TERMS OF REFERENCE

Technical support for preparing an Integrated Climate and Air Quality Management Plan (IC-AQMP) for reducing air emissions in greater Cairo

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 higher than the WHO recommended concentrations and higher than national guidelines resulting in a significant public health toll and degradation of quality of life of the population, especially among the poor. Recently, the Greater Cairo (GC) Cost of Environmental Degradation (COED) attributed the highest environmental cost – by far – to air pollution, 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 that of air pollution's COED 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 COVID-19 show that there is an increased likelihood of contracting the disease in places 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 khamasin 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 each of these climate impacts, as well as to river and urban flooding, water scarcity and wildfires. The impacts can be 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

[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.

vector-borne 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 implementing the Greater Cairo Air Pollution Management and Climate Change Project (hereafter "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 Greater Cairo, i.e., Cairo, Giza and Qalubiah Governorates[4], and is implemented by the Ministry of Environment through its Egyptian Environmental Affairs Agency (EEAA) and its Waste Management Regulatory Authority (WMRA) and in collaboration with other partners. A Project Coordination Unit oversees overall project implementation and ensures that fiduciary requirements are met.

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.

To maintain the GoE's advancement towards reducing emissions, and to identify further abatement actions, an Integrated Climate and Air Quality Management Plan (IC-AQMP) will be prepared. This plan will present an array of actions for continued emission reduction based on robust observations and sound analytical methods. The IC-AQMP aims to reduce the sources and amounts of pollutants responsible for the degradation of urban ambient air quality and regional and global warming, thereby improving the quality of life of GC resident.

The requested services covered by these terms of reference are **to support implementation of Component # 1 of the Project, on Enhancing the Air Quality Management (AQM) and Response System, implemented by EEAA.** 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.

II. Objective of the Assignment

To prepare an Integrated Climate and Air Quality Management Plan (IC-AQMP) by a qualified consulting firm, referred to hereafter as "the Consultant". This plan will present an array of actions for continued emission reduction based on robust observations and sound analytical methods.

The Plan will present mitigation actions with estimated budget requirements in the form of a time-bound action plan with clear roles and responsibilities for implementation. The IC-AQMP will serve as the overarching framework for government action and will lay out the vision for further scaling-up.

[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.

[4] More details on the Project Components are provided in Annex 1.

III. Scope of Work and Detailed Tasks:

The Consultant is requested to conduct the following tasks

1. Development of an Integrated Climate and Air Quality Management Plan (IC-AQMP) including the management of the relevant tasks under the project and providing strategic guidance in managing and implementing AQM planning;
2. Microeconomic analysis
3. Macroeconomic analysis
4. Provide strategic advisory services to EEAA in air quality and climate change management and implementing AQM planning;
5. Stakeholder coordination, and facilitate consensus building process; and
6. Capacity Building.

Detailed Tasks:

The Consultant shall prepare an Integrated Climate and Air Quality Management Plan (IC-AQMP) that will present an array of actions for continued emission reduction based on robust observations and sound analytical methods. The IC-AQMP aims to reduce the sources and amounts of pollutants responsible for the degradation of urban ambient air quality and regional and global warming, thereby improving the quality of life of GC resident.

The Plan will present mitigation actions with estimated budget requirements in the form of a time-bound action plan with clear roles and responsibilities for implementation. The IC-AQMP will serve as the overarching framework for government action and will lay out the vision for further scaling-up.

The Consultant is expected to coordinate with other firms hired for specific tasks which are relevant to development of IC-AQMP (e.g., firms developing AQ monitoring and inventory strategy, AQ forecasting capacity and developing an institutional response mechanism to high air pollution episodes) (Annex # 2).

The details of the tasks that the Consultant is requested to conduct are as follows:

1. Development of an Integrated Climate and Air Quality Management Plan (IC-AQMP):

- Baseline study and desk review of existing policy proposals from GoE with an impact on air quality or climate change. This review should provide a comprehensive list of potential policies being considered with their pros and cons from a political-economy standpoint as well as their potential impact on air quality and GHG/SLCP footprint. The review should also provide a foundational assessment of key climate and air pollution sources in Greater Cairo;
- Stakeholder engagement. It is critical to the success of the IC-AQMP is effective stakeholder engagement. Key sectors will be involved upstream in the preparation of the IC-AQMP to build trust, ownership, and a sense of shared responsibility. Stakeholder engagement activities will be held regularly to solicit inputs, update stakeholders on progress, and to obtain feedback, particularly on the proposed sectoral mitigation strategies and abatement options. The goal is to develop the abatement options elaborated in the ICAQMP and to present them to the Council of Ministers for action.;

- Develop an IC-AQMP inception report that includes an assessment of the ongoing work by EEAA, DCC and other relevant ministries to develop pathways to reduce local climate and air pollutant emissions in a context of sustainable economic development; goals and objectives of the IC-AQMP "Action" Plan, recommended indicators and monitoring approaches for the plan and a list of potential regulations, incentives or mitigation strategies that have not been considered within the baseline assessment. The Inception plan should also include a proposed organizational structure and budget for GoE agencies charged with Action Plan implementation.

2. Estimating the financial costs of pollution abatement by sector and microeconomic impacts:

- A microeconomic analysis for each of the following sectors should include detailed, sector-specific data collection and modeling of select measures from the baseline assessment as well as of proposed measures that have not been considered by GoE to date. Each measure should be examined with varying levels of implementation to define sensitivities to different levels of investment for various contols based on locally defined control costs;
- Special attention should be paid to the priority climate and air quality interventions to be implemented in the Project's Components # 2 (electric buses/electrification of vehicle fleets) and 3 (investment in waste collection and disposal systems);
- Microeconomic inputs and outputs (e.g. sector-level changes in patterns of investment, supply/demand, taxes, etc. for sectors associated with clean technology as well as potential impacts in sectors that would potentially be displaced, e.g., fossil fuel production) should be synthesized for use in Task 3 below (macroeconomic modeling).

3. Macroeconomic analysis, and cost-effectiveness analysis of the IC-AQMP (Action Plan):

- Based upon the Task 2 microeconomic modeling – and in consultation with EEAA and the broader stakeholder group – define 2-3 packages of pollution control measures for study representing a range of ambition.
- Develop a macroeconomic assessment methodology (including selection of model, definition of input data and assumptions) that spans the broader Egyptian economy that can take inputs from the microeconomic (sector-specific) analysis conducted under Task 2 and assess macroeconomic indicators such as GDP, employment impacts and household disposable income that result from microeconomic investments, flow-through economic benefits to other sectors of the economy and associated development/welfare impacts (as described below).
- For each policy package, study investment/funding alternatives, including the multiple development benefits that accompany the sector-specific microeconomic impacts of the policy choices. These include health and welfare benefits, impacting public health spending, labor productivity, city competitiveness, food and energy security and potential impacts on Egypt's tourism economy. Each scenario should examine projected outcomes under policy and a baseline scenario;
- The consultant will include in their proposal the ability to iterate and re-model scenarios after consultations with the stakeholder group based on group input and to present results

to the group, facilitating a consensus on a final package of measures/scenarios that would constitute the Action Plan.

4. Draft plans to be prepared, discussed with the stakeholders before the Final Plan is issued:
The Consultant will support EEAA and facilitate the presentation and discussion of the Draft plans with the key sectors that were involved in the preparation of the IC-AQMP to solicit inputs, and obtain feedback, particularly on the proposed sectoral mitigation strategies and abatement options.

5. Policy and planning TA and advisory services:
The consultant will provide EEAA with advisory services and technical assistance in coordinating workflow and project delivery for the AQM component of the Project. This may include assistance with policy formulation, planning, follow-up on related national plans, identification of indicators, preparation of briefs and presentations, etc. as it relates to the requirements of the AQM component of the Project.

6. Capacity Building, and knowledge transfer: Transfer the knowledge of preparing the IC-AQMP to EEAA staff, and concerned Ministries/Agencies / Institutions, and build their capacity on how to follow up and update it via training sessions, workshops, meetings, seminars …etc.

IV. Administrative Arrangements

The Consultant will work under the supervision of and report to the Head of the Environmental Quality Department, in his capacity as the Head of the Technical Implementation Unit of Component # 1 of the Project, and/or his designee and with the Lead Advisor of the Component. Contract management and other administrative responsibilities are overseen by the Project Coordinator of the Greater Cairo Air Pollution Management and Climate Change Project, or his designee.

The consultant will closely work with EEAA staff members of the TIU, and will collaborate as needed with other partners that are also supporting EEAA staff with AQM planning. The Consultant will also liaise, in consultation with EEAA with other stakeholders (ministries/agencies) that are involved in the preparation of the IC-AQMP.

V. Duration of the Assignment and Time Schedule for Deliverables

The consultant will work to complete deliverables between **October 1, 2023** and **March 31, 2026** within **30 months** from the start of contract. The first 24 months to develop the IC-AQMP (Action Plan), and the following 6 months to monitor the implementation of the Action Plan, and provide support to EEAA and the different stakeholders.
This work will require reporting to the EEAA as outlined below.

Serial No.	Deliverable	Time from Contract Effectiveness
1	Benchmarking Technical Note & Policy Review Report	2 months

2	Gap Analysis Report	5 months
3	Preliminary Action Plan Document	12 months
4	Emissions Control & Mitigation Plan Investment/Funding Alternative Analysis	15 months
5	Report on the financial costs of pollution abatement by sector and microeconomic impacts	17 months
6	Assessment of health and welfare benefits, and macroeconomic benefits	19 months
7	Report on macroeconomic assessment of defined control measures	20 months
8	Revised AQM Action Plan Document	24 months
9	Report on monitoring and support provided	30 months

** In addition to all reporting, progress updates and ad-hoc reports (as shown below).

Reporting Requirements:

The Consultant shall report to and work under the supervision of the Head of the Environment Quality Sector of EEAA.

Report	**Contents**	**Submission Date/Frequency**		**Number of Copies**	
		Draft	Final	Draft	Final
Quarterly Reports	Work progress, team mobilization, tasks undertaken, partial results, meetings held and persons met, planning of activities for next quarter, updated works schedule and mobilization plan, difficulties encountered, assistance required. The quarterly report	Every quarter		3	

	will also include the draft of the EEAA's quarterly report for Component 1 of the Project. Copies of all ad-hoc reports produced during the quarter will be included as annexures.				
Mission Reports	Participants, people met, objectives of mission, content of mission, extent to which objectives have been met.	1 week after return from mission	1 week after comments from Client	3	3
Ad-hoc Reports	Review reports, recommendations, model documents, audit reports, etc, as detailed above	As and when required	2 weeks after comments from Client	3	3

* All results, data (raw and final), reports should be delivered to EEAA in hard and electronic (editable) Copies.

All reports will include a summary and be written in English with an Arabic translation. Reports would be prepared initially in draft and finalized within an agreed upon period following receipt of comments from EEAA.

V.II Minimum qualifications

Consulting Firm minimum qualifications:

- Consulting firms are expected to have successfully completed and demonstrated experience with at least 3 similar projects in air quality planning requiring complex data analysis, and environmental assessments in low- and middle-income countries; with hand-on capacity building and institutional strengthening components.
- The firm is expected to have a minimum of 10 years experience providing consulting and planning services in environmental planning.

The Consultant's staff will be available for meetings and appointments per the schedule of the EEAA. The Consultant will be expected to present the results to EEAA / MoE and the stakeholders every 3 months during the contract period.

Key experts qualifications

The consultant team composition must include at least the following key experts

1. Team Leader – Air Quality Management Specialist: Ph.D. in Environmental Engineering, Chemical Engineering, earth science or similar field. This individual bring extensive international experience and provide depth of knowledge on air quality management, including development of climate and air quality management plans, costs and benefits of various control strategy options and the methods for assessing health and economic benefits of these actions. A minimum of 15-years of experience working in the field of air quality is required.

2. Air Quality Specialist: Master's Degree or above in Environmental Engineering, Chemical engineering, earth science or similar technical field, with at least 10-years of experience working on air quality management issues, including development of climate and air quality management plans.

3. Environmental Specialist: Master's degree or above in environment science or a related field with a minimum of 10-years of experience**.** Experience working on air quality management plans or climate action plans preferred.

4. Sector-Expert(s) ***(for Sector-Specific Mitigation):*** Master's degree or above in environment science or a related field with at least five years experience developing planning documents for government agencies.

5. Financial Analyst: Master's degree or above in finance, accounting or a related field, at least 10 years of relevant experience in financial analysis and experience with international development projects.

6. Economist: Master's degree or above in economy, finance, accounting or a related field, at least 10 years of relevant experience in national macroeconomic analysis.

The Consultant team should include at least one key expert who is fluent in both speaking and writing the Arabic language to assist the consulting firm in dealing and cooperation with agencies inside Egypt including EEAA.

Scheduling

The Consultant will prepare the proposed schedule of activities and staff mobilization plan at the inception stage; and these may be reviewed and revised every six months in response to EEAA's needs and in agreement with EEAA.

Client's Input and Counterpart Personnel

Services and facilities may be made available to the Consultant by the Client:

- EEAA as possible shall assist with arranging meetings with local Government and other authorities as necessary during the course of the consultant's work.

- EEAA shall make available to the Consultant the available air quality data, emissions inventory, meteorological data and air quality index data as relevant to the conduct of the Project.
- EEAA shall make best efforts for collaborative working arrangements with EEAA, WMRA, PCU, and counterpart staff.

The consultant will report directly to:
Head of Environment Quality Sector,
Egyptian Environmental Affairs Agency (EEAA),
Ministry of Environment.

The Consultant will also work closely with the World Bank members of the Project team.

Annex 1
Greater Cairo Air Pollution Management and Climate Change 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".

Annex # 2
Component # 1 Activities which are relevant to the development of IC-AQMP and for which the procurement process for hiring Consulting firms to implement it is proceeding

Activity # 1 : Technical support for providing recommendations for the deployment, operation and maintenance of an SLCP/GHG monitoring network.

Activity # 2: Developing mobile source emissions inventory, and emissions inventory integration". EOI has been prepared and published on STEP.

Activity # 5.1: Provide recommendations for improving Emergency Response Mechanism for the Seasonal Severe Air Pollution Crisis (Black Cloud).

Activity # 6: Provide technical support for EEAA newly developed source apportionment monitoring network and chemical speciation analysis operated by EEAA/Cairo University.