PC-1

Punjab Smog mitigation and response initiative – AirSafe

ORIGINAL APPROVED COST	**PKR Million. 5,381.000/-**
1st REVISED PROPOSED COST	**PKR Million. 5,381.000/-**
ORIGINAL APPROVED GESTATION	**20 Months** **Till June 2026**
1st REVISED PROPOSED GESTATION	**20 Months** **Till June 2026**
APPROVAL FORUM	**PDWP (PDWP)**

1. NAME OF THE PROJECT

Punjab Smog mitigation and response initiative AirSafe

2. LOCATION OF THE PROJECT

2.1. DISTRICT(S)

I. LAHORE

3. AUTHORITIES RESPONSIBLE FOR

3.1. SPONSORING AGENCY

- ENVIRONMENT PROTECTION & CLIMATE CHANGE DEPARTMENT

3.2. EXECUTION AGENCY

- ENVIRONMENT PROTECTION & CLIMATE CHANGE DEPARTMENT

3.3. OPERATIONS AND MAINTENANCE AGENCY

- ENVIRONMENT

3.4. CONCERNED FEDRAL MINISTRY

- MINISTRY OF CLIMATE CHANGE

4. PLAN PROVISION

Sr #	Description
1	**Source of Funding:**Scheme Listed in ADP CFY
2	**GS No:**7800
3	**Total Allocation:**0.000

Comments:

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 for the Year 2024-25.
The plan provision as per PC-I is as follows:

(PKR Million)

Total Est. Cost	Provision of FY 2024-25	Provision of FY 2025-26
5,381.000	5,005.708	375.292

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5. PROJECT OBJECTIVES

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:

i. Improve Environmental Governance in the Punjab

ii. Promote green investments to reduce pollution
iii. Enhance environmental awareness
iv. Monitor, review and rationalize the Environmental Quality Standards (EQSs)
v. Ensure environmental sustainability through capacity building of provincial departments
vi. Promote research and development for improving quality of environment
vii. Devise ways and means for pollution prevention
viii. Transfer of environment friendly technology to the private sector.

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.

Alignment with Punjab Spatial Strategy

This project is aligned with the sectoral objective 6 of Punjab Spatial Strategy that is “Enhance environment protection and management”.

6. DESCRIPTION AND JUSTIFICATION OF PROJECT

6.1 JUSTIFICATION OF PROJECT:

The Project was approved in 46th PDWP Meeting held on 15 Nov 2024 and approved it (**Annex-AA).** Provincial Cabinet in its meeting held on 03 Dec 2024, approved the scheme (**Annex-AB**). Administrative approval has been issued vide Dated 26th Dec 2024(**Annex-AC).**

Reasons for Revisions:

-Procurement of Fixed 26 AQMSs instead of 20 Mobile and 05 fixed AQMSs;
-Revision of estimates for Fog Cannon Machines with Allied Equipment; and
-Cancellation / Non Procurement of Equipment i.e., Flue Gas Analyzer, Stack PM Assembly, High Volume Sampler, CO%u2082 Analyzer, Dust Fall Sampler, Ion Chromatograph, Centralized Data Acquisition and Dissemination System, Portable Air Quality Monitoring Stations

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.

Revision of estimates for Fog Cannon Machines with Allied Equipment

The procurement process for Fog Cannon Machines with Allied Equipment has been advertised twice Dated

23rd Dec 2024 & 27th 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.

Cancellation / Non Procurement of Equipment i.e., Flue Gas Analyzer, Stack PM Assembly, High Volume Sampler, CO%u2082 Analyzer, Dust Fall Sampler, Ion Chromatograph, Centralized Data Acquisition and Dissemination System, Portable Air Quality Monitoring Stations)

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.

6.1 Description:

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 unfavorable 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 25 fixed 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).

These monitoring stations have been essential for tracking air quality, enforcing environmental standards, and taking action against pollution sources in 10 District Headquarters. Whereas, 28 District Headquarters and many other tehsil level urban centres are devoid of any such air quality monitoring facility. To further enhance the effectiveness of air quality monitoring and management in the province, EPA now aims to bridge the gap of AQMS in Punjab and intends to procure further 26 more AQMS. This expansion will involve deploying new fixed and mobile air quality monitoring stations in underserved areas, particularly in smaller cities and towns where air pollution may be rising due to industrial growth, vehicular emissions, and agricultural activities.

Keeping in view the fuel adulteration and compromised quality of fuel used in the Punjab Province, the level of air pollutants increases from automobiles emission. To curb the increase of air pollutants due to

fuel adulteration EPA intends to keep a watchdog on the fuel quality, available at Fuel Filling Stations. Therefore, it is planned to have 3 mobile fuel testing laboratories, starting from Lahore. These mobile labs are equipped to perform on-site fuel quality tests, helping to identify substandard or adulterated fuels that contribute to high levels of vehicular emissions and air pollution. By ensuring that fuel quality meets regulatory standards, the EPA can reduce the contribution of fuel-related pollutants, which is a significant source of air contamination in urban areas.

The present air quality monitoring stations installed in 10 cities measure the conventional six air pollutants that is able to monitor quality of air at specific sites. This data does not describe the source of the pollution, hence the appropriate and targeted strategy cannot be formulated. Addition of carbon black and carbon brown monitors will build the capacity of EPA to research on the sources of the air pollution and plan its management. With each air quality monitoring station, one black brown carbon analyzer will be installed.

Methane is the major GHGs which are responsible of climate change at national and international level. Currently, EPA does not have any testing or monitoring facilities of this gas therefore, through this project intervention Methane analyzers is being procured to assess the level of these GHGs in the atmosphere and continuous monitoring will lead to GHGs mitigation plan at provincial level in line with SDGs and NDCs.

As, the vehicular emissions are considered a major contributor in formation of the SMOG and its inspection regime lacks the emission testing equipment to get the scientific evidence of violation of the PEQS. The procurement of 20 set of vehicular emission analyzers will help to attain the compliance of PEQS in automobiles especially in diesel engines and motorcycles. Regular inspections and enforcement of vehicle emission standards will help curb the number of high-emission vehicles on the road, particularly those that are older or poorly maintained.

Collectively, this advancement gives the EPA Punjab the tools it needs to strengthen its air quality management capabilities. The fixed monitoring stations, fuel and emission testing equipment, and advanced analyzers will not only help the agency track pollution levels more accurately but also enforce compliance with air quality standards, identify sources of pollution, and develop targeted interventions. By enhancing these monitoring and enforcement capacities, the EPA will be better positioned to promote cleaner air, improve public health, and contribute to more sustainable urban environments across the province of Punjab.

6.2 Justification and Technical Parameters:

a. **For augmenting air quality monitoring capacity**

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.

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	Hazardous
07.11.2024	607	
08.11.2024	588	
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 perse 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 neighborhoods. 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.

Under this project, the procurement will be carried out through invoking "urgency" under the Punjab Procurement Rules, 2014. The payment to the contractor for the operation and maintenance wherever applicable will be made under the object head of A03915 "Payment to others for services rendered". Furthermore, the terms and conditions for hiring the contractor will be chalked out subsequently.

b. Provision of smoke emissions analyzers for vehicular inspection

The combustion of gasoline and diesel releases hydrocarbons (HC), nitrogen oxides (NOx), and carbon monoxide (CO), which are primary pollutants in smog formation. Under sunlight, NOx and HC undergo photochemical reactions, producing ground-level ozone (O3). Diesel's higher sulfur content generates sulfur dioxide (SO2), which contributes to particulate matter (PM). Together, these pollutants create smog, especially under conditions like temperature inversions that trap emissions near the ground.

Various studies have identified various proportions of vehicular pollution in the total mix of pollution sources. In all these studies, pollution from the transport sector is a significant source.

Section 15 of the Punjab Environmental Protection Act, 1997 states that "*15. Regulation of motor vehicles.– (1) Subject to the provisions of this Act and the rules and regulations made thereunder, no person shall operate a motor vehicle from which air pollutants or noise are being emitted in an amount, concentration or level which is in excess of the Punjab Environmental Quality Standards, or where applicable the standards established under clause (g) of sub-section (1) of section 6*.". This Section clearly states that every vehicle has to be compliant with the environmental quality standards as notified by the Government. The procedure for impounding the vehicles and its trial has explicitly mentioned in the Punjab Environmental Protection (Motor Vehicles) Rules 2013.

To address the issue of air pollution, stringent regulations and effective enforcement mechanisms are essential. Periodic motor vehicle inspections are a crucial component of these efforts. By regularly examining vehicles for compliance with emission standards, will result in more compliance levels. This proactive approach will help to ensure that vehicles operate efficiently and minimize their environmental impacts.

In the wake of prevailing circumstances, there is a dire need for the enforcement of environmental standards for vehicular emissions.

c. Fuel quality checking equipment with vehicles

Fuel adulteration due to adding or mixing substandard, harmful, or cheaper substances to a fuel, such as gasoline or diesel, to increase the fuel's volume, decrease its quality, or decrease its cost. The adulterants can include substances such as kerosene, water, methanol, ethanol, or other chemicals that are not normally present in the fuel or are present in much smaller quantities. Fuel adulteration can have negative impacts on engine performance and efficiency, as well as on the environment and human health. In Pakistan matter of fuel quality checking and controlling the adulteration has surfaced as a challenge.

Pollutants caused by fuel combustion include particulate matter, nitrogen oxides, volatile organic compounds, benzene, metals and Sulphur dioxide etc., and many of these contribute to the creation of smog. Testing the fuel sample involves using specialized fuel analyzers to measure various physical characteristics (density, viscosity etc.) and chemical parameters such as Lead Content: A harmful metal that was once used as an anti-knock additive, Benzene Content: (carcinogen), Sulfur content (a pollutant that contributes to acid rain and air pollution) and Polycyclic Aromatic Hydrocarbons (PAHs): Harmful to human health.

The Euro emission standards were introduced to reduce harmful toxins found in exhaust fumes from combustion-powered cars, trucks, and motorbikes. These vehicles emit harmful toxins such as nitrogen oxide (NOx), carbon monoxide (CO), hydrocarbons (HC) and particulate matter (PM) all of which are dangerous to the environment and population. For example, in Euro-1 standards the quantity of sulfur is 1000 parts per million (PPM), while this quantity is 500 PPM in Euro-2, 300 PPM in Euro-3, 50 PPM in Euro-4 and just 10-PPM in Euro 5 and 6.

Currently, EPA laboratories are insufficient to test or conduct the analysis of different parameters in petroleum products. Through this scheme, EPA intends to test fuel quality in Punjab province to reduce air pollution. It will become a permanent part of EPA where fuel stations will be inspected on regular basis. These laboratories will carry out chemical analyses of fuel samples collected from petrol stations to identify any discrepancies or substandard products.

Section 15 (2) -Regulation of Motor Vehicle under Punjab Environment Protection Act 1997 states, "Ensuring compliance with Punjab Environmental Quality Standards, Provincial agency may direct that any motor vehicle shall install pollution control devices or other equipment or use such fuels or undergo such maintenance or testing as may be prescribed".

Similarly, the Punjab Clean Air Policy with a phased action plan (72 of 2023) commands the establishment of a fuel testing laboratory in Punjab to ensure the use of better-quality fuel and reduce vehicular emissions for a clean environment.

Punjab Government is striving hard to combat the devastating impacts of smog that is likely prevail from October to December, therefore, Pre-emptive measures against all sources of air pollution is urgently required. One of the key contributors to smog is the harmful vehicular emissions due to use of substandard fuel, which significantly increases the risk to human health.

As per Section 2 (xxxiii) of The Punjab Environmental Protection Act 1997, pollution means *"contamination of air, land or water by the discharge or emission of effluents or wastes or air pollutants or noise or other matter which either directly or indirectly or in combination with other discharges or substances alters unfavorably the chemical, physical, biological, radiation, thermal or radiological or aesthetic properties of the air, land or water or which may, or is likely to make the air, land or water unclean, noxious or impure or injurious, disagreeable or detrimental to the health, safety, welfare or property of persons or harmful to biopersity."*

Punjab Environmental Quality Standards for Motor Vehicle Exhaust & Noise:

Govt. of Punjab vide Notification No. SO(G)/EPD/7-26/2013 dated 12.08.2016 has notified PEQS for motor vehicle exhaust and noise. It would also help to comply with relevant emission standards of petrol / diesel, particularly carbon monoxide (CO), hydrocarbon+NOx (HC+NOx).

d. install fog canons in the severely hit smog areas

Fog canon or anti-smog gun is a device that spews fine nebulized water droplets into the atmosphere so that the smallest dust and polluted particles are absorbed. It is designed in such a way that it converts the water into a fine spray with droplets size of 50-100 microns by passing it through high-pressure propellers.

1 It is not a long-term solution to air pollution, however, it can provide temporary relief during periods of high air pollution.

Fog cannons can be used in smog-prone areas to help settle particulate matter by releasing a fine mist of water vapor into the air. This mist can interact with airborne particles, such as dust, soot, and larger pollutants commonly found in smog, causing them to agglomerate with water droplets and become heavier, allowing them to fall to the ground more quickly. The increased humidity from the fog can temporarily reduce the concentration of these larger particles in the air, improving visibility and air quality in the immediate vicinity. Additionally, fog cannons can help settle particulate matter and respirable dust PM10). Therefore, fog cannons can provide temporary relief in specific areas with high levels of dust and smog. This is a short term measure to bring down the exalted levels of smog in any particular area. Emergency Procurement of 15 fog cannons as an emergency procurement can act as a supplementary measure along with other methods of tackling air pollution in smog hit areas. These fog cannons will be mounted on the water bowsers, fabricated on engine mounted vehicle.

Rs.5,381.000 million.

Revised General Abstract of Cost is at **Annex-A.**

Basis of Estimates of funds against different "Head of Accounts" is given at **Annex-A-1.** If there is no estimate is given then it means that an estimate is on Lump-sum basis. All prices are indicative, if any change in cost is required during procurement process the variation will be met from the available budget / estimates.

Furthermore, the specification of each item is given as follows:

#	**Specification**	**Annex No. as Per Approved PC-1**	**Annex No. as Per Revised PC-1**
i.	Mobile AQMS	~~**Annex-B**~~	-
ii.	Fixed Air Quality Monitoring Stations	~~**Annex-C**~~	**Annex-B***
iii.	Portable Air Quality Monitoring Stations	~~**Annex-D**~~	-
iv.	Smoke opacity meter & Automotive emission analyzer	~~**Annex-E**~~	**Annex-C**
v.	Fuel Quality Checking Equipment	~~**Annex-F**~~	**Annex-D**
vi.	Fog Canon Machine	~~**Annex-G**~~	**Annex-E***
vii.	Black Carbon & Brown Carbon Analyzer,	~~**Annex-H**~~	**Annex-F**
viii.	Flue gas analyzer	~~**Annex-I**~~	-
ix.	Stack PM Assembly	~~**Annex-J**~~	-
x.	High Volume Sampler,	~~**Annex-K**~~	-
xi.	Methane & Total HC Analyzer,	~~**Annex-L**~~	**Annex-G**
xii.	CO2 Analyzer	~~**Annex-M**~~	-
xiii.	Dust fall sampler	~~**Annex-N**~~	-
xiv.	Ion Chromatograph	~~**Annex-O**~~	-
xv.	Centralized Data Acquisition and Dissemination System	~~**Annex-P**~~	-

**these are the updated specifications.*

It is pertinent to mention that if any modification/revision of specification is required, hence forthwith, then

it will be carried out through a Technical Committee to be notified by the EPCCD.

6.2 SECTORAL SPECIFIC INFORMATION:

Undefined.

7. CAPITAL COST ESTIMATES:

Financial Components: Revenue
Cost Center:OTHERS- (OTHERS)
Fund Center (Controlling):LZ5214

Grant Number: Development Revenue - (PC22036)
LO NO:LO23000136
A/C To be Credited: Account-I

PKR Million

Sr #	Object Code	2024-2025		2025-2026	
		Local	Foreign	Local	Foreign
1	**A09501**-Purchase of Transport	282.000	0.000	0.001	0.000
2	**A09601**-Purchase of Plant and Machinery	4,455.191	0.000	0.001	0.000
3	**A03919**-Payments To Others For Service Rendere	206.917	0.000	375.000	0.000
4	**A03603**-Registration	51.600	0.000	0.290	0.000
5	**A09202**-Purchase of Software	10.000	0.000	0.001	0.000
Total		**5,005.708**	**0.000**	**375.293**	**0.000**

8. ANNUAL OPERATING COST (POST COMPLETION)

Financial Components: Revenue
Cost Center:OTHERS- (OTHERS)
Fund Center (Controlling):LE4275

Grant Number: Development Revenue - (PC22036)
LO NO:LO23000136
A/C To be Credited: Account-I

PKR Million

Sr #	Object Code	2026-2027		2027-2028		2028-2029		2029-2030		2030-2031	
		Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign	Local	Foreign
1	**A03603**-Registration	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

2	**A03919**-Payments To Others For Service Rendere	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	**A09202**-Purchase of Software	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	**A09501**-Purchase of Transport	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
5	**A09601**-Purchase of Plant and Machinery	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total		**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

9. Demand and Supply Analysis:

undefined

10. FINANCIAL PLAN AND MODE OF FINANCING

10.1 FINANCIAL PLAN EQUITY INFORMATION:

Through Annual Development Program

10.2 FINANCIAL PLAN DEBT INFORMATION:

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10.3 FINANCIAL PLAN GRANT INFORMATION:

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10.4 WEIGHT COST OF CAPITAL INFORMATION:

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11. PROJECT BENIFITS AND ANALYSIS

11.1 PROJECT BENEFIT ANALYSIS INFORMATION:

The project significantly contributes towards the protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development.

11.2 ENVIROMENTAL IMPACT ANALYSIS:

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11.3 ECONOMIC ANALYSIS:

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11.4 FINANCIAL ANALYSIS:

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12. IMPLEMENTATION SCHEDULE

12.1 IMPLEMENTATION SCHEDULE/GANTT CHART:

FY 2024-25 to FY 2025-26 (Two Years).

12.2 RESULT BASED MONITORING (RBM) INDICATORS:

Annex –H,

12.3 IMPLEMENTATION PLAN:

Annex – L

12.4 M&E PLAN:

Annex-J

12.5 RISK MITIGATION PLAN:

Annex-I

12.6 PROCUREMENT PLAN:

Annex-K

13. MANAGEMENT STRUCTURE AND MANPOWER REQUIREMENTS

EPCCD, SPIU and EPA will execute this project. The funds will be released at the cost center of Section officer (General), EPCCD.

14. ADDITIONAL PROJECTS / DECISIONS REQUIRED

15. CERTIFICATE

Focal Person Name: Muhammad Nadeem **Designation:**AD Research, EPA Laboratory, Lahore.
Email: **Tel. No.:**0312-4422054
Fax No:
Address: Environment Protection Department, Hockey Stadium, Lahore.

Focal Person Name: Muhammad Nadeem **Designation:**AD Research, EPA Laboratory, Lahore.
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Prepared by:	28/02/2025 Muhammad Nadeem Assistant Director (Research), EPA Laboratory, Lahore
Checked by:	28/02/2025 Dr. Muhammad Arshad Assistant Director (Research), EPA Laboratory, Lahore
Recommended by:	Farooq Alam Deputy Director (Labs), EPA Laboratory, Lahore
Recommended for Approval by PDWP:	Secretary Environment Protection and Climate Change Department

Annex-A

Revised General Abstract of Cost

Amount in PKR)

Object	Description	Approved PC-I			Revised PC-I			Diff of Cost (Revised - Approved)
		FY 2024-2025	FY 2025-2026	Total	FY 2024-2025	FY 2025-2026	Total	
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

Annex-A1

(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			Revised PC-I			Diff. of cost
Description	Unit (Nos.)	Cost per unit	Total	Unit (Nos.)	Cost per unit	Total	
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.

Annex–B

SPECIFICATION OF FIXED AIR QUALITY MONITORING STATION

MINIMUM SPECIFICATIONS OF FIXED AIR QUALITY MONITORING STATION		
A	**Analyzer**	**Ambient Air Ozone Analyzer**
1.	Measured parameter	O_3(ozone) in ambient air
2.	Technology	Ultra-violet-absorption method (NDUV), with cleaning of measurement cell by purified reference gas after every measurement in the optical system.
3.	Certification	Must be US-EPA designated and QAL1 certified
4.	Features	Analyzer must be able to have multi-screen remote access through Ethernet for control and diagnostics. Must have real-time calibration points and data, auto-diagnostic control and maintenance data screens should be able to display while the instrument is operating. Should include heated de-ozonator to remove any O3 in the reference gas. Inert materials like glass or PTFE must contact the sample. Calibration Solenoid Valve.
5.	Options/Up gradations	2 years consumables as per manufacturer manual must be supplied.
		220 VAC, 50Hz operation
6.	Display	Touch screen display
7.	Measurement ranges	0-0.1/0.2/0.5/1.0 ppm; Range selection: Auto or manually ranges selectable, with two-point calibration which should be valid for all four ranges
8.	Display units	ppb, ppm
9.	Lower Detectable Limit	0.5 ppb; 3σ(3Sigma)
10.	Zero drift	$<$ 0.5 ppb/ 24h at lowest range, $<$ 0.5 ppb/week at lowest range
11.	Span drift	$<$ 0.5ppb / 24h at lowest range, $<$ 0.5 ppb/week at lowest range
12.	Linearity	± 1% FS
13.	Sample flow rate	As defined by manufacturer design
14.	Sampling pump	Internal
15.	Data storage	As defined by manufacturer design
16.	Communication ports	LAN, optionally RS232 or as defined by manufecturer
17.	Chassis	As per manufacturer specifications
18.	Sampling Condition	

		The sampling rate and temperature will be customized with the original manufacturer guidelines
B.	**Analyzer**	**Ambient Air CO Analyzer**
19.	Measured parameter	CO in ambient air
20.	Technology	NDIR, with cleaning of measurement cell by purified reference gas after every measurement in the optical system.
21.	Certification	Must be US-EPA designated and QAL1 certified
22.	Features	Analyzer must be able to have multi-screen remote access through Ethernet for control and diagnostics. Must have real-time calibration points and data, auto-diagnostic control and maintenance data screens should be able to display while the instrument is operating. AS type (anti-shock) interference-compensating detector and purifier for reference gas. The reference gas purifier should eliminate interferences by oxidizing CO to CO2.The optical system should have a designed without reflecting mirrors or with minimized use of them to prevent the accumulation of foreign matter. With Calibration Solenoid Valve included.
23.	Options/Up gradations	2 years consumables as per manufacturer manual must be supplied
		220 V AC, 50 Hz operation
24.	Display	Touch screen display
25.	Measurement ranges	0-5/10/20/50 ppm, Autoselection of four measurement ranges with two-point calibration, which should be valid for all four ranges.
26.	Display units	ppb, ppm,
27.	Lower Detectable Limit	0.02 ppm; 3σ(3Sigma)
28.	Zero drift	< 0.02 ppm/day at lowest range, < 0.2 ppm/week at lowest range,
29.	Span drift	< 0.02 ppm/day at lowest range, ±1.0% F.S./week
30.	Linearity	± 1% FS
31.	Sample flow rate	as defined by manufacturer design
32.	Sampling pump	Internal
33.	Data storage	As defined by manufacturer design
34.	Communication ports	LAN, optionally RS232
35.	Chassis	As per manufacturer specifications
36.	Sampling Condition	The sampling rate and temperature will be customized with the original manufacturer guidelines
C.	**Analyzer**	**Ambient Air SO2 Analyzer**
37.	Measured parameter	SO2, in ambient air
38.	Technology	UV Fluorescence
39.	Certification	Must be US-EPA designated and QAL 1

40.	Features	Analyzer must be able to have multi-screen remote access through Ethernet for control and diagnostics. Must have real-time calibration points and data, auto-diagnostic control and maintenance data screens should be able to display while the instrument is operating. UV-fluorescent detector should be resistant to moisture interference; Hydrocarbons elements should be eliminated and filtered with Integral HC-cutter. Should Incorporate a lamp intensitycompensator. Uses a built-in inert PTFE sample inlet filter. With Calibration Solenoid Valve included.
41.	Options/Up gradations	2 years consumables as per manufacturer manual must be supplied
		220 VAC, 50Hz operation
42.	Display	Touch screen display
43.	Measurement ranges	0-0.05/0.1/0.2/0.5 ppm, Autoselection of four ranges with two point calibration, which should be valid for all four ranges.
44.	Display units	ppb, ppm,
45.	Lower Detectable Limit	0.5 ppb; 3σ(3Sigma)
46.	Zero drift	< 0.5 ppb / 24h at lowest range, < 0.5 ppb/week at lowest range
47.	Span drift	< 0.5 ppb/day at lowest range,0.5 ppb/week at lowest range
48.	Linearity	± 1% FS
49.	Sample flow rate	as defined by manufacturer design
50.	Sampling pump	Internal
51.	Data storage	As defined by manufacturer design
52.	Communication ports	LAN, optionally RS232
53.	Chassis	Preferably metal chassis or as per manufacturer specifications
54.	Sampling Condition	The sampling rate and temperature will be customized with the original manufacturer guidelines
D.	**Analyzer**	**Ambient Air NOx Analyzer**
55.	Measured parameter	NO, NO_2 & NOx in ambient air
56.	Technology	Reduced pressure chemiluminescence (CLD), with cleaning of measurement cell by purified reference gas after every measurement in the optical system.
57.	Certification	Must be US-EPA designated and QAL 1 certified

58.	Features	Analyzer must be able to have multi-screen remote access through Ethernet for control and diagnostics. Must have real-time calibration points and data, auto-diagnostic control and maintenance data screens should be able to display while the instrument is operating. Continuous NOX, NO, NO2 measurements using a dual cross-flow single chemiluminescence detector and referential calculation. Detector (Silicon photodiode sensor) respond to gas concentration quickly. Includes auto-recycle internal drier to make dry air for generating ozone gas; Built-in O3 drier unit, O3 decomposer, reference gas generator and sample pump. With Calibration Solenoid Valve included.
59.	Options/Up gradations	2 years consumables as per manufacturer manual must be supplied
		220 VAC, 50Hz operation
60.	Display	Touch screen display
61.	Measurement ranges	0 - 0.1/0.2/0.5/1.0 ppm, Autoselection of four ranges with two-point calibration, which should be valid for all four ranges.
62.	Display units	ppb, ppm,
63.	Lower Detectable Limit	0.5 ppb; 3σ(3Sigma)
64.	Zero drift	< 0.5 ppb / 24h at lowest range, as well as ±1.0 ppb/week at lowest range
65.	Span drift	< 0.5 ppb/day at lowest range, as well as ±1.5% of F.S./week at lowest range
66.	Linearity	± 1% FS
67.	Sample flow rate	Approx. 0.8 L/min or as defined by manufacturer design
68.	Sampling pump	Internal
69.	Data storage	As defined by manufacturer design
70.	Communication ports	LAN, optionally RS232
71.	Chassis	Preferably metal chassis or as per manufacturer specifications
72.	Sampling Condition	The sampling rate and temperature will be customized with the original manufacturer guidelines
E.	**Analyzer**	**Ambient Air PM2.5 Analyzer**
73.	Measured parameter	PM2.5 in ambient air
74.	Technology	Beta Ray attenuation method
75.	Certification	Must be US-EPA designated and QAL 1 certified
76.	Features	Analyzer must be able to have multi-screen remote access through Ethernet for control and diagnostics. Must have real-time calibration points and data, auto-diagnostic control and maintenance data screens should be able to display while the instrument is operating, fitted in cabin rack, necessary sampling heads and pole.
77.	Options/Up gradations	2 years consumables must be supplied
		Analyzer must be able to analyze PM 2.5

		220 V AC, 50 Hz operation
78.	Display	Touch screen display
79.	Measurement ranges	0-10000 µg/m3 and analyzer
80.	Display units	µg/m3, mg/m3
81.	Lower Detectable Limit	<1 µg/m3 (24h average) 2σ
82.	Sample flow rate	16.67 l/m
83.	Sampling pump	External (vacuum pump)
84.	Operating Temp range	0-50 C
85.	Operating Humidity range	0-90% or higher
86.	Humidity Control	Actively controlled inlet heater module
87.	Data storage	As defined by manufacturer design
88.	Communication ports	LAN, RS232 and Dry contact output
89.	Chassis	Preferably metal chassis or as per manufacturer specifications
90.	Sampling Condition	The sampling rate and temp will be customized with the original manufacturer's design/guidelines.
91.	Accessories	Zero Air Filter, Cutter and calibration membrare and other relevent accessories must be provided.
F.	**Analyzer**	**Ambient Air PM10 Dust Analyzer**
92.	Measured parameter	PM10 in ambient air
93.	Technology	Beta Ray attenuation method
94.	Certification	Must be US-EPA designated and QAL 1 certified
95.	Features	Analyzer must be able to have multi-screen remote access through Ethernet for control and diagnostics. Must have real-time calibration points and data, auto-diagnostic control and maintenance data screens should be able to display while the instrument is operating, fitted in cabin rack, necessary sampling heads and pole.
96.	Options/Up gradations	2 years consumables must be supplied
		Analyzer must be able to analyze PM10
		220 VAC, 50Hz operation
97.	Display	Touch screen display
98.	Measurement ranges	0-10000 µg/m3 and analyzer
99.	Display units	µg/m3, mg/m3
10(	Lower Detectable Limit	<1 µg/m3 (24h average) 2σ
10	Sample flow rate	16.67 l/m
10	Sampling pump	External (vacuum pump)
10	Operating Temp range	0-50 C
10	Operating Humidity range	0-90% or higher

10	Humidity Control	Actively controlled inlet heater module
10	Data storage	As defined by manufacturer design
10	Communication ports	LAN, RS232 and Dry contact output
10	Chassis	Preferably metal chassis or as per manufacturer specifications
10	Sampling Condition	The sampling rate and temp will be customized with the original manufacturer's design/guidelines.
11		
G.	**Multi-gas Calibrator with GPT (Gas phase titration), Built-in Ozone generation and oven with zero air generator, fitted into the AQMS as per manufacturer guidelines, ready to be used for calibration.**	
11	Principle of Test Gas Production	Via dilution
11	Ozone Generation	Internal O3 generation via UV tube in thermostatically controlled enclosure
11	Maximum Ozone Concentration	±500 ppb at 1 l/min
11	Temperature Control	Adjustable from 40°C to 75°C, preset at 70°C for UV chamber
11	Temperature Regulation	Via PD controller with PT100 sensor, accuracy ±0.1°C
11	Flow range calibration gas	5-50 ml/min and 25-250 ml/min
11	Flow Range (Zero Gas)	0.08-5 l/min
11	Accuracy of MFC	±0.8% of current value plus ±0.2% of FS
11	Pressure Sensitivity	0.1% / bar, typical for N2
12	Inlet Pressure	2 bar
12	Warm-up Time	30 minutes
12	Number of Calibration Cycles	8 individually adjustable cycles, each with up to 20 calibration points
12	Display/Operation	Touch-sensitive LCD screen (640x480 pixels) on front panel
12	Housing	19" Rack, 3HU
12	Power Supply	110-230V, 50-60Hz
12	Data Logging	Integrated data logger with Ethernet connectivity for data transfer
12	Test Gas Inlet Connection	As per Manufacturer design and compatible with system
12	Test Gas Outlet Connection	As per Manufacturer design and compatible with system
12	Zero Gas Connection	As per Manufacturer design and compatible with system
H.		**Air Sample handling System and Exhaust Manifold**

		As per manufacturer design.
I	**Meteorological Instrumentation**	The meteorological instrumentation should be interfaced directly with the data acquisition system. Lightning protection system must be provided. A crank-up telescoping mast of about 10m heights should be used to mount meteorological instrumentation. The tower should be grounded. The relative humidity and solar radiation sensors should be mounted in the mast also. The items should be from a reputable manufacturer and should include following sensors. a. Wind Speed Sensor: 0-50m/s ; Resolution 0.1m/s. b. Wind Direction Sensor : Range 0-360 degree. c. Vertical Wind Speed Sensor: Range 0-30 m/s or better. d. Relative Humidity Sensor: Range 0-100%. e. Ambient Temperature Sensor; Range 0-60C or better. f. Precipitation (Rain) Gauge; Range 0.2-100mm/hr or better. g. Solar Radiation Sensor: range 0 – 1500 W/m^2 or batter. h. Barometric Pressure Sensor: Range 600 – 800 in mm Hg or better.
J	**Station Data Acquisition System**	The station data acquisition system will include Station Data Acquisition and Control System (DAS) ,Desktop PC (heavy duty industrial grade), Data logger, workstation for operator and analyst with suitable software to store air quality data and meteorological parameters and compatible to transfer all data to the central server / system. The system should be complete and operational with UPS, cables, connectors and software for data analysis. The station software captures data from all channels in the system and stores in the Personal Computer. Personal computer is used for calibration and configuration of each channel.
I.	Calibration Gases	Must be completed with Calibration Gases SO2, NO, NO2 CO filled with balanced nitrogen, supply with 2 years shelf life, aluminum cylinders at least 10 liters, with dual stage pressure regulator, complete with all calibration arrangements, fitted with safety principles in the AQMS, able to perform calibration of analyzers.
K	**Centralized Data Acquisition System for Ambient Air Quality Monitoring Stations**	

	Data Acquisition	Intelligent Data Acquisition System (DAS) to support Ambient Air Quality Monitoring Stations. The system should be designed for efficiency, automation, and user-friendly operation, ensuring seamless integration with existing environmental monitoring infrastructure. The DAS must enable the collection; management, analysis, and reporting of ambient air quality and meteorological data from multiple monitoring stations. The system must collect data from the analyzers of the ambient air quality monitoring station on a scheduled basis. Support for communication with remote stations using various communication methods, preferably by TCP/IP connection.
	Data Qualification	Data pre-validation according to the metrological context before sending data to central management software) or as per manufacturer specs.
	Automatic management of calibration.	Automatic management of calibration. Ability to adapt the linearization parameters according to calibration results Control of absolute, relative drifts, drifts between span points, standard deviation drifts. Storage of all the information related to the calibration-check or as per manufacturer specs.
	Software Specifications	The DAS software must include Built-in database capabilities for efficient data storage, retrieval, and management. Ability to manage and store collected data efficiently, with provisions for migrating older data to other storage solutions to maintain performance. Reporting: Multiple default report formats, including graphical and tabular formats. Capability to generate custom reports based on user-defined parameters.
	Hardware Specifications	The hardware for the DAS should include 32 Channels, Industrial PC, W/i5 8250U CPU, 8G RAM, 6 Serial,2 LAN, HDMI, DC In 12-24VDC,500GB 2M Solid State Disk, Windows11 pro., 3 x RS-485 to RS-232 Convertor and RS-232 Cables, 1 x 8-DO/7-DI module + 1 x 8-AI module, 1 x Din Rail with 24 VDC, Power Supply pre-wired with all modules above
	Communication and Data Logging	The DAS must enable data collection from all analyzers through a TCP/IP connection. The system should include a ready-to-use data logger for efficient data acquisition. The DAS must support seamless communication with remote stations. Data logging should be reliable and capable of handling large volumes of data. shall support Various communication modes: (i.e, land line, GSM, IP, GPRS, Modbus, MQTT, IoT, etc)

		Shall have feature of Automatic polling at user defined intervals Remote access Data file exchange according to the international standard
	Error Detection and Alerts	The DAS must have built-in error detection capabilities.
	Automatic AQI calculation & Disseminatio n	Data acquisition from analyzers and other devices via digital or Analog inputs. Data acquisition system must be able to calculate AQI on user defined breakpoints and graphical representation Along with user defined parameters. Must be enable to expose its AQI and integration with any mobile and website technology and Hourly. Preferably AQI results on mobile application and on website Automatically. Will generate wind rose, hourly, daily, monthly and annual average reports. Calculations aggregation of the resulting data on various time period to determine averages Management of failures, thresholds overruns and alarms
L	**Others:**	
	i.	Air Conditioner, 1.5 Ton invertors, fitted in the cabin wall and properly insulated,
	ii.	UPS 10 KVA sign wave attached with the AQMS with Lithium Ion Battery Power Bank of more than 12kWh.
	iii.	Water Cooled Power Generator 10KVA branded which can run at least 6 hours continuously, with sound proof canopy, mounted on trolley with two main and one adjustable small wheel, good suspensions, hand brake, electric distribution switches as per international safety instructions. Generator in fixed AQMS is also needed to fulfill the 80 percent up time data or solar system can be made compulsory.
		OR
		The bidder will install solar panels with battery backup for nighttime operation or any other proper and reliable arrangement for 24/7 energy supply.

		Engineering, integration and electrification, modifications for AQMS as per manufacturer design/ layout. Fabrication + Racks x Distribution Power Panel, Teflon Piping, Trolley for towing the Power Generator, Insulated Container / Shelter, 10.75 feet length, 6.75 feet width, 6.5 feet height / as per manufacturer's dimensions to be supplied & Manufactured Locally as per manufacturer design or guidelines, the upper roof of the container should be protected with additional Stainless sheet, water proof for life time, air tight. Stairs access for going into the cable and on the top, the container be firmly fixed on the truck. The container will be affixed with the print screen having name and monogram of EPA. EPA will provide the printing material.
M	AQMS Shelter/Room Requirement	The bidder is responsible to design, built & supply of Insulated shelter room / Container Suitable for AQMS as approved by the client. The shelter room / container must have but not limited to the following features.
	Construction	Ring type steel frame structure, (not panels) mounted on an under frame as a structural member. Inner and outer frames separated with insulators.
	Lining	External: Roof, front, back, sides walls are pre-painted galvanized steel sheets (minimum 2mm) and bottom of the floor are lined with heavy gauge galvanized steel sheet.
		Internal: Roof and side walls are lined with pre-painted galvanized steel sheets sheet (minimum 2mm) and Floor lined with wood ply & vinyl rubber sheet.
	Insulation	3" inches thick polyurethane foam injected under pressure without thermal bridges.
	Door	One back door and one side door having size: (30" x 72") with display window will be provided, GRP molded frame, sealing and suitable locking system.
	Fiber Coating	Fiber coating on the roof for water proofing
	Other mandatory features	Sampling Head: Sample gas guided in inert material (borsilikat glass)
	i.	Two fire extinguishers (6kg)
	ii.	One Exhaust fan 6" 220V
	iii.	02 Nos GI elbow (Exhaust & fresh air)
	iv.	Installation of 02 AC with unit frame.
	v.	Stair fabrication & installation.
	vi.	Safety pipe grill on the all-around the Roof.
	vii.	Emergency switch
	viii.	Internal temperature monitoring of the shelter (24x7) maintaining the temperature as per recommendations mentioned in the analysers operation manual.
	ix.	Almirah/closet for gas cylinders with strap
	x.	Checklist for routine O&M signed by the engineer at site

	xi.	Operation Manual at each site
	xii.	MSD's for Gas Cylinders
	xiii.	Roof safety railing
	xiv.	Automatic fire prevention and suppression system
	xv.	Automatic Access control
	xvi.	LED Display at the station to view locally analyze data by the DAS (Station Data Acquisition and Handling System) for operator
	xvii.	Internet for AQMS site for Connectivity with Central Server/Control Room.
	xviii.	Rust and Waterproof furniture
N	**Specific Instructions:**	
	i.	All the analyzers and systems should be of latest model.
	ii.	The AQMS assembled in manufacturer design and operated, any missing accessory required for operation will be completed by the bidder.
	iii.	Two years consumables and spares as per manufacturer manual.
	iv.	Training will be given to the EPA Lab officers for operation and calibration, Maintenance, Performance Evaluation, Evaluation, Auditing, etc.
	v.	The data log and maintenance sheets will also be developed which will be used for the maintenance and operation record.
	vi.	Hard bind copies of the operation and maintenance manuals of all analyzers and other components of AQMS.
	vii.	The bidder shall submit EPA designated number along with quote.
	viii.	To make the consistent supply of electricity the bidder will arrange either generator or solar system as a backup to the AQMS

Further Recommendations:

1. Any quoted specifications equivalent or better than the required specification will be accepted subject to provision of valid documentary proof by the bidder.
2. The bidder shall provide training and skills to staff of EPA Laboratories for conducting Technical Systems Audits (TSAs), Performance Evaluations (PEs), Data Quality Assessment of AQMS as prescribed by US-EPA.

Annex–C

SPECIFICATIONS OF SMOKE EMISSION ANALYZERS FOR VEHICULAR INSPECTIONS

#	Name	Description
1	Smoke opacity meter	• **Accuracy:** ±1 digit • **Operating Temperature:** 32° - 120° F (0° - 49° C) • **Power:** 12V sealed lead-acid cell (approx. 40 hours of operation) • **Resolution:** 1 digit (.01% of full scale) • **Meets:** SAE J1667 specification for full flow meters Appendix C using the required algorithm
2	Automotive emission analyzer	Conformed standards: ISO 3930/OIML R99 (2000) Class0 *1 Application: Exhaust gases in idling status from gasoline vehicle (two-wheel or four-wheel vehicle), LPG vehicle (four-wheel vehicle) Principle: CO, HC, CO_2: non-dispersive infrared (NDIR) • Air-to-fuel ratio (AFR), Excess air ratio (λ, lambda): carbon balance method, or Brettshneider method (only with O_2 measurement) *2 **Measured/displayed components:** Measured components (standard): CO: 0.00% vol to 10.00% vol HC: 0 ppm vol to 10,000 ppm vol, or 0 ppm vol to 20,000 ppm vol * (as hexane equivalent valume CO2: 0.00 % vol to 20.00% vol AFR: 10.0 to 30.0 • LAMBDA: 0.000 to 9.999 External input components (optional): • O2: 0.00% vol to 25.00% vol • NO: 0 ppm vol to 5,000 ppm vol • Engine speed (RPM): 0 rpm to 9,990 rpm (Guaranteed range for linearity is 200 rpm to 6,000 rpm)

#	Name	Description
		• Oil temperature (TEMP): 0 °C to 150 °C • Monitor display: LCD (black and white, 320 x 240 dot) •Input/outputs: • Digital input/output: RS-232C (standard), RS-485 (option) *4 • Printer: RS-232C Calibration gas: Dedicated cylinder • Mixed gas of CO, C3H8 and CO2, Environment: • Ambient temperature: 0 °C to 45 °C 5°C to 40 °C (for OIML conformity) • Humidity: below 90% as relative humidity • Ambient pressure: 80 kPa to 106 kPa Power supply *5; 100 V to 240 V AC 50/60Hz, single phase Power Capacity: Approx om vol *3 Power capacity: Approx. 90 VA at stable state •Dimensions: 260(W) x 357(D) x 157(H) mm (without optional units) Mass: Approx. 4 kg (without optional units) • Response speed *6.7: Within 15 s, as Td + T95, • Repeatability *7.8: • CO: Within 0.01% vol, or within 1.7% of reading (whichever is larger) • HC: Within 3.3 ppm vol, or within 1.7% of reading (whichever is larger) • CO2: Within 0.17% vol, or within 1.7% of reading (whichever is larger) Warm-up time: 5 minutes

Annex–D

SPECIFICATIONS OF MOBILE FUEL TESTING LABORATORY EQUIPMENT

The detailed specifications for each piece of equipment:

#	Equipment	Parameter Tested	Specifications
1	**Gas Chromatograph (GC)**	Hydrocarbons, Benzene, Aromatics	**Type**: Portable GC **Detectors**: Flame Ionization Detector (FID) and Thermal Conductivity Detector (TCD), dual-channel **Temperature Control**: Up to 450°C **Injection**: Manual and auto-sampler compatibility **Software**: Includes software for data acquisition and analysis **Carrier Gas**: Options for nitrogen, helium, or hydrogen **Power Supply**: Rechargeable battery for field use or standard 220V AC power.
2	**Fuel Analyzer**	Octane Number, Cetane Number	**Type**: Portable, ASTM-compliant **Measurement Range**: Octane number: 0–120; Cetane number: 20–100 **Accuracy**: ± 0.2 units **Calculation**: Automatic real-time octane and cetane number calculation **Data Storage**: In-built memory for 10,000+ readings **Display**: Digital touchscreen display **Power Supply**: Battery-operated, 8-hour continuous operation **Additional Features**: Bluetooth and USB connectivity for data transfer to computers and mobile devices.
3	**Density Meter**	Fuel Density at 15°C	**Type**: Portable, digital **Principle**: Ultrasonic or oscillating U-tube **Resolution**: 0.001 kg/m³ **Temperature Range**: Measurement temperature compensation from -10°C to 50°C **Calibration**: Automatic calibration feature **Display**: LED or LCD display for on-site

#	Equipment	Parameter Tested	Specifications
			reading **Connectivity**: USB interface for data transfer **Power Supply**: Rechargeable lithium battery for 8-hour field usage.
4	**Flash Point Tester**	Flash Point of Fuels	**Standard**: ASTM D93, Pensky-Martens Closed Cup **Range**: -30°C to 300°C **Accuracy**: ± 1°C **Automation**: Fully automated ignition and extinguishing **Display**: Digital touchscreen for real-time temperature display **Ignition**: Electric spark ignition **Power Supply**: Rechargeable battery or 220V AC **Additional Features**: Over-temperature protection, built-in cooling system for rapid reset between tests, USB for data storage.
5	**Sulfur Analyzer**	Sulfur	**Technology**: X-ray fluorescence (XRF) **Resolution**: 1 ppm **Range**: 0 to 5% sulfur content **Portability**: Handheld and portable, suitable for on-site testing **Compliant Standards**: ASTM D4294 **Battery**: Rechargeable lithium battery for up to 10 hours **Data Output**: USB and Bluetooth for data storage **Display**: High-resolution digital display **Additional Features**: Can be calibrated with certified sulfur standards, built-in memory for 1000+ test results.
6	**Water Content Tester (Karl Fischer Titrator)**	Water Content	**Method**: Coulometric titration **Range**: 1 ppm to 5% water content **Display**: Digital display with graphical interface **Accuracy**: ± 0.1 ppm **Sample Type**: Suitable for liquid, solid, and gas samples **Portability**: Compact, battery-operated **Data Storage**: 500 readings in memory, with

#	Equipment	Parameter Tested	Specifications
			USB for export **Additional Features**: Automatic endpoint detection, ability to work with various solvents, self-calibration feature.
7	**Infrared Spectroscopy (FTIR)**	Functional Groups in Fuel Samples	**Wavelength Range**: 4000 cm^{-1} to 400 cm^{-1} **Resolution**: 0.5 to 4 cm^{-1} **Detectors**: DTGS (Deuterated Triglycine Sulfate) or MCT (Mercury Cadmium Telluride) **Sampling Modes**: Transmission, ATR (Attenuated Total Reflectance), Diffuse Reflectance **Interface**: USB/Ethernet for PC connection **Software**: Spectral analysis software for functional group identification and quantification **Features**: Fast scanning, auto-sampling, real-time monitoring, in-built calibration standards.
8	**Mobile Van**	Fuel Testing Mobile Lab	**Model**: HI-ROOF 2.5L Diesel (KDH 13) **Features**: Dual A/C, high roof for lab setup, equipped with power outlets for equipment **Modifications**: Reinforced flooring and insulation for lab environment **Additional**: Capable of supporting onboard testing equipment and technicians in-field.
9	**Fabrication Charges**	Mobile Lab Setup	**Purpose**: Custom fabrication for mobile lab environment **Includes**: Workbench installation, storage compartments, secure mounts for equipment, safety features such as fire extinguisher, first aid kit **Other Modifications**: Electrical wiring, battery backup, and insulation for temperature control.

Annex–E

SPECIFICATIONS OF FOG CANNON MACHINES AND ALLIED EQUIPMENT

1. Fog cannon 120 meter
2. Generator 200 kVA
3. Water storage tank 12000 liter
4. Trailer for 18ton wight bearing capacity
5. Engine 18 ton or above depending on the design of manufacturer

Item	Name	Parameters
Design Conditions and Performance Guarantee	Range	120 meters (actual range without wind)
	Operation Mode	Automatic/Remote
General Technical Parameters	Maximum Coverage Area	≥33000 m²
	Water Source Requirements	Water Pressure: 0.1-0.5Mpa, Water Quality: PH 6-8, Suspended Solids Must ≤50PPm
	Power Supply Requirements	Voltage: AC380V, 50Hz
	Applicable ambient temperature	0 °C ~ 50 °C
	Protection level	IP 55
Fan Part	Fan Diameter	⌀1400 mm
	Fan Power	75 kW
	Impeller	Aluminum alloy
Pitch Structure	Power Unit	Hydraulic
	Pitch Angle	0° ~ 40°

Left and Right Structure	Power Unit	Hydraulic
	Rotation Angle	0° ~ 180°
High Pressure Pump Group	Water Pump Form	Stainless steel multistage centrifugal pump
	Water Pump Power	15 kW
	Flow Rate	18 T/H
	Pipe Material	High-pressure pipe + stainless-steel pipe line
	Water Inlet Size	DN50
Spray Assembly	Water Drop Particles	30-200 um
	Number of Nozzle	110 Pcs
	Material	SS304 Stainless Steel
	Water Ring Material	Stainless Steel seamless pipe
	Quantity	Double rings
	Welding Method	Carbon-dioxide arc welding
Electronic Control Assembly	Control Cabinet Material	Stainless Steel
	Remote Control Function	Industrial remote control
	Remote control	10-button remote control
	Electric control box	Stainless Steel, IP-65
	Motor control	Frequency conversion start
	Pump control	Star-delta

Surfacing	Equipment bracket	Channel Steel Square Tube
	Material Cutting	Laser Cutting
	Surface Treatment	0.6mm shot blasting
	Painting	Electrostatic spray plastic
	Maximum Shape Size	2500 x 1500 x 2700 (mm)
	Weight	2000 KG (Approximate)

Annex- F

Specifications of Carbon Brown & Black Analyzer

Parameters	Elemental Carbon /Black Carbon & Brown Carbon
Zero Check	automatically Zero check
Data Generation	Real Time data Generation, Minimum 1 mini
Sample Collection Media	Teflon-coated glass fiber filter tape or equivalent
Wavelength	370 – 950 nm or better (Minimum Seven to Nine Wavelength operation - UV – IR)
Resolution	0.001 µg/m3 or 1 ng/m3
LDL	< 0.005 µg/m3
Range	< 0.01 to >100 µg/m3
User Interference	color touch-screen display
Power	100-230VAC, 50/60Hz
Communication	Ethernet, RS232, USB

Annex- G

Methane, NMHC-THC Analyzer	
(1) NMHC-THC monitor	
1) Measuring method :	Converter oven or Column oven
2) Detector :	Hydrogen flame ionization
3) Range :	0 to 50 ppmC or more (Auto-ranging)
4) Low detection limit :	0.1ppmC or less
5) Zero drift :	Auto zero or 0.5ppmC/day
6) Span drift :	Less than 1.0 ppmC / day
7) Analog output :	2 signals (methane, Non-methane hydrocarbon) or more, 0~1V or 0~10 V
8) Digital output :	RS-232C
9) Self check and diagnostics :	Built-in
10) Re-start function :	Automatic start
11) Automatic zero compensation function :	Equipped
12) Zero-gas generator :	Built-in
13) Automatic ignition of FID	Equipped
14) Rack mount:	with chassis slides
15) Power source:	AC 220V, 1-ph. 50Hz
(2) Hydrogen generator	
1) Application :	For Hydrogen gas supply to NMHC-THC monitor
2) Principle :	Electrolysis of pure water
	(no use of any liquid caustic electrolytes)
3) Gas characteristics :	H_2, Purity more than 99.99%
4) Flow rate :	90 ml/min. (STP) or more
5) Power source :	AC 220V, 1-ph. 50Hz
(3) Built-in Zero-gas generator	
1) Application :	Supply of Zero-free HC (for FID Unit)
2) Flow rate :	100 cc/min. or more
3) Pressure :	0.3 bar or more
(4) Air-compressor (When Column oven method was adopted.)	
1) Application :	Air supply for Built-in Zero-gas generator
2) Flow rate :	Approx. 500ml/min. or more
3) Pressure :	Approx. 2 bar or more
4) Power Source :	AC 220V, 1-ph, 50Hz

Specifications of Methane Analyzer, Total HC Analyzer

Annex-H

Result-Based Monitoring Indicators

Input	Output	Baseline Indicator	Target After Completion	Targeted Impacts
Procurement of 30 Air Quality Monitoring Stations (20 mobile units, 5 portable, 5 fixed)	Installation and deployment of Air Quality Monitoring Stations	Nos of Air Quality Monitoring Stations installed	Operationalization, Utilization and maintenance of Air Quality Monitoring Stations, smoke emission analyzers & fuel quality checking equipment to enhance air quality monitoring and compliance in urban areas	• Protection, conservation, rehabilitation and improvement of the environment, for the prevention and control of pollution, and promotion of sustainable development • Enhanced air quality monitoring across urban areas • Improved fuel quality and reduced environmental pollution • Reduced dust pollution levels and improved public health
Acquisition of 25 hybrid crossover vehicles for urban area patrolling	Increased patrolling for vehicular emissions inspections	Nos. of hybrid crossover vehicular procured		
Procurement of 20 smoke emission analyzers for vehicular inspections	Facilitation of vehicular emissions testing	Nos. of smoke emissions analyzers procured		
Acquisition of 03 fuel quality checking equipment with vehicles	Effective fuel quality monitoring	Nos. of 03 fuel quality checking equipment with vehicles procured		
Purchase of 15 fog cannon machines	Implementation of dust suppression strategies	Nos. of 05 fog cannon machines procured		

Annex-I

RISK MITIGATION PLAN

Risk Cause	Risk Effect	Likelihood (Most Likely, Likely, unlikely)	Consequence (Minor/ Moderate/ Major)	Mitigation Strategy
Delay in release of funds	Delays in procurement and project completion	Likely	Major	Efforts for the timely release of project funds
Delay in procurement due to economic situation, Govt. restrictions or force majeure for machinery & equipment, renting building, development and deployment of software/licensing	Delay in project activities Compromise in scope due to price escalation of procurement items	Likely	Major	Streamline the procurement process to minimize other delays. Set fixed-price contracts where possible. conduct market analysis to establish financial contingencies.
Price escalation due to economic conditions	Compromise in scope due to price escalation of procurement items, services and operational expenditure	Likely	Major	Manage deficiency through savings in other heads. Timely completion of procurement activities
Technical failures in new equipment	Ineffective monitoring and reporting of data	Likely	Major	Bind Contractor to provide seamless services
Insufficient training for personnel	Poor operation of equipment	Likely	Minor	Implement a comprehensive training and

	leading to inaccurate data			capacity-building program before deployment.
Environmental conditions affecting performance	Reduced effectiveness of equipment like fog cannons	Likely	Moderate	Evaluate environmental conditions prior to deployment; select equipment suited for local requirements.
Theft or vandalism of equipment	Financial loss and operational downtime	Likely	Major	Implement security measures for equipment

Annex-J

MONITORING & EVALUATION PLAN

Level	Indicator	Baseline	Target	Monitoring Method/frequency
Goal • Procurement of air quality monitors • Acquisition of urban patrolling vehicles • Purchase of smoke emission analyzers • Purchase of fuel quality checking equipment • Installation of fog cannon machines • Data collection from monitoring devices • compliance checks	• Number of monitors installed • Number of vehicles operational • Number of functional analyzers • Number of functional testing equipment	EPA has three 3 AQMS. EPCCD under PGDP going to have 30 (25 fixed and 5 mobile) air quality monitoring stations. Except that there is no other facility available	Reduced vehicular emissions and improved air quality. Improved fuel quality, reduced dust levels and improved 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
Output • Installed air quality monitors • Operational urban patrolling vehicles • Functional smoke emission analyzers • Functional fuel quality testing equipment • Active fog cannon machines • Air quality data • Compliance with environmental standards	• Number of fog cannon machines operational • Frequency of data reports generated • Number of compliance checks conducted	No. of functional testing facilities / systems / data		

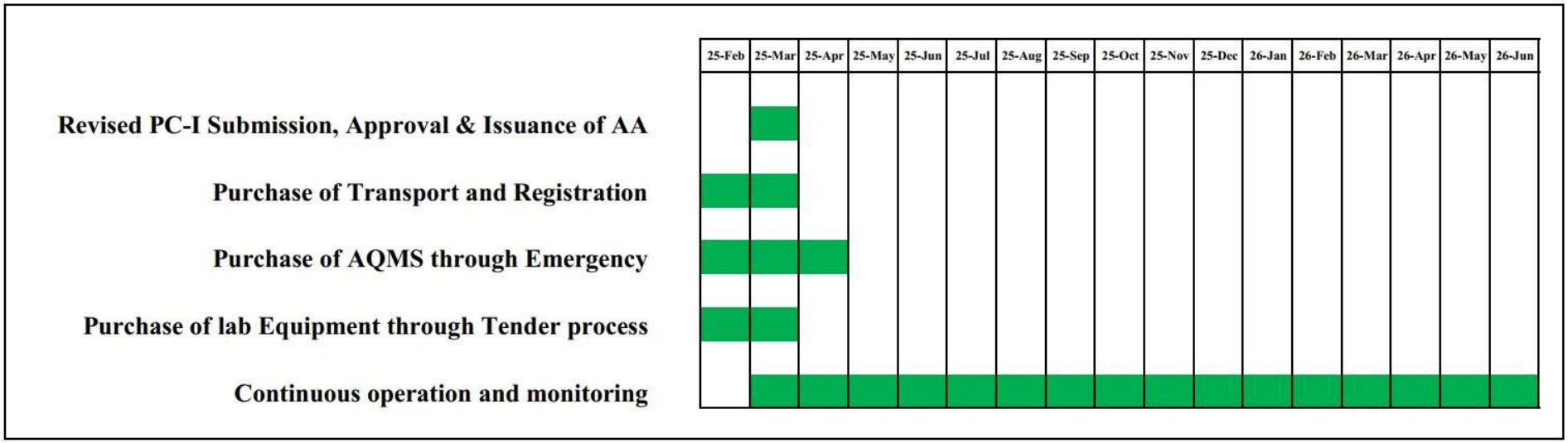
Annex-K

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

Annex-L

Implementation Plan



Annex-AA

Off # 042-99059302

NO.12(6) PO(COORD-II)P&D/2024
GOVERNMENT OF THE PUNJAB
PLANNING & DEVELOPMENT BOARD
Dated Lahore the 23rd December, 2024

1. The Secretary to Government of the Punjab,

   i. Finance Department. ii. Environment Protection Department.
2. The Secretary, P&D South Punjab Secretariat, Bahawalpur.
3. The Chief Economist / All Members, P&D Board.
4. The Director, Punjab Economic Research Institute (PERI)
5. The Director General, Monitoring & Evaluation (M&E)
6. The Chief Executive Officer, Urban Unit, Lahore.

Subject: **MINUTES / DECISIONS OF THE MEETING OF PROVINCIAL DEVELOPMENT WORKING PARTY (PDWP). (SECTOR: ENVIRONMENT)**

I am directed to enclose herewith a copy of minutes of **46th PDWP meeting held on 15th November, 2024** under the chairmanship of Chairman P&D Board, for information and further necessary action of the following Item(s):-

Agenda Item No.	ADP No. (2024-25)	Name of the Item (s)	Approved Cost (Rs. in million)
Ex-Agenda	7800 Computer ID#	Punjab Smog Mitigation and Response Initiative – Air Safe	5,381.000

(MUSA RAZA)
ASSISTANT CHIEF (COORD-II)

A Copy, along with copy of the minutes, is forwarded to:-

Sr. No.	PARTICULARS
	PLANNING & DEVELOPMENT BOARD, LAHORE
1	Sr. Chief (C&M) /Chiefs: Environment, ECA, Technical, Consultancy/ Consultant (Coord)
2	Manager MIS, P&D Board
3	PSO to Chairman, P&D Board
4	PS to Secretary, P&D Board
	C.C.
5	Chief (Environment / Climate Change) Ministry of Planning, Development & Special Initiatives, Govt. of Pakistan, "P" Block, Pak Secretariat, Islamabad.

ASSISTANT CHIEF (COORD-II)

	GOVERNMENT OF THE PUNJAB PLANNING & DEVELOPMENT BOARD ENVIRONMENT & CLIMATE CHANGE SECTION
MINUTES OF 46TH PDWP MEETING HELD ON 15.11.2024	
Agenda Item No: (ex-agenda)	PUNJAB SMOG MITIGATION AND RESPONSE INITIATIVE – AIRSAFE
Date & Time:	15.11.2024 (Friday) At 10:45 AM
Status:	Non-ADP Scheme
Venue:	Auditorium P&D Board
Participants:	List Attached

The Sr. Chief (Coordination) invited the Chief (Env. & CC), P&D Board, to present the agenda item related to the environment section. The Chief (Env. & CC) briefed the forum that the scheme titled *"Punjab Smog mitigation and response initiative – AirSafe"* has been proposed by EPCCD Department for SMOG monitoring. This scheme will be funded from the block provision under the scheme titled "Smog Less and climate resilience Punjab" at GS No. 3663 having Cost of Rs. 10,000.00 million with a current year Allocation of Rs. 5,000.00 million for the Year 2024-25.

DISCUSSION:

The Chief (Env. & CC) informed the house that the project is linked with growing disastrous situation of the air quality in Punjab, particularly in Lahore. 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. The Punjab Government has procured 30 Air Quality Monitoring Systems under the PGDP. Of these, 8 have already been delivered, while the remaining systems are expected to be delivered shortly.

The Secretary (EPCCD) apprised the house that only 3 Air Quality Monitors of EPA are currently functional. He said an 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. Augmenting the existing air quality monitoring capacities through provision of a total of 30 air quality monitoring systems (5 Fixed AQMS, 20 Mobile AQMS and 5 portable AQMS)

ii. Provision of smoke emissions analysers for vehicular inspection

iii. Mobile Unit for fuel quality checking

iv. Installation of fog cannon machines

On a query from the chair regarding existing arrangement for data collection and analysis, the Secretary Environment Protection, Climate Change Department (EPCCD) informed that various studies have been carried out by different agencies. He noted that these studies often present contradictory findings regarding the contribution of different sectors to environment pollution. He further informed the house that the EPCCD is currently collaborating with SUPARCO on a study of sources apportionment of particulate matter. The results of this study, expected later this year, will be used to develop evidence-based policies addressing air pollution.

The Member Energy P&D Board raised a question regarding the Environment Department's mandate for regulating motor vehicles and conducting fuel quality testing. In response, the Secretary (EPCCD) informed the house that, under Section 15 of the Punjab Environmental Protection Act, 1997, the regularization of motor vehicles falls under the department's purview. However, he pointed out that no government department is currently engaged in fuel quality testing, despite it being a potential major contributor to air pollution in Lahore and across Punjab. He stressed the critical importance of fuel quality checks and highlighted the urgent need for portable air quality monitoring systems to facilitate vehicle inspections effectively. He also informed the house that recently EPCCD department has been mandated to undertake vehicle inspection along with transport department for which the procurement of Gas Analyzer has been proposed in instant PC-I.

On a query regarding lumpsum provision amounting to Rs. 593.75 Million for payment of other services, Secretary EP&CCD informed that this provision has been made for operations and maintenance of the installed equipment which has been calculated at the rate of 15% per annum of the cost of the AQMS.

On another query by the Chair regarding the number of AQMS required, the Secretary EP&CCD informed that the AQMS needed are far more than requested in the current PC-I since the existing and proposed AQMS does not cover all the geographical areas of the

pollution hotspots in Punjab. He stated that AQMS installation is of utmost importance for evidence-based decision making in the Government of the Punjab.

The Chairman P&D Board enquired about the envisaged contours of data collection, management, analysis and decision making system with regard to all the data collected from existing and proposed AQMS. Secretary, EP&CCD informed that a state of the art Environmental Monitoring Centre (EMC) is under execution which will be main platform to synchronise all data collected through these AQMS and provide evidence based reports for appropriate decisions by the policy makers. Besides this, there is a SMOG monitoring Centre already established in EPA which will analyse and process all the data.

DECISION:

i. The PC-I of the scheme titled *"Punjab Smog mitigation and response initiative – AirSafe"* was approved at a cost of Rs. 5,381.000 million, with a gestation period of two years (FY 2024-25 to FY 2025-26), subject to inclusion of the scheme in ADP 2024-25.

ii. The Department will initiate a summary for inclusion of the scheme in ADP 2024-25.

****

GOVERNMENT OF THE PUNJAB
PLANNING & DEVELOPMENT DEPARTMENT
(ENV&CC SECTION)

LIST OF PARTICIPANTS

Date: 15 November, 2024

Venue: AKS Auditorium

	NAME OF OFFICERS	DESIGNATION
PLANNING & DEVELOPMENT BOARD		
1.	Barrister Nabeel A. Awan	Chairman P&DB (In Chair)
2.	Dr. Asif Tufail	Secretary P&DB / Member Env. & CC.
3.	Mr. M. Masood Anwar	Chief Economist
4.	Dr. Abid Bodla	Member (ID)
5.	Mr. Ahmed Mustajab Karamat	Member (Social Development)
6.	Mr. Yawar Hussain	Member (Education)
7.	Mr. Shafaqat Ali	Member (Health)
8.	Mr. Khawar Kamal	Member (LG&CD /UD)
9.	Mr. Aslam Javed	Member (Agriculture)
10.	Mr. Sadaqat Hussain Khan	Member (Energy)
11.	Mr. Agha M. Ali Abbas	Member (Governance)
12.	Mr. Mohsin Abbas Shakir	Member (Water)
13.	Mr. M. Ansar	Director PERI
14.	Mr. Mahmood Ul Hassan	Sr. Chief (RP)
15.	Mr. Sohail Rauf	Sr. Chief (C&M)
16.	Muhammad Akhtar Mundhaira	Additional Secretary (South P&D Board)
17.	Malik Ghulam Farid	Chief (Social Sector) (South P&D Board)
18.	Ms. Saba Asghar Ali	Chief (Env. & CC)
19.	Mr. Rizwan Ali	Assistant Chief (Env. & CC)
20.	Mr. Musa Raza	Assistant Chief (Coord-II)
21.	Ms. Nadia Zia	Assistant Chief (Infrastructure & Development) (South P&DB)
22.	Ch. Fahad Anwar	Assistant Chief (Social Sector) (South P&DB)
23.	Mr. Abraham Mall	Planning Officer (Coord)
24.	Mr. Muhammad Sohail	Planning Officer (Social Sector) (South P&DB)
25.	Mr. Azhar Abbas	Planning Officer (Infrastructure & Development) (South P&DB)
26.	Dr. Saira saeed	Planning Officer (Env. & CC)
ENVIRONMENT PROTECTION & CLIMATE CHANGE DEPARTMENT		
27.	Raja Jahangir	Secretary EPCCD
28.	Tariq Hussain Bhatti	AS Admin EPCCD
29.	Farooq Alam	DD EPA
SP&IU		
30.	Samia Saleem	
31.	Sajid Raiz	DD (PS-I) SPIU EPCCD
32.	Sughra kashif	DD (SS) SPIU EPCCD
33.	Mr. Asim Rehman	Deputy Director (EPE)
34.	Dr. Wajid	DD (M&E) SPIU
FINANCE DEPARTMENT		
35.	Ms. Nur-ul-Ain	Additional Secretary (Dev)
URBAN UNIT		
36.	Khurrum Afzal Malik	SS Eco development
OTHERS		
37.	Ghazanfar Mubin	Director Monitoring (M&E)

EX-AGENDA ITEM NO.68 **APPROVAL FOR PROCUREMENT OF EQUIPMENT, MACHINERY, HIRING OF HUMAN RESOURCE AND OTHER ALLIED ITEMS / ACTIVITIES TO DEAL WITH SMOG EMERGENCY**

68.1 The Secretary EP&CC Department briefed the Cabinet that Punjab is one of the most urbanized regions of South Asia with around 127 million population living in its metropolises. In recent years, the air quality in Punjab, particularly in Lahore, became a growing concern due to consistently high levels of air pollution. Air Quality Index (AQI) across various months remains alarmingly elevated, with January and December consistently recording the highest AQI levels, indicating hazardous conditions. 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.

68.2 The Environment Protection and Climate Change Department (EPCCD) is working to protect and improve the environment, control pollution, and support sustainable development. Currently, EPCCD operates three Air Quality Monitoring Stations (AQMS) and is setting up 25 more in 10 districts across Punjab, along with acquiring five mobile stations which will take some time for its completion. However, the lack of U.S. EPA-approved monitoring stations led to the use of low-cost sensors – installed by different private individuals and entities – that often report exaggerated AQI values, causing panic among masses. Such exorbitant values do not depict the true picture of prevailing air quality in the province. This inaccurate data creates a false impression of air quality, leading to emergency-like responses and public unrest.

68.3 The deteriorating air quality in Lahore is linked to multiple factors, including vehicular emissions, industrial activities, and construction dust, compounded by unfavorable weather conditions in winter. Further, air pollution is a transboundary phenomenon requiring true identification of pollution being discharged into the environment by the province itself vis-à-vis the impacts of pollution from the neighboring countries. EPCCD currently lacks appropriate numbers of US EPA approved mobile Air Quality Monitoring Stations required to be deployed as and when an emergent situation arises across the province; mobile fuel testing vehicles to check the adulteration and compromised quality of fuel that contributes to high levels of vehicular emissions and air pollution; capacity and equipment to measure the level

of pollution transferred from transboundary; and equipment to combat smoke at a localized level like fog cannon/ anti-smog guns.

68.4 There is a block provision under the "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 for the Year 2024-25. In view of the emergent requirements, EPCCD proposed a new ADP scheme to be funded from this block to deal with this emergency situation i.e.:

Name of ADP Scheme	Brief Description	Cost (in million PKR)
Punjab Smog Mitigation and Response Initiative – Air Safe	Emergency procurement of the mobile AQMS, mobile fuel testing labs, fog cannon and procurement of equipment for measuring transboundary impacts and traceability of pollution sources.	5,381.000

68.5 In view of the situation explained above, the Chief Minister Punjab was requested to approve the technical supplementary grant of Rs. 5,000.00 million from the block allocation of "Smog Less and Climate Resilience Punjab" appearing at GS No. 3663 having Cost of Rs. 10,000.00 million with allocation of 5000.00 million for CFY 2024-25 and additionally Rs. 381.00 million may be provided through the supplementary grant during the CFY 2024-25, allow this Department for procurement of essential equipment by invoking Rule 59(c)(v) of the Punjab Procurement Rules, 2014 for controlling Smog being an emergency situation and inclusion of the scheme in the ADP (2024-25).

68.6 The P&D Board examined the case and it was stated that proposal of Environment Protection and Climate Change Development (EP&CCD) for inclusion of the development project titled "Punjab Smog Mitigation and Response Initiative – Airsafe" in the ADP 2024-25 is endorsed. The required funds will primarily be allocated from the block allocation under "Smog Less and Climate Resilient Punjab", with additional funding to be managed through other sources as required. The Finance Deparmtent also examined the case and endorsed the proposal of the administrative department in light of the views of the P&D Board. In addition, an

amount of Rs. 381.00 million may be provided by the P&D Board through inter/intra-sectoral re-appropriation in ADP 2024-25.

68.7 The MD PPRA also examined the case and it was stated that procuring intends to engage in direct contracting to procure mobile AQMS, mobile fuel testing labs, fog cannon and equipment for measuring transboundary impacts and traceability of pollution sources under rule 59 c(v). The rule ibid stipulates;

> (c) direct contracting: a procuring agency shall only engage in direct contracting if any of the following conditions exist:
>
> (v) in case of an emergency but the procuring agency shall specify appropriate fora vested with necessary authority to declare an emergency.

68.8 It is mentioned here that the principle method of procurement is always open competitive bidding process. For the instant case, the PC I in its procurement plan shows some of the equipments (analyzers and fuel quality checking equipment) to be procured through open competitive basis. In the summary all the equipment amounting to Rs. 5381 M have been proposed to be procured through emergency procurement. The procuring agency may like to determine as to whether it plans to procure some of the equipment through open copmetitive bidding process or otherwise. Besides, there exists no procurement method as "emergency procurement method" as mentioned in the summary and PC I, however, "direct contracting" is mostly used to save time and efforts in emergency sitautions. It is also important to mention here that to invoke 59 c(v), the procuring agency requires approval of declaration of emergency from the appropriate fora and it seems as the procuring agency has specified the Chief Minister as an appropriate fora in this case.

68.9 After the approval of the declarartion of emergency, a notification to this effect may be issued enabling the procuring agency to proceed with the direct contracting for procurement of the equipment mentioned above. It is important to mention here that direct contracting can be done on emergency basis only after the emergency has been imposed. If the emergency situationon on smog already exists i.e. emergency stands notified by a specified fora already, the procuring agency can proceed with the direct contracting at its own. The contents of the summary further reveal that the procuring agency likes to purchase US EPA approved equipments and monitoring stations for accurate measurement of the pollution as well as controlling smog. Besides, the very nature of the project as divulged in the PC I (section 8 of

Draft PC I), makes it a one time highly procurement intensive project with given timelines for purchase/installation of equipment, monitoring stations and vehicles etc. This brings the whole scenario closer to the provision of rule 59 d(iv) of PPR 2014 which provides as under:

> (d) negotiated tendering: a procuring agency may engage in negotiated tendering with one or more contractors with or without prior publication of a procurement notification but this procedure shall only be used when:
>
> (iv) the Provincial Cabinet, for reason to be recorded in writing, approves any specific procurement to be made on urgent basis and shall fix the time for such urgency.

68.10 The rule ibid empowers Provincial Cabinet to approve the procurement of the equipment, monitoring stations, vehicles and allied paraphernilia (excluding HR) on urgent basis by fixing reasonable/viable time of procurement from the timelines proposed in the draft PC I enabling procuring agency to engage in negotiated contracting with **one** or **more** contractors with or without publication. This provision is more flexible as the procuring agency may not have to have the emergncy imposed all the time while conducting instant procurement in the said project which has a gestation period till June 2026. This option will also provide procuring agency to engage with more than one contractors having been able to demonstrate cost effective procurement of the intended quality products with comparative analysis achieving value for money, exibiting fair and transparent procurement process on the timelines of its choosing as approved by the Cabinet.

68.11 Accordingly, the Cabinet was requested to consider and approve the technical supplementary grant of Rs. 5,000.00 million from the block allocation of "Smog Less and Climate Resilience Punjab" appearing at GS No. 3663 having Cost of Rs. 10,000.00 million with allocation of 5000.00 million for CFY 2024-25 and additionally Rs. 381.00 million may be provided through the supplementary grant during the CFY 2024-25, to allow this Department for procurement of essential equipment by invoking Rule 59(c)(v) of the Punjab Procurement Rules, 2014 for controlling Smog being an emergency situation and inclusion of the scheme in the ADP (2024-25).

DECISION No. 68:

The Cabinet considered and approved the proposal contained in para 68.11 above read with views of MD PPRA at para 68.7 to 68.10 above.

GOVERNMENT OF THE PUNJAB
ENVIRONMENT PROTECTION & CLIMATE CHANGE DEPARTMENT

Dated Lahore the 26th December, 2024

ORDER

NO. SO(TECH)/EPCCD/1-34/2024: Consequent upon the decision taken in the 46th PDWP meeting held on 15.11.2024 and in exercise of the powers conferred under Sr. No. 8 [Note 2 (vi)] of Second Schedule (Part-I) of the Punjab Government Delegation of Financial Powers Rules, 2016 Administrative Approval (AA) is hereby accorded for the following scheme with gestation period up to 30-06-2026 at the estimated cost mentioned against its name:

Scheme Name	Estimated cost
Punjab Smog Mitigation and Response Initiative – Airsafe	**Rs. 5,381.000 Million**

2. The Executing Agencies shall observe all codal, legal and procedural formalities prescribed by the Government of Punjab.

3. The expenditure involved would be debitable to grant No. PC-22036-Development, 05-Environmental Protection – 055-Administration of Environment Protection – 0551 – Administration of Environment Protection – 055101 - Administration -LE-4275-Administration- **LO24013701 Punjab Smog Mitigation and Response Initiative – Airsafe** (GS# 7800 in ADP 2024-25)

SECRETARY
ENVIRONMENT PROTECTION &
CLIMATE CHANGE DEPARTMENT

NO. & DATE EVEN

A copy is forwarded for information and necessary action to:-

1. The Accountant General, Punjab, Lahore.
2. The Director General, EPA Punjab, Lahore.
3. The Chief (Environment), P&D Department, Punjab, Lahore.
4. The Project Director (SP&IU), EPCCD Punjab, Lahore.
5. The Deputy Secretary (ES), Finance Department, Punjab Lahore.
6. The Budget Officer –VII, Finance Department, Punjab, Lahore.
7. The Section Officer (IMCT/EP), Finance Department, Punjab, Lahore.
8. The Section Officer (General), EPCCD Punjab, Lahore.

SECTION OFFICER (TECH)

16. REVISION HISTORY

16.1 ORIGINAL

.

18. RELATION WITH OTHER PROJECTS

20. FOCUS ON MARGINALISATION

SR.NO.	CRITERIA	YES/NO	ACTION	COMMENTS
Description & Objectives				
1	Do the description / Objectives of the PC-I specify link / alignment with provincial strategies and sectoral policies?	NO		
Use of Gender Disaggregated Data				
1	Was gender disaggregated data used to determine rationale / need of the project for select beneficiaries?	NO		
Social Impact				
1	Do project objectives/justification include focus on marginalised groups (women, PWDs, minorities, transgender, poor etc.)?	NO		
1a	Have marginalised groups (Women, PWDs, Minorities, Transgender Persons, Poor etc.) been included in project objectives / justification and / or as beneficiaries of the project?	NO		
2	Does the PC-1 include specific provisions for capacity building / training of marginalised group (if applicable)?	NO		
Results Based Monitoring				
1a	Does the PC-I include a Results Based Monitoring Framework (RBMF)/Logical Framework?	NO		
2	Were SDG indicators used for determining targets included in the PC-I?	NO		
Inculsion/Participation				

1	Did the Stakeholder consultation(s) held during ADP Formulation and / or PC-I development include experts and representatives of marginalised groups and CSOs?	NO		
Monitoring & Evaluation				
1	Does the project provide a role to communities in project monitoring and/or implementation (if relevant)?	NO		
2a	Does the project include formation of a Steering Committee and/or Project Implementation Committiees?	NO		
2b	Is there a provision to ensure representation of women in these committees?	NO		