BRIHANMUMBAI MUNICIPAL CORPORATION

Environment & Climate Change Department

Reply to Queries on Expression of Interest for

"Shortlisting of technology and make & model for sensor-based air pollutants measuring units/devices (PM 2.5 & PM 10)"

Sr. No.	Clause / Page No.	Clause	Bidder Queries	Bidder Request	BMC's Remark
1	Certification (Page 6, Clause 2)	mCERTS/TUV/NIST any one Certification	Can alternative performance evaluations such as AirParif (France), CSTEP (India), or IIT Kanpur be accepted in place of mCERTS/TUV/NIST? If mCERTS/TUV/NIST certification is required, what is the grace period for vendors to obtain certification?	Recognised global and Indian agencies have already conducted performance assessments, ensuring accuracy and reliability. Including these will support wider participation and encourage innovation. Some vendors may require 3-6 months for certification processing. Clarity will help manage project timelines.	BMC recognizes the importance of performance evaluations for data accuracy. Performance evaluation certification from AirParif (France) is acceptable. CSTEP (India) or IIT Kanpur will also be accepted. Refer Corrigendum – II.
2	Power Supply (Page 7, Clause 7)	The devices shall operate on AC mains supply. It shall be able to run independently on Solar Panel in case of power outage.	Do we require solar if each construction site has its own electric connection? This will unnecessarily increase the cost of the project. If necessary then, will BMC provide specifications for solar panel & battery backup, or should bidders propose configurations?	Clarification on this requirement will help in cost optimization and efficient project planning.	The sensor-based air quality monitor must have a backup power supply source by way of solar panel or UPS with power back up of 10 to 12 hours in case of power outage. Refer Corrigendum – II.

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3	FRM/FEM Testing (Page 7, Clause 11)	The accuracy and precision of these Ambient Air Quality Sensor Monitor sensors shall be tested with FRM/FEM regulatory monitors.	Is FRM/FEM regulatory testing mandatory for all submissions? Also, please confirm if FRM/FEM testing centres in India are authorised for compliance.	Clarity on whether Indian testing laboratories are officially recognised for validation under the EOI.	FRM/FEM testing centres in India are authorised for compliance. This requirement ensures that bidder demonstrate the accuracy and precision of their sensors at the level of FRM/FEM regulatory monitors and provide appropriate proof of compliance, for finalizing the make and model under the EOI.
4	End of Life Cycle (Page 10, Post Shortlisting Conditions)	The participating firm shall ensure that the product offered is not at 'End of Life Cycle' and manufacturer shall support for spare parts/ maintenance services for next five years.	What are the expected disposal & recycling standards for outdated sensor units?	Ensuring compliance with BMC's sustainability and environmental protection guidelines.	The sensor can be disposed/recycled as per international best practices for sustainability and environment protection. The manufacturer shall support for spare parts/ maintenance services for next three years.

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5	Security & Tampering Prevention (Page 10, Post-Shortlisting Conditions)	The shortlisted firm will be blacklisted/debarred if found tampering their units/devices while actual usage at construction sites, and the security deposit of the shortlisted firms shall be forfeited.	What tamper-proofing measures should be incorporated? How will violations be handled? Will BMC conduct tampering inspections?	Need clarification on BG forfeiture and legal implications in case of tampering or unauthorised modifications.	Any form of data tampering will be considered a violation, subject to necessary action as per the EOI conditions. BMC reserves right to conduct inspection of devices though third party.
6	Dehumidifier (Page 7, Clause 10)	The dehumidifier shall design to prevent humidity in measuring ambient air during hot and humid or monsoon conditions.	Is the inclusion of a dehumidifier mandatory or optional?	Certain air quality monitoring setups may not require a dehumidifier. Clarification helps with cost estimation and technical feasibility.	Dehumidifier is optional. Refer Corrigendum – II.

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7	Data Storage & Backup (Page 7, Clause 8)	For short duration, storage of real-time data at instances of network connectivity issues shall be done locally.	What is the minimum internal memory requirement for data storage during network failures?	Helps in designing a data redundancy strategy to prevent data loss in connectivity issues.	Refer Corrigendum – II.
8	Financial Statement Requirement (Page 10, Post-Shortlisting Conditions)	The shortlisted firm shall submit financial statements for the past three years.	As it is a startup company and if we qualify for all the technical specifications, can we submit the financial statement from the company's inception along with the DPIIT startup certificate?	Providing flexibility for startups will encourage broader participation while ensuring financial credibility.	Yes, Startups can participate, If they qualify for all the technical specification and should submit financial statements from their inception and DPIIT certificate.

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9	Co-Location Requirement (Page 8)	The participants shall note that, during the scrutiny of applications, the accuracy levels of units/devices offered by them will be checked by co-locating it near the CAAQMS.	Should all devices be co-located at a CAAQMS station, or can validation be done at an approved private/government laboratory?	Confirmation on acceptable testing locations will help vendors comply more efficiently.	The devices can be validated at any NABL approved private/government labs including IITs and CSTEP. Refer Corrigendum – II.
10	Device Communication & Security (Page 7, Clause 6)	The units/devices shall be compatible to transmit the real time data to the central system.	What encryption and security standards are required for real-time data transmission to BMC servers?	Ensuring data integrity, cybersecurity compliance, and preventing unauthorised access.	This will be defined in a detailed SOP during the implementation phase, once the make and model of the air quality monitoring units are finalized under the EOI.

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11	Maintenance & Support (Page 10, Post-Shortlisting Conditions)	Manufacturer shall support for spare parts/maintenance services for next five years.	What is the minimum required maintenance & service period for shortlisted devices? Should spare parts be stocked for a specified period?	Ensuring vendors can support devices for their operational lifespan and avoid supply chain issues.	Minimum required maintenance service shall be provided for three years.
12	Calibration Frequency (Page 7, Clause 11)	The accuracy and precision of these Ambient Air Quality Sensor Monitor sensors shall be tested with FRM/FEM regulatory monitors.	What is the required calibration frequency for installed devices?	Helps determine operational costs and maintenance schedules for long-term deployment.	Calibration shall be done every two months.
13	Sensor Replacement (General Query)	Not specified in the document.	In case of sensor failure, what is the expected replacement timeline? Are there BMC guidelines for acceptable failure rates?	Ensuring fast replacement turnaround for continued air quality monitoring and reducing operational downtime.	Expected replacement timeline is 24 hours. Refer Corrigendum – II.

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14	Procurement & Approval (General Query)	Not specified in the document.	Once shortlisted, do vendors need separate approvals from other government bodies, or does BMC approval suffice for deployment?	Clarity on regulatory pathways will help in faster project implementation.	BMC's approval would suffice for deployment in Mumbai jurisdiction.
15	API Integration (Page 7, Clause 6)	Data shall be accessible through Rest APIs for Integration into third-party software, process automation, and central command centre.	Will BMC provide API integration specifications for real-time data transmission?	Ensuring seamless data access and compatibility with third- party software for analysis.	Refer answer to question no. 10.
16	Live Data Display (Page 7, Clause 6)	The communication module shall be responsible for transmitting data to the central cloud server and to display the real-time monitoring data on LED screen.	Is it mandatory for devices to display real-time air quality data on an on-site LED screen, or is cloud- based access sufficient?	Clarity on real-time visibility requirements will help in designing hardware accordingly.	An LED display for public information is also required at the site as part of real-time data visibility. Refer Corrigendum – II.
17	Cloud Storage (Page 7, Clause 5)	The cloud server shall work as a centralized platform for storing, analyzing, and sharing air quality data.	Should vendors provide their own cloud storage, or will BMC host the data on a centralized government cloud?	Understanding storage responsibilities and compliance with data protection laws.	Vendors are not supposed to provide their own cloud storage. BMC will host the data on centralised government cloud.

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18	EOI pg. no. 6	Under list of "Broad Working Principle and Technical/Physical details" one of the criteria in #2 mentioned is the following: Certifications: mCERTS/TUV/NIST any one certification	Besides the above certifications, there have been many other global "Performance Assessments" that have been conducted for the exact same technology that is under evaluation in this EOI. For e.g. The French Government backed AirParif has undertaken a long-term evaluation called AirLabs Micro sensors. The details of the French-government backed initiative can be seen on their official government portal here: https://www.airparif.fr/en/microcapteurs. The actual results of the evaluation of the equipment can be seen here (https://airparif.shinyapps.io/2023ChallengeResultsEN/)	Strong request that Performance Evaluations undertaken in India by reputed agencies like	BMC recognizes the importance of performance evaluations for data accuracy. Performance evaluation certification from AirParif/CSTEP is acceptable. Refer Corrigendum – II.
19	one of the criteria in #2 mentioned		In India, CSTEP in Bangalore which is an Institute of Repute (IoR) under the National Clean Air Program (NCAP) has also undertaken performance evaluation for Sensor-based Air Quality Monitoring equipment. The results of the evaluation from CSTEP can be seen here (https://cstep.in/publications-details.php?id=2053 and here https://cstep.in/drupal/sites/default/files/2022-04/Performance%20Assessment%20of%20LowCost%20PM2.5%20Sensors.pdf). The performance evaluation of Sensor-based PM2.5 and PM10 monitors done by CSTEP is very relevant to India as it has been done in Indian conditions. CSTEP is working with several government agencies and has received funds from NCAP to support cities in their air quality initiatives	CSTEP and globally by AirParif should be included in the Performance Criteria and Certifications of this EOI.	Performance evaluation Certification by CSTEP (Institute of Repute (IoR) under NCAP) is also acceptable.
20			Several IITs in India, including IIT Kanpur have deployed over 1400 sensor-based AQ devices and these government approved deployments have not requested for mCERTS/TUV/NIST certifications in the past. If there is a strong requirement for mCERTS or associated certifications, we are willing to apply for those UK and EU-based certifications and provide the necessary certification documents in the coming 2 to 4 months.		In addition to mCERTS/TUV/NIST, colocation validation/certification from IITs (Kanpur, Bombay, Delhi, Madras, Kharagpur) will be acceptable. Refer Corrigendum – II.

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21	Clause no. 4.1; Page no. 12	mCERTS/TUV/NIST any one Certification	We request to accept the alternative certifications - AirParif, CSTEP, IIT Kanpur in lieu of mCERTS / TUV / NIST. Additionally, what is the grace period for obtaining certification?	Note that specified certification is only available with one vendor in Asia which is restricting the open participation. Hence, we request BMC to consider broader certification options.	Refer Corrigendum – II.
22	Clause No. 11.3; Page No. 33:	The shortlisted firm shall submit financial statements for the past three years.		We request to allow startups to submit financial statements from their inception, along with a DPIIT certificate, instead of three years of financial data. This would encourage startup participation while maintaining financial credibility.	Startups can participate, If they qualify for all the technical specification and should submit financial statements from their inception and DPIIT certificate.
23		Eligibility & Compliance	Will someone who already has done a collocation study with MPCB or any respective state pollution control board earlier be considered or given more preference?		For this assignment, co-location study has to be done afresh to ascertain performance evaluation of the sensor in the real world scenario.

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24		Technical Specifications	The EOI specifies an $R^2 > 0.7$ accuracy requirement for PM2.5 and PM10 sensors. Could you clarify if higher accuracy (e.g., $R^2 > 0.9$) would be given preference in terms of ratings for recommended OEM's?		Terms & Condition of the EOI prevails.
			The required communication module mentions multiple options (Wi-Fi, GSM, LoRa, etc.). Would a device that supports both GSM & Wired communication like Ethernet or Modbus be given preference?		Terms & Condition of the EOI prevails.
			The document states that the sensor must transmit real-time data to a central system. Could you specify the exact preferred data transmission interval (e.g., every 2 minutes, 5 minutes, or 15 minutes)?		This will be defined in a detailed SOP during the implementation phase, once the make and model of the air quality monitoring units are finalized under the EOI.
			The document states that it shall be possible to run independently on a Solar Panel in case of a power outage. Will the system be required to run independently on the Solar Panel or it shall be compatible with the Solar Panel, in the case of remote locations where an AC power supply is not available?		The system shall operate on AC mains supply. It shall be able to run independently on Solar Panel or UPS with power back up of 10 to 12 hours in case of power outage.
25		Data Accuracy & Calibration	The EOI requires the co-location of devices with a CAAQMS for 15 days. Could you clarify:		OEM/Dealer can select colocation sites with approval of BMC.
			How the co-location sites will be selected and who will be responsible for selecting the site, OEM/Dealer or BMC?		
			Does BMC have specific institutes approved for conducting the accuracy validation process?		Any NABL approved private/government lab including IIT (Kanpur, Delhi, Mumbai, Madras and Kharagpur) and CSTEP.
			Will the applicant receive the CAAQMS raw data for direct comparison?		Not applicable.
			The document requires hourly data aggregation if 75% of the data points are available. Could you confirm if real-time minute-wise data reporting is also acceptable?		Yes, it is acceptable.

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26		Submission & Documentation	The EOI mandates the submission of a bank guarantee of ₹5 lakh upon shortlisting. Could you confirm if this amount is refundable upon project completion?		Yes.
27		General & Business Considerations	Is there an opportunity for pilot deployment before large-scale implementation?		Not applicable.
			Does BMC have a predefined budget or quantity requirement for the shortlisted sensor-based devices?		The EOI aims to shortlist sensor makes and models for deployment on construction sites by the respective project proponents.
			Once shortlisted, will the firm be required to re-apply after three years, or will there be an extension process?		Extension can be granted on performance review.
			Will preference be given to Indigenous manufacturers under the Make in India initiative of the Government of India?		It is a Global EoI.

Sd/-

Ch. Eng. (Env. & CC)