TERMS OF REFERENCE

Provide recommendations for improving Emergency Response Mechanism for the Seasonal Severe Air Pollution Crisis (Black Cloud)

1. 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 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]

[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.

[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.

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 project aims specifically to reduce emissions that contribute to air pollution concentrations, thus leading to air quality improvements, and to simultaneously mitigate climate change (more details on the project components is provided in Annex # 1).

Egypt is located in the northeastern corner of Africa continent, and this directly contributes to the feeling of air pollution in the country, especially in the Greater Cairo region, where there are 3 desert regions in Egypt: the Eastern Desert located east of the Nile River, and the Western Desert that extends west of the Nile River and is characterized by the presence of the Bahariya, Kharga, Farafra and Siwa oases, as well as the desert areas located in the Sinai Peninsula. The climate of Egypt is also affected by several factors, the most important of which are the location, topography, the general system of pressure, depressions and water bodies. This nature has caused instability in the weather, during which what is known as the storm state (raised dust) appears, which has a negative impact on the quality of air.

Due to the geographical location and the natural conditions of Egypt, and its location in the Sahara Belt region of North Africa, where rainfall is rare and temperatures are relatively high, which helps to increase the attachment of dust particles to the atmospheric air, the higher the permissibility of crystallization of pollutant atoms, the formation of suspended particles, and the increase in the proportions of particles observed in the air. And due to the multiplicity of sources of pollution, especially in the urban area in Greater Cairo and the widespread industrial areas close to the population belt, therefore suspended particles are the main indicator of air pollution in Egypt, especially in major cities due to the geographical nature and the concentration of many human activities in those cities, as these particles usually consist of several elements, which crystallize and their particles aggregate to form particles of larger sizes and diameters with different compositions, and they are graded in their levels of danger according to the classifications of their diameters and components and, accordingly, their impact on air quality and thus the health of citizens.

The diversity and complexity of the sources of air pollution is also considered one of the most important results that occurred as a natural reality of the process of intense acceleration in urban and economic development that Egypt witnessed in recent decades, so that the economic boom became accompanied by an increase in air pollution rates and noise levels, in addition to the nature and size of major industries and the multiplicity of emissions sources, especially from the old facilities and their presence within the residential blocks. Therefore, Egypt has given special attention to the process of monitoring and reducing emissions rates in the Egyptian air environment.

Black Cloud: Greater Cairo and some areas of the Delta region are exposed during the Autumn period of each year to a bout of severe air pollution referred to as the Black Cloud. Several factors contribute to its formation, including some natural sources such as mineral dust that results from unfavorable weather conditions (i.e., hot dry conditions followed by strong winds) that significantly increase the flow of pollutant off the desert, as well as various human activities including industrial activity that is concentrated in the regions north and south of Greater Cairo, the open burning of solid waste generated in huge quantities in the regions of Greater Cairo and the Delta, and rice cultivation that is concentrated in the Delta regions, especially the eastern

region, which also results in the burning of agricultural crop residues after harvest, negatively affecting both the harvesting areas, as well as adding to other sources of air pollution that affect Greater Cairo.

An executive plan has been developed to control pollution sources by dividing the work along several axes:
• 1st axis: Coordination with the ministries of Environment, Agriculture, Local Development, and Interior.
• 2nd axis: The system of collecting, and recycling rice straw.
• 3rd axis: Reducing vehicle exhaust.
• 4th Axis: Controlling emissions from industrial facilities.
• 5th Axis: Controlling the open burning of municipal waste.
• 6th Axis: Awareness, training and information programs.
• 7th axis: Enhancing EEAA's ability to follow up and monitor through the Central Operations Room.

The executive plan relied on activating the private sector in establishing a system to deal with agricultural waste, and provides economic incentives to contractors to urge them to actively participate in this system. A number of working groups are also being formed to pass by rice-growing areas in the Delta governorates to control rice straw fires in those governorates (Qalyubia - Sharkia - Dakahlia - Western - Buhaira - Kafr El-Sheikh).

The Ministry of Environment has signed 2 protocols with the Ministry of Agriculture to collect, press and recycle rice straw. Where the ministry, through these protocols, provides subsidies to contractors for collecting and pressing rice straw at a value of 50 pounds/ton collected, in order to encourage them to work in this system.

Measures mentioned above were taken to confront the severe air pollution attacks in Greater Cairo and the system is managed by the Ministers of Environment, Local Development and Agriculture, provided that meetings take place periodically or in the event of a crisis to take the necessary actions.

This solicitation seeks an individual consultant, referred to hereafter as “the consultant” to provide recommendations for improving the Emergency Response Mechanism to be followed by the parties engaged in managing the seasonal severe air pollution crisis (Black Cloud events).

2. Objectives:

This procurement opportunity seeks to establish a contract between the GoE and an individual consultant to provide support to the Egyptian Environmental Affairs Agency (EEAA) and World Bank through the Greater Cairo Air Pollution and Climate Change Project (hereafter “The Project”) to provide recommendations for improving Emergency Response Mechanisms to be implemented by the parties participating in managing the seasonal severe air pollution crisis (Black Cloud) that happens every year in Greater Cairo. The proposed Emergency Response Mechanisms should consider a combination of technical, policy/ institutional and preventive actions.

3. Scope of Work:

The Consultant is requested to conduct the following tasks:

1. Review the performance of existing institutional mechanism and provide recommendations for strengthening and improving the functionality of the committees (e.g. existing National Black Cloud Committee)/ co-ordination between agencies, including regular meetings during the BC and emergency meetings during spikes.

2. Review the existing measures (policies, degrees, protocols, etc.) currently taken by the Ministers of Environment, Local Development and Agriculture to confront the severe air pollution attacks in Greater Cairo and assess its implementation performance (including inspection and enforcement) to identify the gaps and lessons learned.

3. Review the protocols signed by the Ministry of Environment and Ministry of Agriculture to collect, press and recycle rice straw.

4. Review the executive plan developed to control pollution sources, which is divided to the following main axes:
   - Coordination with the Ministries of Environment, Agriculture, Local Development, and Interior.
   - System of collecting, and recycling rice straw.
   - Reducing vehicles exhaust.
   - Controlling emissions from industrial facilities.
   - Controlling open burning of municipal waste.
   - Awareness, training and information programs.
   - EEAA's ability to follow up and monitor through the Central Operations Room.

5. Analyze the AQ information being monitored by EEAA and identify immediate/ short term mitigation actions needed for reducing BC emissions (not just crop burning but all major sources)

6. Collect international best practices for AQ emergency response plans, including public awareness and education approaches to inform the public and sensitive populations of protective actions that can be taken, municipal actions plans (e.g., U.S. AirNow's AQ Flag Program; https://www.airnow.gov/air-quality-flag-program/ or individual city action programs https://www.airnow.gov/aqi/action-days/). Additionally look at how other governments have implemented air pollution mitigation approaches (e.g., The Chinese government has orders for 80 per cent of government-owned cars to be taken off the road on red alert days)

7. Provide additional or updated recommendations as part of an emergency short term plan & medium term plan including measures that deal with and address the reuse of corn stover prior to the 2023 season of the Black Cloud (i.e. prior to September 15, 2023).

8. Provide recommendations for improving the Emergency Response Mechanism for the Black Cloud to be taken by the parties participating in managing that crisis. This may involve creating new emergency plans to be enacted, decision protocols to be followed, and identifying the departments who may need to implement adaptive responses for example, school closures, alternative transportation patterns, industry closure, shutting down certain human emission activities in the short-term to manage pollution and air quality levels.

9. Identify additional studies/ assessments needed to identify medium and long term actions for strengthening the (i) policy/ regulatory framework (ii) monitoring, analysis, information sharing and forecasting systems (iii) development and implementation of emergency response plan.

Timing:
The Consultant will work to complete deliverables within one month from signing the contract. This work will require reporting to the EEAA.

4. Deliverables and Timeline:

Serial No.	Deliverable	Time from Contract Signature
1	Inception / Roadmap Report laying out the work program, and expected deliverables.	1 week
2	• Draft Report with recommendations for improving institutional Emergency Response Mechanism for the Black Cloud to be taken by the parties participating in managing that crisis. The report should also include recommendations for enhancing and improving the functioning of the existing National Black Cloud Committee. • Draft emergency plans to be enacted, decision protocols to be followed, the departments who may need to implement adaptive responses for example, school closures, alternative transportation patterns, industry closure, shutting down certain human emission activities in the short-term to manage pollution and air quality levels.	3 weeks
3	• Final Report with recommendations for improving institutional Emergency Response Mechanism for the Black Cloud to be taken by the parties participating in managing that crisis. The report should also include recommendations for enhancing and improving the	1 month

	functioning of the existing National Black Cloud Committee. • Final Emergency plans to be enacted, decision protocols to be followed, the departments who may need to implement adaptive responses for example, school closures, alternative transportation patterns, industry closure, shutting down certain human emission activities in the short-term to manage pollution and air quality levels.	

5. Qualifications and Responsibilities:

- Experience in air quality management planning.
- Experience in environmental crisis management and risk mitigation.
- Experience in environmental emergency response mechanisms.
- Broad access to international expertise in similar countries that can contribute knowledge to the Egyptian agencies, institutions and personnel.

6. Administrative and Reporting Arrangements

The consultant will report directly to the following:

Head of Environment Quality Sector
Egyptian Environmental Affairs Agency (EEAA)
Ministry of Environment,
Egypt

The Consultant will work collaboratively with EEAA staff, the members of the Project's team, and with other development partners that are also supporting EEAA staff with AQM planning (including the World Bank). The Consultant will also need to liaise with other ministries that may be providing data inputs, but this is to be coordinated through EEAA.

The consultant will be available for meetings and appointments per the schedule of EEAA and the World Bank teams. The consultant will be expected to present results to EEAA.

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".