Terms of Reference

For hiring an Environmental Expert to provide technical support in Air Quality Management skills training, and developing university curriculum

Technical Implementation Unit (TIU)
Component 1: Enhancing the Air Quality Management (AQM) & Response System
Greater Cairo Air Pollution Management and Climate Change Project

I. Background

As part of the "Sustainable Development Strategy (SDS): Egypt Vision 2030",[1] the country committed to halving its fine particulate matter (PM_{10}) air pollution by 2030. Significant improvements have been made towards that goal in recent years. In fact, Cairo's PM_{10} concentration fell by about 25 percent over the past decade. Despite these improvements, the city's pollution levels are still several times the WHO recommended concentrations and higher than national guidelines taking as these high levels are taking their toll on the health and quality of life of the population, in particular poor people. Subsequently, the Greater Cairo (GC) Cost of Environmental Degradation (COED) attributed to air pollution is by far the highest in the country, with a mean estimate equivalent to 1.35 percent of national GDP in 2017. Conversely, the GC COED attributed to waste (net of air pollution damages, via the burning of waste) is half the air pollution's COED and results in a mean estimate equivalent to 0.68 percent of national GDP in 2017 which includes the opportunity losses from composting, recycling, methane capture, etc. Moreover, recent studies on the COVID-19 show that there is an increased likelihood of contracting the disease with high levels of ambient pollutants.[2]

Climate change models project Egypt's mean annual temperature to increase between 2 ºC and 3 ºC by 2050 and an increase in the duration of long-lasting heatwaves. Hot sandstorms known as khamsin blow millions of tons of grit from the Sahara to the North African coast and increases in local temperatures of up to 20 ºC are projected to increase in frequency and intensity. By 2050 the intensity and seasonality of heavy rains, as well as the probability of droughts will increase. Long-lasting heatwaves likely will increase in duration of between 9 to 77 days by 2085. The GC area is vulnerable to all of these, as well as to river and urban flooding, water scarcity and wildfires. The impacts are severe, particularly for public health and agriculture. Climate change will put additional pressures on citizens' health, in the form of increases in the prevalence and severity of cardiopulmonary conditions through heat and sandstorms, potential increases in vector-borne

[1] http://www.cabinet.gov.eg/English/GovernmentStrategy/Pages/Egypt%E2%80%99sVision2030.aspx and https://www.greengrowthknowledge.org/sites/default/files/downloads/policy-database/Egypt%20Vision%202030%20%28English%29.pdf.

[2] Larsen, Bjorn. 2019. Egypt: Cost of Environmental Degradation: Air and Water Pollution. The World Bank. Washington, D.C.; and Back of the envelop calculations for cost of solid waste environmental degradation performed by the Team.

diseases, through decreased nutrition and food security and reduced water quality. Further, it has been demonstrated that extreme heat events are linked to worsening air pollution.[3]

In response to this situation, the Government of Egypt (GOI) is seeking to reduce air and climate emissions from critical sectors and increase resilience to air pollution in Greater Cairo. The Ministry of Environment is in that respect implementing, with the support of the World Bank, the "Greater Cairo Air Pollution Management and Climate Change Project".

The Project aims specifically to reduce emissions that contribute to air pollution concentrations, thus leading to air quality improvements, and to simultaneously mitigate climate change. Air pollutants include PM_{10} and $PM_{2.5}$, while climate pollutants include both longer lived greenhouse gases (GHGs) such as CO_2, as well as Short-lived Climate Pollutants (SLCPs) that include black carbon, methane and several short-lived HFCs.

The Project is composed of the following 5 components:
Component 1: Enhancing the Air Quality Management (AQM) & Response System.
Component 2: Support the operationalization of SWM Master Plans in GC.
Component 3 Vehicle Emission Reduction.
Component 4 Communication & Stakeholders Engagement.
Component 5: Project Management and Monitoring & Evaluation.

(For more information: https://projects.worldbank.org/en/projects-operations/project-detail/P172548)

This assignment is requested in the context of **Component 1: Enhancing the Air Quality Management & Response System:** This component will support the enhancement of the Air Quality Management (AQM) decision support system in GC through a strengthened AQM infrastructure (monitoring and analytical), capacity building activities, developing emergency response plans and raising public awareness through information dissemination. Component # 1 comprises two subcomponents:

- Subcomponent 1.1: Reduction of air pollution and GHGs.
- Subcomponent 1.2: Strengthening resilience to air pollution.

These two subcomponents are to be achieved through several "Sub-tasks" (bundled into fewer subcontracts that achieve the same intent).
Detailed information on the 2 Subcomponents, and the Sub-tasks is mentioned in **Annex # 1**.

The Consultant's assignment is related to the following Sub-task under Component # 1: "Support the development of an integrated system for having qualified cadres to work in the environment field (green Jobs), including developing University Curriculum"

The Developmental Goal of the Assignment is to "Advocate the establishment of an enabling environment to sustain a pool of Egyptian environmental professionals covering the areas of environmental sciences, environmental engineering, climate change, and air pollution while ensuring a continual supply of candidates".

[3]Markandya and Chiabai, Valuing Climate Change Impacts on Human Health: Empirical Evidence from the Literature, Int. J. Environ. Res. Public Health, 6, 759–86, 2009.

Project implementation arrangements:
A Project Coordination Unit (PCU) has been established at the MoE. The PCU ensures that the Project is implemented in accordance with the Legal Agreement signed between the GoE and the World Bank, the Project Appraisal Document (PAD), the Project Implementation Manuals (Project Operational Manual, M&E Manual, etc.).

Four Technical Implementation Units (TIUs) have also been established to oversee the implementation of all components. The TIU for Component 1 is chaired by the Head of the Environmental Quality Sector of the Egyptian Environmental Affairs Agency (EEAA) and includes members of the different departments of the sector (Ambient Air Quality, Vehicle Emissions, Early Warning, Industrial Facilities Emission)

II. Objective of the Assignment:

The Project is seeking to hire an Environmental Expert for Component 1 of the Project referred to hereafter as "the Consultant" to assist the Environment Quality Sector, EEAA and TIU of Component 1 in the development of an integrated system for having qualified cadres to work in the environment field (green Jobs), including development of University Curriculum"

The Developmental Goal is foreseen to be achieved through the fulfilment of the following 3 objectives:

1. Developing and Provision of enriched environment education and knowledge. While this includes pre-university education, the project is concerned, herein, with university undergraduates only.
2. Offering enhanced knowledge, assessment tools, and judgement skills to boost a professional career in environmental conservation, sustainable development, and strategic planning and management of national resources. This concerns a university post-graduate program.
3. Sustaining a hands-on training program for technicians and professionals working in the field of environment and/or seeking green jobs

III. Scope of Work and Specific Tasks:

The Consultant shall assist the Environment Quality Sector, EEAA and TIU of Component 1 to identify the gaps, and develop a work plan for the development of an integrated system for having qualified cadres to work in the environment field (green Jobs), including development of University Curriculum.
The Project shall recruit specialized experts as per the required activities, and following the approval of the work plan and budget.

Each of the objectives will be achieved by activating an integrated implementation program, which satisfies each specific objective separately, while concurrently assures streamlining of involved actions all across the program. This will be conducted as follows:

Objective 1: Environmental Education Program for Undergraduates:

Provision of enriched environment education and knowledge, and this includes pre-university education, the project is concerned, herein, with university undergraduates only.

Scope of Work of the Consultant and Detailed Tasks:

The Consultant is requested to conduct the following tasks:

1. Conduct a needs assessment to identify deficiencies in the basic environmental knowledge, background, and acquaintance with environmental issues.
2. Prepare a vision of how to narrow such gap and create an educational system which produces graduates with the proper environmental competences and sustainability comprehension.
3. Prepare an implementation plan that will be finalized after a series of consultations with Cairo University. Action plan will comprise a plan for work and budget and a Log. Frame detailing the scope of interventions proposed, Number of targeted courses, details of course files, CU staff involved, institutional setup as per CU-regulations, and assorted logistics.
4. Prepare ToR for implementation.

Time Schedule for Deliverables:

Serial No.	Deliverable	Time from Contract Signature
1	Background & needs assessment Report	1 month
2	Preliminary action plan, and log frame	2.5 months
3	Final Action plan & Log Frame	3 months
4	ToR	3.5 months

Objective 2: Environmental Education Program for Postgraduates:

In its persistent pursuit to maintain a continually renewed pool of environmental experts and technicians, EEAA has recently supported the establishment of a multi-disciplinary postgraduate program, which offers its holder the required knowledge, assessment tools, and judgement skills to boost his/her professional career in environmental conservation, sustainable development, and strategic planning and management of national resources.

This program offers its graduates a Professional **M**asters in **E**nvironmental **C**ompliance & **Na**tural **Re**sources **Ma**nagement (MEC-NAREMAN). The program addresses the baseline gaps in environmental knowledge, practice and comprehension of sustainability principles. A phased implementation approach is applied where the Climate & Energy Track will be first piloted through the School of Engineering – Cairo University. Submitting the program files and applying for approval by the Sector Committee of the Supreme Council of Universities, through the CB3 Project, is expected in 2023. The CB3 project is terminating by Sep 2023, accordingly "Greater Cairo Air Pollution Management and Climate Change Project" will succeed CB3 and carry on with Phase II of the Program which involves the Air Pollution & Waste Management Track along with the socioeconomics and green transformation Track.

Scope of Work of the Consultant and Detailed Tasks:

The Consultant is requested to conduct the following tasks:

1. Formulate a marketing Strategy for the MEC-NAREMEN Program;
2. Formulate a performance follow up program for piloting Phase I;
3. Prepare draft action plan & Log Frame in consultations with PCU & CU; a
4. Finalize the action plan & Log Frame for Phase II.
5. Prepare ToR to implement action plan.

Time Schedule for Deliverables:

Serial No.	Deliverable	Time from Contract Signature
1	Marketing Strategy for the MEC-NAREMEN Program	1 months
2	Performance follow up program for piloting Phase I	2 months
3	Draft action plan & Log Frame	4 months
4	Final action plan & Log Frame for Phase II	5 months
5	ToR	6 months

Objective 3: Air Pollution & Waste Management Capacity Building Program

Within its efforts to provide opportunities for enhancing the professional performance and effectiveness of personnel working in the environmental field, whether at EEAA or at the business market, EEAA is formulating a novel environmental Practice certification program with primary focus on air pollution and waste management issues.

A capacity building center will be hosted by EEAA to provide periodical capacity building modules along with EEAA/CU-approved training certificates. The program will be conducted in two phases; Phase I Waste Management, and Phase II Air Pollution.

The Consultant will develop a plan and write TOR for a full- fledged capacity building program to train existing EEAA personnel, and private sector professionals to tackle the above mentioned concerns.

Scope of Work of the Consultant and Detailed Tasks:

1. Prepare a gap analysis;
2. Provide highlights for the topics/categories to be covered by the capacity building program for both; 1. Waste Management, and 2. Air pollution;
3. Formulate a development, implementation and executive skills/professional education certificate program;
4. Formulate a performance monitoring program;
5. Prepare Draft action plan & Log Frame in consultations with PCU&CU;
6. Prepare action plan & Log Frame for Phases I & II; and
7. Prepare TOR for the consulting firms/universities to implement action plan and develop Capacity building program.

Time Schedule for Deliverables:

Serial No.	Deliverable	Time from Contract Signature
1	Gap analysis Report	0.5 month
2	Highlights for the topics/categories/skill areas to be covered by the Capacity Building Program for Waste Management and Air pollution.	1 month
3	Development strategy for an environmental professional certificate program within the identified skill areas	1.25 months
4	Performance monitoring program	1.75 months
5	Draft action plan & Log Frame	3.5 months
6	Final Action plan & Log Frame	4 months
7	TOR for the consulting firms/universities to implement action plan and develop Capacity building program	3.5 months

IV. Qualifications:

- Master's degree or above.
- At least 20 years of relevant work experience with experiential education, pedagogical design, experience with continuing education/executive education programs.
- At least 20 years of relevant work experience with international accreditation processes and organizations.
- Previous working experience with international and regional universities and agencies.
- Good written communication skills.
- Good knowledge of computer proficiency, including MS Office products (Word, Excel, PowerPoint) and web-based management systems.
- Fluency in written and spoken English.

V. REPORTING

The Consultant will report to the Lead Advisor of TIU for Component 1 and under his supervision.

VI. Level of Effort and Contract duration

Level of effort is 72 Business Days.The duration of the assignment is 6 months. The assignment may require occasional travel inside Egypt.

Annex # 1

Greater Cairo Air Pollution Management and Climate Change Project

Brief on the Project :

The Government of Egypt (GoE) is currently implementing **Greater Cairo Air Pollution Management and Climate Change Project** (the Project) financed by The World Bank. The Project seeks to reduce air and climate emissions from critical sectors and increase resilience to air pollution in GC,i.e., Cairo, Giza and Qalyubia Governorates and is being implemented with Ministry of Environment (MoE) in close collaboration with Ministry of Local Development (MoLD), Qalyubia Governorate, Cairo Transport Authority (CTA) and other stakeholder agencies. The Project focuses on two main sources of air pollution: solid waste management and vehicle emissions in GC region and includes the following five main components:

Component 1: Enhancing the Air Quality Management (AQM) and Response System: This component aims to support the enhancement of the AQM decision support system in GC through a strengthened AQM infrastructure (monitoring and analytical), capacity building activities, developing emergency response plans and raising public awareness through information dissemination.

Component 2: Support the Operationalization of Solid Waste Management (SWM) Master Plans in GC: This component aims to support operationalization of Governorate SWM master plans, which lay down the full range of necessary actions and investments needed for each governorate to improve SWM services in accordance with the specificity of each Governorate. In view of the complexity and magnitude of SWM system in GC, the Project follows a phased and gradual approach to achieve tangible results on the ground. This approach involves providing technical support at the central level to the Waste Management Regulatory Authority (WMRA) and the MoLD and specific investments, technical, financial and project development support to SWM actions at the local level to the Qalyubia Governorate.

Component 3: Vehicle Emission Reduction: This component aims to support activities aimed at reducing vehicle emissions from public transport sector. This shall be achieved through procurement of about 100 electric buses and the infrastructure required to operate and maintain these buses. The component will also support the CTA in acquiring the needed knowledge and experience in operating and scaling up electric bus fleet in Cairo. The Project will also upgrade facilities at CTA, including retrofitting existing bus depots with electric charging stations, power supply and related safety equipment; training CTA staff such as bus drivers and mechanics on operating and maintaining the new e-equipment.

Component 4: Communication and Stakeholders Engagement: This component aims at ensuring that all stakeholders, in an inclusive manner, are actively involved in the design, implementation and monitoring of all Project activities and the Project is implemented following a full consultative participatory approach that is meant to build a constructive relationship between the stakeholders and the GoE. This component is complementary to the comprehensive Stakeholders Engagement Plan (SEP) developed as part of the environmental and social risk management.

Component 5: Project Management and Monitoring and Evaluation (M&E): This component will support the establishment of Project Coordination Unit (PCU) at MoE and four Technical Implementation Units (TIU) for each of the first four components.

Component 6: Enhanced E-Waste and HCW management for Reduction of uPOPs: It is an additional finance (AF) to the parent project, this new activity focuses on reduction of unintended

persistent organic pollutants (uPOPs) aligns with the "GEF Project Design and Review Considerations in Response to the COVID-19 Crisis and the Mitigation of Future Pandemics".

Brief on Component 1: Enhancing the Air Quality Management & Response System.
This component comprises two subcomponents:

- **Subcomponent 1.1:** Reduction of air pollution and GHGs. This subcomponent will support the carrying out of a program of TA activities on reduction of air pollution and GHGs, namely: (a) development of an Integrated Climate and Air Quality Management Plan (IC-AQMP) including a time-bound action plan for its implementation; (b) strengthening Air Quality Management (AQM) regulatory and policy tools through (i) developing a mobile source emissions inventory including road and nonroad sources, and integrating it with existing inventories and (ii) continuous monitoring of short lived climate pollutants, greenhouse gases, and carbon dioxide monitoring; (c) development and rolling out of a specialized AQM and green jobs skills training program in universities and ministries including curricula such as chemical engineering, atmospheric science, environmental economics and environmental health, renewable energy interventions, energy efficiency and environmental economics, and resource efficiency/circular economy interventions; and (d) strengthening policy dialogue by carrying out assessments of the environmental health and the economic benefits of priority climate and air quality interventions, including cost-benefit and cost-effectiveness of emission abatement investments and capacity-building initiatives such as the trainings program.

- **Subcomponent 1.2:** Strengthening resilience to air pollution. This subcomponent will strengthen resilience to air pollution through:(a) improving air quality forecasting tools through development of a chemical transport model-based approach and its integration with local air quality monitoring data and dissemination of the forecasting information; (b) establishing institutional response mechanisms for high pollution days such as definition of criteria and protocols for identification of air quality action days and development of emergency plans and applicable decision protocols for said air quality action days; and (c) strengthening the technical capacity of the National Committee for Crisis Management and Risk Reduction for implementation and enforcement of the protocols.

These two subcomponents are to be achieved through ten "Sub-tasks" (bundled into fewer subcontracts that achieve the same intent):

1. Establishment of a SLCP/GHG Monitoring Network for GCA–to support in providing recommendations on the deployment, operation and maintenance of proposed network, (structured in a scoping and subsequent implementation phase).This network should integrate seamlessly with and support existing AQ monitoring networks (ambient & industrial) in GCA (including routine AQ monitoring sites in GCA as well as the recently designed source apportionment network and the telemetry monitoring system for point source of industrial facilities), thus an initial step shall involve conducting a network assessment to review EEAA's comprehensive AQ monitoring objectives and, QC/QA and requirement for enhancement road map. Implementation activities will include design and deployment of network components (including source apportionment and PM2.5/BC/CO2 monitoring components), but also analysis, data management, and quality assurance of GCA monitoring program.

2. Establishment of an integrated Emission Inventory Database for GCA and Egypt – to provide operational support in refining the existing emission inventory consisting of a point and area source inventory for GCA, a biogenic and geogenic inventory for Egypt and a UNFCCC compliant GHG inventory for Egypt to create a unified and comprehensive national inventory database that includes a mobile source inventory per the existing mobile source inventory development roadmap. The resulting unified database should enable policy tracking, international reporting, and chemical transport modeling. The data base structure should enable reporting interfaces that enable data reporting from various users (e.g., governorate level reporting of traffic and vehicle registration data, industrial reporting of point source emission data, etc.) to report data into the national system.

3. Development of an Integrated Climate and Air Quality Management Plan (IC-AQMP "Action" Plan)– to provide operational support to develop, assess, and evaluate policy options under a multi-level governance process to identify and justify elements of the GC Action Plan (including technical analysis, economic assessment and facilitation of consensus building process).

4. Development Curricula , Sustainable training at Local Universities and license system – to provide operational support for the development and roll-out of a new environmental resource management curriculum at GCA universities. The outcome should result in enhanced training and knowledge – at both the undergraduate and graduate level – around principles, basics and updates of environmental science, and AQM planning specifically, to ensure a pipeline of trained professionals for EEAA, as well as better prepared students to address other green skills development needed for Egypt as a whole. This should be planned in collaboration with University of Cairo, either alone or in partnership with Helwan University, and Aim-shams University, to ensure that Cairo is producing a steady supply of students with skills needed for environmental management and the green economy. In order to enhance the quality of the professional market of skilled professionals within Egypt, the Consultant should propose a rigorous international license and accreditation process.

5. Support Sustainable Development Within the Egyptian Government– to provide operational support to improve capacity of ministry staffs and sustainable development units - via executive skills training - to undertake integrated climate and air quality management planning and implementation of mitigation actions.

6. Implementation of Micro- and Macroeconomic Assessment of Action Plan– to provide operational support to provide a sector-specific detailed economic analysis of actions identified by IC-AQMP working group (see III above) comparing implementation costs against health, agriculture, and energy benefits of interventions, as well as macroeconomic benefits of reduced health spending, alternative patterns of investment and quality of life improvements, for labor force, tourism, recreation, etc.

7. Development of advanced Air Quality Forecasting system–to provide operational support to develop an enhanced AQ forecasting program (structured into a scoping and subsequent implementation phase) that builds on existing forecasting capacity for both poor air quality

days and climatically extreme events. This work would likely involve an international vendor to provide support and training with local implementation partners who might carry on forecasting work at conclusion of project.

8. Development of AQ Public Awareness Website– to provide operational support to create a public information portal that provides access to information on (a) general background on air pollution/ public action (b) current conditions/AQ index and local observations and data and (c) forecasts with self-protective actions for public/ sensitive populations.

9. Establishment and Implementation Support for an Institutional Response Mechanism-to provide operational support to facilitate an intra-governmental stakeholder process to identify appropriate responses to declared "AQ Action Days" and implementation arrangements to be carried out by various government and private stakeholders (e.g., industries, schools, public health authorities, media, sensitive populations, etc.)

10. Provision of operational support for the newly developed source apportion (SA) monitoring network and chemical speciation analysis operated by EEAA/Cairo University -including knowledge transfer and capacity building for Egyptian colleagues as appropriate. This includes aspects of manual sampling, collection, transfer and storage, chemical speciation analysis, receptor modeling and reporting over calendar years 2023-2025, inclusive.

Annex # 2
Phase 2 of Implementation

Objective 1: Environmental Education Program for Undergraduates:

	Actions
1	Prepare the course files
2	Prepare the institutional setup
3	Conduct Introductory workshop
4	Administrative approvals at CU to launch the program

Objective 2: Environmental Education Program for Postgraduates:

	Actions
1	Finalize course files
2	Finalize institutional setup
3	Conduct Introductory workshop
4	Administrative approvals at CU to launch Phase II including arrangements with offering Faculties (Science, Agriculture, Engineering)

Requirements for Holding a MEC-NAREMAN Degree

MEC-NAREMAN degree achieved upon successful completion of:			
Requirements	**Weight**	**Credit Hours**	**Open to**
5 General courses	equivalent to	15 chs	All Disciplines
5 Specialized courses per each of 5 different tracks	equivalent to	15 chs	5 relevant disciplines (Eng. – Agro. – Air pollution – Biochm. –Socio-economy)
1 Term Project	equivalent to	9 chs	In relevant discipline

MEC-NAREMAN Program Tracks

MEC-NAREMAN Program Tracks				
Climate & Energy Track	**Biodiversity & Biotechnology Track**	**Desertification & Land Management Track**	**Socio economy & Green Transformation Track**	**Air Pollution & Waste Management Track**
Eng. Sector: Civil & Environmental,	Pharmacology Bio-technology Botany	Agricultural Engineering Agronomy	Economy Political sciences Business	Engineering, Science, Agronomy

Mechanical, Chemical, Electrical / Computer Eng.	Protectorate rangers	Urban planning	Actuarial	

MEC-NAREMAN Program – Engineering Track Courses

Courses	**Part I: General**	**Part II: Climate & Energy Engineering Track**
CORE	Basic Ecology	Global Warming & Climate Change
	Global Environment Issues & Agreements	Carbon Emissions & GHGs Assessment
	Ecological Foot-printing	CC Adaptation; planning and interventions
	Introduction to Waste Management	CC Mitigation; engineering interpretations
	Environmental Economics	Natural Resources Management
ELECTIVES	*Renewable energy basics; solar, wind & hydro*	*Sea Level Rise; engineered solutions*
	Sustainable cities	*Introduction to Climate Modeling*
	Elementary cycles controlling the environment	*Green Buildings & Smart Buildings*

Objective 3: Air Pollution & Waste Management Capacity Building Program

Actions	
1	Prepare training files
2	Finalize institutional setup
3	Conduct Introductory workshop
4	Administrative approvals at CU to launch the program

Objective 4: Experts Registration & Certification Program:

Action	
1	Formulate a performance monitoring program
2	Finalize institutional setup
3	Conduct Introductory workshop
4	Administrative approvals at CU to launch the program