along Alexandria's vulnerable coast and ocean and sea, endangering biodiversity, native species, crops (Zea mays, rice), and total water supply while worsening drought, floods, and hot temperature extremes.

To counter these causes and complex dynamics, our joint strategy deploys clean technology, targeted solutions, and strict energy conservation. We expand renewable energy via solar energy, solar power, wind power, and renewable energy source capacity for power generation; accelerate solar energy conversion and electric vehicle (EV) mobility; utilize biofuel and hydrogen; and process municipal waste via recycling, gasification, biomass, and reforming reactions. Engineered carbon capture—via adsorption, absorption, membrane systems, gas separation, and injection or storage in structural basins—complements natural carbon sequestration, urban greens, and environmental protection to enhance air quality and air pollution control. Guided by costs and cost analysis, cost-benefit analysis, and carbon markets, this plan optimizes investment, unlocks economic benefits, and minimizes systemic risk under environmental uncertainty. Ultimately, this unified program offers a scalable model driving sustainable economic growth, building climate resilience, and protecting planet Earth (planet) for the global human population across developing countries and nations like the United States and China.

Climate change is a major environmental challenge affecting Alexandria because of its Mediterranean coastal location, urban development, industrial activities and dependence on natural resources.

The main climate challenges include rising temperatures, sea-level rise, coastal erosion, flooding, air pollution, greenhouse gas emissions, water scarcity and ecosystem degradation.

Alexandria University has an important role in supporting sustainable development through scientific research, environmental policies, renewable-energy projects, carbon-footprint assessment and cooperation with local government and community stakeholders.

In January 2025, the Alexandria Green City Action Plan (GCAP) was published as a strategic framework for developing a more sustainable and climate-resilient city.

The plan identifies Alexandria University as a key knowledge partner for climate-change and land-use actions.

- **Alexandria Green City Action Plan – January 2025**

  The Alexandria Green City Action Plan was developed under the EBRD Green Cities Programme, with support from the European Bank for Reconstruction and Development and the Austrian Federal Ministry of Finance.

  The plan was prepared in cooperation with Alexandria Governorate and relevant governmental and technical stakeholders.

  Its main objectives include:

  - Reducing greenhouse gas emissions.
  - Improving environmental protection and air quality.
  - Strengthening climate adaptation and coastal resilience.
  - Improving energy efficiency and renewable-energy utilization.
  - Protecting water resources and ecosystems.
  - Developing sustainable urban infrastructure.
  - Improving climate-risk management and early-warning systems.

- Encouraging community participation in sustainable development.

The plan provides a framework for coordinating environmental policies, investment projects and climate-related actions across Alexandria.

- **Collaboration Between Alexandria University and Local Government**

  The Alexandria Green City Action Plan identifies Alexandria University as a key knowledge partner for all climate-change and land-use actions.

  This creates an important relationship between academic research and local government decision-making.

  The university can contribute through:

  1. Scientific research and climate modelling.
  2. Analysis of greenhouse gas emissions and carbon footprints.
  3. Environmental impact assessment.
  4. Climate-risk and vulnerability assessment.
  5. Research on coastal protection and adaptation.
  6. Renewable-energy and energy-efficiency technologies.
  7. Monitoring environmental conditions and climate-related risks.
  8. Technical recommendations for sustainable urban planning.

  The plan also identifies the Alexandria Governorate, Ministry of Local Development, Egypt Meteorological Department and other public authorities as relevant stakeholders.

- **Climate Action Priorities in Alexandria**

  Carbon Emissions and Greenhouse Gas Reduction

  The city plan addresses greenhouse gas emissions through sustainable energy, improved transportation, energy-efficient buildings and better waste management.

  Alexandria University also reports progress in reducing its institutional carbon footprint.

  According to its 2024–2025 Sustainability Report:

  - Carbon footprint in 2020/2021: 7,541.33 tonnes CO_2e.
  - Carbon footprint in 2024/2025: 3,040.60 tonnes CO_2e.
  - Reported reduction: approximately 59.7%.

These figures provide evidence of the university's contribution to carbon-emission reduction through energy-efficiency improvements and renewable-energy measures.

Renewable Energy and Energy Efficiency

The Green City Action Plan promotes:

- Solar photovoltaic installations.
- Renewable-energy production.
- Energy-efficient buildings.
- Smart electricity distribution.
- Energy monitoring and optimization.
- Reduced dependence on fossil fuels.

The plan also includes a case study of the SOLE energy rehabilitation project at Alexandria University's Faculty of Engineering.

This project involves cooperation between the Alexandria Chamber of Commerce and the Confederation of Egyptian European Business Associations to improve the building's energy performance through photovoltaic technology.

Climate Adaptation and Coastal Protection

Alexandria is vulnerable to climate-related coastal hazards, including sea-level rise, storm surges, coastal erosion and flooding.

The Green City Action Plan includes a coastal protection action designed to reduce damage to coastal areas and important infrastructure.

Proposed approaches include:

- Coastal protection infrastructure.
- Nature-based solutions.
- Improved land-use planning.
- Flood-risk assessment.
- Protection of vulnerable urban areas.
- Climate-resilient infrastructure.

Alexandria University can contribute scientific expertise and research to support these adaptation measures.

Flood Risk and Early-Warning Systems

The plan includes an important action entitled:

CR3 – Early Warning System and Local Preparedness Plan.

This action recognizes the need to strengthen the existing local preparedness plan by integrating climate-related hazards and a multi-hazard early-warning system.

The proposed approach includes:

- Reviewing existing emergency plans.
- Identifying climate-related hazards.
- Strengthening alert systems.
- Improving local preparedness.
- Supporting coordination between government agencies and technical institutions.
- Developing an operational early-warning system.

The Alexandria Governorate, Egypt Meteorological Department and Alexandria University are identified as relevant partners.

Water Resources and Environmental Protection

The Green City Action Plan also addresses water management and environmental sustainability.

Its priorities include:

- Improving wastewater treatment.
- Reducing water pollution.
- Protecting rivers, lakes and coastal ecosystems.
- Improving drainage systems.
- Developing water-reuse opportunities.
- Protecting natural resources.
- Reducing environmental pressures from industrial activities.

These measures contribute to climate resilience and sustainable urban development.

Transportation and Sustainable Urban Development

The plan identifies transportation as an important contributor to urban emissions.

Proposed approaches include:

- Improving public transportation.
- Supporting electric vehicles.
- Developing bus rapid transit corridors.
- Promoting energy-efficient transportation.
- Improving walking and cycling infrastructure.
- Reducing traffic congestion and air pollution.

These measures support lower carbon emissions and improved urban environmental quality.

Waste Management and Circular Economy

The city plan recognizes the importance of waste management in reducing greenhouse gas emissions.

Its proposed actions include:

- Increasing recycling.
- Reducing waste sent to landfills.
- Promoting waste separation.
- Improving waste-treatment facilities.
- Exploring waste-to-energy opportunities.
- Reducing methane emissions from landfill operations.
- Encouraging community participation in waste reduction.

- **University Coordination with Local Stakeholders in 2025**

  On 16 January 2025, Alexandria University's Community Service and Environmental Development Council discussed establishing a committee to rationalize electricity consumption across the university's faculties and institutes.

  The initiative was aligned with Egypt's sustainable development strategy and Egypt Vision 2030.

  This activity provides evidence of university-level institutional coordination on energy conservation and environmental sustainability.

  The university's wider relationship with local development stakeholders is also reflected in the Green City Action Plan, which identifies the university as a knowledge partner.

- **Stakeholder Engagement and Community Participation**

The Alexandria Green City Action Plan was developed through a stakeholder-engagement process.

The plan documents a stakeholder meeting held in January 2024 involving 39 participants, with an online and offline survey involving 32 participants. These consultations informed the prioritization of the city's environmental challenges.

The plan identifies climate adaptation and resilience, water quality and availability, greenhouse gas emissions and air quality as important environmental priorities.

Community participation is also incorporated into proposed urban development, green infrastructure and environmental management actions.

Alexandria University can strengthen these partnerships by:

- Sharing scientific research with Alexandria Governorate.
- Providing technical advice on climate-risk assessment.
- Organizing joint climate-awareness events.
- Supporting local environmental initiatives.
- Cooperating with community organizations.
- Publishing climate-related research and recommendations.
- Participating in monitoring and evaluating climate-action projects.

- Alexandria University has established a comprehensive program of 26 projects promoting renewable energy, energy efficiency, climate change mitigation, and sustainable resource management. Aligned with SDG 13 – Climate Action, these initiatives integrate education, research, infrastructure, and social interaction through renewable energy centers, solar power and wind power systems, green building technology, biofuel research, and circular economy projects. The University operates centers across Agriculture, Science, and Engineering, where hybrid solar–wind systems and solar energy conversion (including BIPV) support campus operations, power generation, and applied study. Specialized postgraduate degrees focus on climate change, sustainability, water resources, and the blue economy via international partnerships. Campus sustainability initiatives—including water and plastic recycling, energy-efficient buildings, solar stations, and waste processing—demonstrate our commitment to reducing CO2 emissions / carbon emissions, improving energy utilization, and protecting the environment. Supported by monitoring, data analysis, and cost-benefit analysis, this framework mitigates risk under environmental uncertainty, lowers our carbon footprint, strengthens regional resilience, and prepares graduates to solve global greenhouse gas challenges for planet Earth (planet) across developing countries and global nations.



Car pooling application for smartphones - Green Cycle project in the Faculty of Pharmacy (Alexandria University, Egypt)

- The University's commitment to waste reduction extends beyond campus operations through research, technology, and social interaction. Alexandria University established the PECA Fab Lab for recycling plastic into new materials and product lines using digital manufacturing, while researchers drive biofuel and chemical reforming reactions to convert used cooking oil into green solutions. Community action—including beach-cleaning, environmental protection campaigns, and national partnerships—promotes sustainability, lowers our carbon footprint, and advances SDG 13 – Climate Action for our shared environment.



- The University's Central Laboratory performs chemical and physical analysis of water quality using standard methodology, ensuring effective environmental protection and monitoring to safeguard surrounding coastal ecosystem and ocean and sea environments. Community action including coast cleanup campaigns, marine conservation, and awareness program initiatives strengthens Alexandria University's contribution to protecting aquatic water resources and advancing SDG 13 – Climate Action.

Central Water Laboratory – Alexandria University



Official university evidence – 2025

Alexandria University Centre of Excellence for Water Laboratory, accredited for chemical and physical water-quality testing.

Students cleaning Ras El-Tin Beach



25 October 2025

Alexandria University students collecting plastic bottles and solid waste to protect marine organisms and the coastal environment.

Marine pollution awareness and beach-cleaning campaigns



2025

Local beach-cleaning and environmental awareness campaigns addressing plastic pollution and threats to marine biodiversity.

Water-quality testing and scientific laboratory equipment



Laboratory analysis of water samples using scientific equipment to assess physical and chemical water-quality parameters.

- Alexandria University actively empowers students to lead sustainability action that fosters environmental awareness, innovation, and social interaction. During the reporting period, over 30 SDG 13 – Climate Action program activities were organized, demonstrating student contribution to sustainable development. Initiatives included international conferences, green chemistry campaigns, climate awareness events, water resources entrepreneurship bootcamps, research competitions, and environmental protection workshops. These efforts advance education, lower our carbon footprint, and strengthen community resilience across global nations.



Water Entrepreneurship Training Programme – Youth in Water: Shaping the Future
15 May 2025
Students and academic representatives participating in an entrepreneurship programme organized in cooperation with the European Union.



Soil and Water: The Source of Life – World Soil Day

7 December 2025

Students and researchers participating in scientific lectures and student project competitions about soil and water sustainability.



Student Smart Waste Management Competition

22 December 2025

Students developing innovative solutions for university waste management.



Student sustainability and environmental engagement

Reporting period: 2024–2025

University-wide sustainability activities included workshops, awareness campaigns and student engagement.