

### GOVERNMENT OF THE PUNJAB PLANNING & DEVELOPMENT BOARD (ENVIRONMENT & CLIMATE CHANGE SECTION)

### WORKING PAPER FOR PDWP

### PART - APROJECT PROFILE(Revised PC-I received 03-03-2025)

1.	Project Title	Punjab Smo	Punjab Smog mitigation and response initiative – AirSafe								
2.	Location	Lahore, Pur	Lahore, Punjab, Pakistan								
3.	Sponsoring	Environmer	t Protectio	on &	Climate	Change	Department	(EP&CCD),			
	Agency	Governn	Government of the Punjab, Lahore.								
		i. Env	i. Environment Protection & Climate Change Department (EP&CCD),								
4.	Executing Agency	Government of the Punjab, Lahore.									
		ii. Env	ii. Environmental Protection Agency, Government of the Punjab								
5	<b>Operation</b> and	N/A	J/A								
5.	Maintenance										
6.	<b>Cost of the Project</b> (Rs. In Million)	This scheme will be funded from the block provision under the titles "Smog Less and climate resilience Punjab" at GS No. 3663 having Cost of Rs. 10,000.00 million with an Allocation of Rs. 5,000.00 million for the Year 2024-25. The plan provision as per PC-I is as follows: (PKR Million)									
			Cost	2	024-25		2025-26				
		5,	381.000	5,	005.708		375.292				
7.	Gestation Period	2024-25 to 2025-26 ( 02 Years)									

### 8. <u>BACKGROUND AND BRIEF INTRODUCTION:</u>

In recent years, the air quality in Punjab, particularly in Lahore, has become a growing concern due to consistently high levels of air pollution. Data from 2022 to 2024 reveals that the Air Quality Index (AQI) across various months remains alarmingly elevated, with January and December consistently recording the highest AQI levels, indicating hazardous conditions. For instance, January's AQI has steadily risen from 233 in 2022 to 265.7 in 2024. Similarly, December's AQI has consistently exceeded 270 in both 2022 and 2023. While some improvements were observed in spring and early summer months—such as a significant reduction in AQI in April from 174 in 2022 to 96.3 in 2024—overall air quality remains suboptimal, especially during the winter months due to the seasonal impact of temperature inversions that trap pollutants close to the ground.

The deteriorating air quality in Lahore is linked to multiple factors, including vehicular emissions, industrial activities, and construction dust, compounded by unfavourable weather conditions in winter. The health implications of prolonged exposure to such high AQI levels are severe, increasing the incidence of respiratory illnesses, cardiovascular conditions, and other health problems among residents. Therefore, urgent action is required to mitigate air pollution through stricter emissions controls, promotion of cleaner energy

sources, and increased monitoring of pollutant sources across Punjab to protect public health and improve quality of life.

The Project has broadly four components i.e., augmenting the existing air quality monitoring capacities through provision of 20 mobile five fixed and five portable air quality monitoring systems; provision of smoke emissions analyzers for vehicular inspection; fuel quality checking equipment with vehicles; and installation of fog canon machines.

To effectively address the growing air quality challenges in Punjab's urban centers, the Environmental Protection Agency (EPA) Punjab is making significant investments in a comprehensive suite of monitoring and testing equipment. These interventions are designed to enhance the region's ability to track pollution sources, enforce environmental standards, and ultimately promote cleaner air for its residents. EP&CCD has already initiated to install fixed AQMS in 10 districts of Punjab (Lahore, Sheikhupura, Faisalabad, Gujranwala, Rawalpindi, Sialkot, Multan, Sargodha, Bahawalpur and DG Khan).

Due to the recent trends of higher values of AQI, there is need to have more mobile AQMS across the Punjab for the better and effective monitoring, as and when required at various locations. A glimpse of Average AQI during the month of November, 24 is as follows:

Date	Average AQI	Category
01.11.2024	207	Unhealthy
02.11.2024	242	Unhealthy
04.11.2024	455	Hazardous
05.11.2024	309	Very Unhealthy
06.11.2024	447	
07.11.2024	607	Hozordous
08.11.2024	588	nazaruous
09.11.2024	559	
10.11.2024	518	
11.11.2024	407	Hazardous
12.11.2024	607	Hazardous

To accurately assess air quality in both fixed and dynamic environments, a diverse range of monitoring units is crucial. Mobile units enable data collection across large areas, especially in high-pollution zones like busy roads and industrial areas. Portable units offer flexibility for targeted monitoring in specific locations, such as construction sites or residential neighbourhoods. Fixed monitors provide continuous, long-term data for identifying trends, establishing baselines, and pinpointing persistent pollution sources. This multifaceted approach facilitates adaptive, data-driven air quality management and informed intervention strategies.

#### 9. <u>SCOPE / COMPONENTS OF THE PROJECT:</u>

The project objectives are as follows:

- i. To augment the air quality monitoring system in Punjab
- ii. To enhance vehicular emission testing and gauging their compliance level.

- iii. To regularly monitor and enforce fuel quality at sale points to control fuel adulteration, reduce vehicular emissions, and improve air quality
- iv. To install fog canons in the severely hit smog areas

Following are the sectoral objectives of Environment Protection & Climate Change Department:

- 1. Improve Environmental Governance in the Punjab
- 2. Promote green investments to reduce pollution
- 3. Enhance environmental awareness
- 4. Monitor, review and rationalize the Environmental Quality Standards (EQSs)
- 5. Ensure environmental sustainability through capacity building of provincial departments
- 6. Promote research and development for improving quality of environment
- 7. Devise ways and means for pollution prevention
- 8. Transfer of environment friendly technology to the private sector.

### 10. <u>Reasons for Revisions:</u>

- i. Procurement of Fixed 26 AQMSs instead of 20 Mobile and 05 fixed AQMSs;
- ii. Revision of estimates for Fog Cannon Machines with Allied Equipment; and
- iii. Cancellation / Non Procurement of Equipment i.e., Flue Gas Analyzer, Stack PM Assembly, High Volume Sampler, CO<sub>2</sub> Analyzer, Dust Fall Sampler, Ion Chromatograph, Centralized Data Acquisition and Dissemination System, Portable Air Quality Monitoring Stations

### i. Procurement of Fixed 26 AQMSs instead of 20 Mobile and 5 fixed AQMSs

The Environment Protection and Climate Change Department initially considered procuring 20 mobile Air Quality Monitoring Stations (AQMS) and 5 fixed AQMS to enhance air quality monitoring coverage. However, after assessing the current and planned AQMS infrastructure, the department has revisited its approach to procure more fixed and less mobile AQMS for a more comprehensive and sustainable monitoring system. Furthermore, under the Punjab Green Development Program (PGDP), 25 fixed AQMSs and 5 mobile AQMSs have already been procured. The Environmental Protection Agency (EPA) is currently operating 3 fixed AQMSs. Under the Punjab Clean Air Plan (PCAP), 25 additional AQMSs are being proposed for procurement. This will ensure a strong AQMS network across the province, reducing the need for mobile units.

It has been opted to install at least one fixed AQMS at every district level. As fixed AQMS provide continuous stream of long-term data, which is essential for developing air quality policies, subsequent emission control strategies, and public health interventions. Previously, mobile AQMSs were preferred due to the limited availability of fixed monitoring stations. Therefore, mobile was preferred.

Price of fixed AQMS has slightly been increased from 100 million per AQMS to 105 million to make delivery happen because of very short delivery time and to generate market response.

With the recent and upcoming AQMS deployments, district-wise coverage of AQI is becoming feasible with fixed monitoring stations. Therefore the department has opted for installation of more fixed AQMS.

### ii. <u>Revision of estimates for Fog Cannon Machines with Allied Equipment</u>

The procurement process for Fog Cannon Machines with Allied Equipment has been advertised twice Dated 23<sup>rd</sup> Dec 2024 & 27<sup>th</sup> Jan 2025 respectively; however, no potential bidder participated in the bidding process within the given cost estimates. Due to the absence of competition and the lack of response from bidders, The situation was reviewed and decided to reassess the estimated costs. As this is that for the very first time the fog canon machines are being procured. The price of the fog cannon machine has been increased due to a very low market response in the last two procurement attempts. Being the first of its kind in Pakistan, with no prior procurement history, its unique features make it a crucial solution for smog mitigation. The Minister for Environment has repeatedly emphasized the need for their earliest availability. In the revised proposal, a better engine and an integrated solution have been considered.

In light of these processes, there is a need to revise the cost estimates for the said procurement, ensuring alignment with prevailing market rates to facilitate successful procurement.

 iii. <u>Cancellation / Non Procurement of Equipment i.e., Flue Gas Analyzer, Stack</u> <u>PM Assembly, High Volume Sampler, CO<sub>2</sub> Analyzer, Dust Fall Sampler, Ion</u> <u>Chromatograph, Centralized Data Acquisition and Dissemination System,</u> <u>Portable Air Quality Monitoring Stations</u>)

Despite being advertised twice, no reputable or well-known brands submitted offers, making it challenging to procure high-quality, reliable equipment and same will be procured if need be under some other project.

### Alignment of Project with Sectoral Objectives

This project is aligned with the following sectoral objectives i.e. (i) Improve Environmental Governance in the Punjab and (vii) Devise ways and means for pollution prevention.

### Alignment of Project with Growth Strategy

Punjab Growth Strategy, inter alia aims, to further augment its existing approaches towards mainstreaming, acceleration and policy support for Agenda 2030 of Sustainable Development Goals. This project is aligned with the Goal 13 i.e. Climate Action.

### **11. SUMMARY OF COST COMPARISON**

# **Revised General Abstract of Cost**

# **Amount in PKR)**

		Approved PC-I			Revised PC-I			
Object	Description	FY 2024-2025	FY 2025-2026	Total	FY 2024-2025	FY 2025-2026	Total	Diff of Cost (Revised - Approved)
A09501	Purchase of Transport	896,727,500	1,000	896,728,500	282,000,000	1,000	282,001,000	(614,727,500.000)
A09601	Purchase of Plant & Machinery	3,828,630,000	1,000	3,828,631,000	4,455,190,562	1,000	4,455,191,562	626,560,562.000
A03919	Payment to others for service rendered	218,750,000	375,000,000	593,750,000	206,916,938	375,000,000	581,916,938	(11,833,062.000)
A03603	Motor Vehicles Registration	51,600,000	289,500	51,889,500	51,600,000	289,500	51,889,500	-
A09202	Computer Equipment- Software/ Licenses etc.	10,000,000	1,000	10,001,000	10,000,000	1,000	10,001,000	-
	Total	5,005,707,500	375,292,500	5,381,000,000	5,005,707,500	375,292,500	5,381,000,000	-

# **Revised Break-up of various Head of accounts**

# (Amount in PKR)

(A09501) Purchase of Vehicles								
Description	Unit (Nos.)	Cost per unit	Total	Unit (Nos.)	Cost per unit	Total	Diff. of cost	
Hybrid crossover vehicles for Urban area patrolling (Toyota Cross 1800 CC)	25	9,989,100	249,727,500.00	25.00	9,600,000.00	240,000,000.00	9,727,500.00	
Fuel Testing Vehicle- Customized Vehicle (2494 CC)	3	14,000,000	42,000,000.00	3.00	14,000,000.00	42,000,000.00	-	
Mobile AQMS Vehicle Customized Vehicel (2800-3000 CC)	20	22,000,000	440,000,000.00	20.00	-	-	440,000,000.00	
Vehicle with water bowser for fog cannon machine - customized vehicle (4500 cc)	15	11,000,000	165,000,000.00	15.00	-	-	165,000,000.00	
Total (A)	63		896,727,500.00			282,000,000.00	614,727,500.00	

(A09601) Purchase of Plant & Machinery							
	Approved PC-I						
Description	Unit (Nos.)	Cost per unit	Total	Unit (Nos.)	Cost per unit	Total	Diff. of cost
Fuel testing mobile laboratory	3	94,700,000	284,100,000	3	100,000,000	300,000,000	15,900,000
Mobile Air Quality Monitoring Station with Generator along with standardized shelter, fixation	20	100,000,000	2,000,000,000	-	100,000,000	-	(2,000,000,000)
Air Quality Monitor Station (Fixed) along with standardized shelter, fixation	5	100,000,000	500,000,000	26	105,000,000	2,730,000,000	2,230,000,000
Air Quality Monitor (Portable for research, development, trend analysis, for confined spaces etc.)	5	10,000,000	50,000,000	-	-	-	(50,000,000)
Carbon Brown & Black Analyzer	5	20,000,000	100,000,000	2	8,661,353	17,322,706	(82,677,294)
Fluegas Analyzer for stack emission	2	35,000,000	70,000,000	-	-	-	(70,000,000)
Stack PM Assembly	2	25,000,000	50,000,000	-	-	-	(50,000,000)
High Volume Sampler, Methane Analyzer, Total HC Analyzer, CO2 analyzer	5	42,500,000	212,500,000	2	14,933,928	29,867,856	(182,632,144)
Smoke opacity meter & Automotive emission analyzer	20	10,000,000	200,000,000	20	8,900,000	178,000,000	(22,000,000)
Dust fall samplers	10	300,000	3,000,000	-		-	(3,000,000)
Fog cannon machines*	15	19,602,000	294,030,000	15	80,000,000	1,200,000,000	905,970,000
Data acquisition & dissemination system (30 AQMS new & 3 Old AQMS)			65,000,000	-	-	-	(65,000,000)
Total (B)			3,828,630,000			4,455,190,562	626,560,562

Key Notes:

- All prices are indicative. If any change in cost is required during procurement process the variation will be met from the available budget / estimates.
- Price of fixed AQMS has slightly been increased from 100 million per AQMS to 105 million to make delivery happen because of very short delivery time and to generate market response.
- The price of the fog cannon machine has been increased due to a very low market response in the last two procurement attempts. Being the first of its kind in Pakistan, with no prior procurement history, its unique features make it a crucial solution for smog mitigation. The Minister for Environment has repeatedly emphasized the need for their earliest availability. In the revised proposal, a better engine and an integrated solution have been considered.
- It has been required from the bidder / contractor to provide a turn key solution without O&M as due to nature and timing of its operations, It was decided that O&M may be taken by EPA and cost will be born from the head services rendered by others.

## 12. PROCUREMENT PLAN

Procurement Name	Procurement Description	Procurement Type (Consultancy, Services, Goods)	Procurement Category (National & International)
Procurement of Air Quality Monitors	Devices for measuring and monitoring air pollution levels	Goods	National – Direct Contracting, under Rule 59(c)(v) of the Punjab Procurement Rules, 2014
Procurement of Vehicles	Vehicles to patrol urban areas and enforce regulations	Goods	National – direct contracting
Procurement of Smoke Emission Analyzers, Carbon Brown & Black Analyzer, Methane Analyzer, Total HC Analyzer, Smoke opacity meter & Automotive emission analyzer	Instruments for measuring the emissions from smoke sources	Goods	National – Direct Contracting, under Rule 59(c)(v) of the Punjab Procurement Rules, 2014
Procurement of Fuel Quality Checking Equipment	Tools used to test fuel quality for compliance with standards	Goods	National – Direct Contracting, under Rule 59(c)(v) of the Punjab Procurement Rules, 2014
Procurement of Fog Cannon Machines	Machinery designed to disperse water mist to control air pollution	Goods	National – Direct Contracting, under Rule 59(c)(v) of the Punjab Procurement Rules, 2014

## **Procurement Plan**

# 13. MONITORING AND EVALUATION PLAN :

Level	Indicator	Baseline	Target	Monitoring Method/frequenc y
<ul> <li>Goal</li> <li>Procurement of air quality monitors</li> <li>Acquisition of urban patrolling vehicles</li> <li>Purchase of smoke emission analyzers</li> <li>Purchase of fuel quality checking equipment</li> <li>Installation of fog cannon machines</li> <li>Data collection from monitoring devices</li> <li>compliance checks</li> </ul>	<ul> <li>Number of monitors installed</li> <li>Number of vehicles operational</li> <li>Number of functional analyzers</li> <li>Number of functional testing equipment</li> </ul>	EPA has three 3 AQMS. EPCCD under PGDP going to have 30 (25 fixed and 5 mobile) air quality monitorin g stations. Except that there is no other facility available	Reduced vehicula r emission s and improve d air quality. Improve d fuel quality, reduced dust levels and improve d public health	Site inspections, installation reports, Vehicle inspection records, Inspection and maintenance records, Equipment testing records, Site inspections, Report analysis, Compliance audit reports on monthly basis

## **MONITORING & EVALUATION PLAN**

Level	Indicator	Baseline	Target	Monitoring Method/frequenc y
<ul> <li>Output <ul> <li>Installed air quality monitors</li> <li>Operational urban patrolling vehicles</li> <li>Functional smoke emission analyzers</li> <li>Functional fuel quality testing equipment</li> <li>Active fog cannon machines</li> <li>Air quality data</li> <li>Compliance with environmenta I standards</li> </ul> </li> </ul>	<ul> <li>Number of fog cannon machines operational</li> <li>Frequency of data reports generated</li> <li>Number of compliance checks conducted</li> </ul>	No. of functional testing facilities / systems / data		

### <u>PART – B</u>

### 14. COMMENTS OF ENVIRONMENT AND CLIMATE CHANGE SECTION

The pre-PDWP meeting of the project was held on 06-03-2025 under the chairmanship of Member (Env & CC) and following observations has been raised by section:

- 1. The project rationale is well-articulated, emphasizing the need for improved air quality monitoring and control measures. However, a clear linkage with Punjab's Climate Adaptation Strategy, the Punjab Green Development Program (PGDP), and Smog Mitigation Plan 2024 should be strengthened to ensure strategic alignment with ongoing initiatives.
- 2. The expected environmental benefits are well-stated, but quantifiable impact assessments (e.g., reduction in PM2.5 levels, emission reduction targets, and expected air quality improvements) should be explicitly included.
- 3. The cost estimates seem justified, but a detailed breakdown of major expenditure heads is missing.
- 4. It is observed that some budget components have been revised upward—justification for these increases should be provided, especially for HR costs, procurement of equipment, and operational expenses.
- 5. The project should include a financial sustainability plan, ensuring that the initiative remains viable post-project completion without relying solely on additional government funding.
- 6. A monitoring and evaluation (M&E) framework with key performance indicators (KPIs) and regular reporting mechanisms should be explicitly outlined to assess the project's impact.
- 7. Potential risks, including delays in procurement, coordination issues, and operational challenges, should be identified, along with mitigation strategies.

### 15. **RECOMMENDATIONS:**

The Revised PC-I is submitted before PDWP at a cost of **Rs. 5,381.000 million** with gestation period of **2 Years (FY 2024-25 to FY 2025-26)** for consideration / approval.