



EXPRESSION OF INTEREST

FOR

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

Website –portal.mcgm.gov.in/tenders

Due Date- 03.03.2025

Office of Chief Engineer (Environment & Climate Change),

3rd Floor, Worli Garage Building, Dr. E. Moses Road

Worli, Mumbai – 400018

Disclaimer

The information contained in this Expression of Interest (the “EOI”) or subsequently provided to Applicant(s), whether verbally or in documentary or any other form by or on behalf of the Authority or any of its employees or advisors, is provided to Applicant(s) on the terms and conditions set out in this EOI and such other terms and conditions subject to which such information is provided.

This EOI is published with the intention to select sensor-based air pollutants (PM 2.5 & PM 10) measuring units/devices to finalize the shortlisted technology and its make & model. While complying with the directions of Hon’ble High Court of Bombay in Suo Moto petition No. 03 of 2023 pertaining to the air pollution in the Mumbai Metropolitan Region.

This EOI is not an agreement and is neither an offer nor invitation by the Brihanmumbai Municipal Corporation (BMC) to the prospective Applicants or any other person. The purpose of this EOI is to provide interested parties with information that may be useful to them in making their key submissions pursuant to this EOI. Each Applicant should before submitting EOI conduct its own studies and analysis.

Information provided in this EOI to the Applicant(s) is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive on account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The BMC accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

BMC and its employees make no representation or warranty and shall have no liability to any person, including any Applicant under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this EOI or otherwise, including the accuracy, adequacy, correctness, completeness or reliability of the EOI and any assessment, assumption, statement or information contained therein or deemed to form part of this EOI or arising in any way by submitting the EOI for the subject work.

BMC also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused to any applicant arising from reliance upon the statements contained in this EOI.

BMC may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this EOI.

The issue of this EOI does not imply that, the Authority is bound to select an Applicant or to appoint the Selected Applicant, as the case may be, for the subject work and the Authority reserves the right to reject all or any of the Applicant or Applications without assigning any reason whatsoever.

The Applicant shall bear all its costs associated with or relating to the preparation and submission of its Application including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by BMC or any other costs incurred in connection with or relating to its Application. All such costs and expenses will remain with the Applicant and the BMC shall not be liable in any manner, whatsoever, for the same or for any other costs or other expenses incurred by an Applicant in preparation or submission of the Application, regardless of the conduct or outcome of the Application Process.

Notice Inviting Expression of Interest

Brihanmumbai Municipal Corporation (BMC) invites Expression of Interest (EOI) for selecting sensor-based air pollutants measuring units/devices (PM 2.5 & PM 10) to be deployed on construction sites. The purpose of inviting this EOI is to decide the technology of the sensor-based air pollution measuring units/devices and shortlist the make & model of these units/device, so that the end users such as builders, developers and contractors can readily have an access to a uniform standardized air pollution sensor units/devices' specification.

The response to the EOI is to be submitted in sealed envelopes at the following address on any working day during office hours on or before **16:00 hrs. on 03.03.2025.**

Office of Chief Engineer (Environment & Climate Change),
3rd Floor, Worli Garage Building, Dr. E. Moses Road
Worli, Mumbai – 400018
Email: che.envcc01@gmail.com (If any query)

The EOI document can be downloaded from the BMC portal **from 17.02.2025 at 16.00 Hrs.** onwards (https://portal.mcgm.gov.in/irj/portal/anonymous/qletenders_new).

Sd/-

Ex. Eng. (Env. & C.C.)-II

2. Schedule of Events

Sr. No.	Event	Date & Time	Venue
1.	Start date for downloading Expression of Interest (EoI) document	17.02.2025 at 16.00 Hrs.	Office of Chief Engineer (Environment & Climate Change), 3 rd Floor, Worli Garage Building, Dr. E. Moses Road Worli, Mumbai – 400018
2.	Last date for submission of EoI (Hard Copy)	03.03.2025 at 17.00 Hrs.	
3.	Date for opening of EoI	04.03.2025 at 16.00 Hrs.	

- 1) If any date specified herein is a holiday, then the next working day will be considered for the activity and the time will remain the same.
- 2) The Schedule indicated above is tentative and BMC may change any or the entire schedule by intimation.

3. Project Background and Objectives

BMC is witnessing a growth in construction and infrastructure projects. These, projects are contributors to air pollution along with vehicular emission, industrial emission & unclean fuel usage etc. The deteriorating ambient air quality in October 2023 giving rise to health problem based on level of air pollution that exists in the surrounding and led to environmental concerns.

The Mumbai Air Pollution Mitigation plan along with 28-point guidelines were issued by BMC to mitigate the air pollution in the atmosphere.

Hon'ble High Court of Bombay has taken cognizance of the air pollution in Mumbai and its surrounding area and filed a Suo Moto petition No. 3 of 2023 and instructed Government of Maharashtra and BMC to take necessary steps to bring down the air pollution in Mumbai as well as in the surrounding areas.

In the hearing held on 9th January 2025, Hon'ble High Court of Bombay has directed to install the air pollution sensing devices on all the construction sites in which construction is in progress and have the readings displayed so that mitigative action can be taken up. All these devices/monitors are to be centrally connected and an appropriate surveillance in regard to the pollution generated by such construction sites are to be rigorously observed.

This "Expression of Interest" (EOI) is invited for deciding the technology of the sensor-based air pollutant measuring units/devices (PM_{2.5} & PM₁₀) and shortlist the make & model of these units/devices, so that the end users such as builders, developers and contractors can readily have an access to a ***uniform standardized air pollution sensor units/devices*** approved by BMC.

The broad specifications for ambient sensor-based air pollutants measuring units/devices for measuring PM_{2.5}, PM₁₀ are as follows, however the participants shall submit their unit/ device specifications in the enclosed data sheets for analyzing the proposals received. It shall be noted that hand held/indoor air quality units/devices shall not be accepted.

Parameter	Measurement range	Accuracy	Response Time (sec)	Life of sensor (months)	Operating conditions
PM _{2.5}	0 to 1000 µg/m ³	R ² >0.7	<10	~24 to 30	T=-30°C to ~70°C RH=0 to 95%
PM ₁₀	0 to 1000 µg/m ³	R ² >0.7	<10	~24 to 30	T=-30°C to ~70°C RH=0 to 95%
Temperature	-10°C to 50°C	+/- 0.5 C for range 0 – 65 C, +/- 1.25 C for range – 20 to 0 C	1	~24 to 30, validated from field deployments	NA
Humidity	15% to 95%	+/- 3%	1	~24 to 30, validated from field Deployments	NA

4. Working Principle and Technical/Physical Details

Broad Working principle and technical/physical specifications of the units/devices are mentioned below for ready reference -

Sr.No.	Description	Provide the details
1	Working Principle	Light Scattering/Optical Particle Counter
2	Certification	mCERTS/TUV/NIST any one Certification
3	Micro Controller viz. Arduino, Raspberry Pi, or similar devices	Shall receive the data from the sensors, processes it, and send it to the cloud server or any other data storage hardware.
4	Communication module	The communication module shall responsible for transmitting data from the microcontroller to the central cloud server and to display the real time monitoring data on LED screen. It shall use various wireless technologies such as Wi-Fi, Bluetooth, GSM, LoRa, Ethernet Sigfox and NB IoT to transmit the data real time or cellular networks. The units/devices shall be compatible to transmit the real time data to the central system. The units/ devices shall be preferably Saral Sanchar certified.
5	Cloud server	It shall work as centralized platform for storing, analyzing, and sharing air quality data. It shall collect data from the communication module of Ambient Air Quality Sensor Monitor and store it in a database. The cloud server shall also provide web and mobile applications for users to access the data.
6	Third party software support	Data shall be accessible through Rest APIs for Integration into third party software, process automation and central command centre.
7	Power supply	The devices shall operate on AC mains supply. It shall be able to run independently on Solar Panel in case of power outage.
8	Internal memory	For short duration, storage of real-time data at instances of network connectivity issues shall be done locally. Memory back up to ensure no data loss or network failure. SD card shall storage data. (In case of a network error, the data shall be still stored on the SD card, preventing any loss of data).
9	Enclosure	The enclosure shall cover and protect the components from environmental factors such as dust, rain and wind. The enclosure housing for sensors and electronic peripherals shall be lightweight and compact System with IP65 (and above grade) enclosure for endurance against harsh weather conditions.
10	Dehumidifiers (optional)	The dehumidifier shall design to prevent humidity in measuring ambient air during hot and humid or monsoon conditions. The dehumidifier shall include a heating element that prevents excessive humid air from being sampled for measurement of PM2.5/10 and as a result, shall improve the performance of particle sensors in outdoor conditions.

11	Sensor Calibration & Data Accuracy	Ambient Air Quality Sensor Monitor shall provide ambient PM2.5 and PM10 concentrations with notable accuracy. In order to ensure and improve their accuracy, the device shall be calibrated. The accuracy and precision of these Ambient Air Quality Sensor Monitor sensors shall be tested with FRM/FEM regulatory monitors.
12	Data Collection, Transmission, and Validation	<p>Real-time data collection: Sensor nodes should report the data at 30-second or 1-minute resolution. The manufacturer shall provide API-based data access every 15 minutes so that officials can be alerted and take quick action, if pollution levels are too high.</p> <p>Data Standardization: While using multiple integrators, the data should be standardized in near-real-time before analyzing the data. General standardization includes converting timestamps into IST, giving uniform names and units to the parameters (PM2.5 and PM10 reported in $\mu\text{g}/\text{m}^3$), and averaging the measurements to uniform time intervals. Standard Reference PM Monitors like the Beta Attenuation Method (BAM) approved by CPCB used in Continuous Ambient Air Quality Monitoring Station (CAAQMS) generally report data as 1-hr averages. Hence, aggregating the sensor data on an hourly basis can assist in comparisons with the reference monitors. However, sensor data should be averaged at hourly basis only if 75% of data points are available for that particulate hour. For routine monitoring and data visualization, reporting at 1-minute or 15- minute basis is recommended.</p> <p>Data processing</p> <p>The dataset from Ambient Air Quality Sensor Monitor deployed shall contain PM10 and PM2.5 concentration and other meteorological parameters (such as Temperature and Relative Humidity) with a timestamp. All the collected datasets shall be merged based on timestamp and unique device ID.</p>

The participants shall submit detailed working principle of their units/device and accuracy calculation methodology in the enclosed sheet in this regard.

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 Continuous Ambient Air Quality Monitoring Stations (CAAQMS) for 15 days. Alternatively, the co-locating study shall be done at any institute of repute (having FRM/FEM regulatory monitors) as specified by BMC. The cost towards co-location study shall be borne by the applicant. The study report of the co-location shall be submitted to this office. After analyzing the results, the applications shall be shortlisted with due approval from the Competent Authority. The approved list of device make and models will be put in Public Domain for benefit of End users.

5. Eligibility Criteria

- The participants shall be manufacturer or their authorized dealer of Sensor based Ambient Air Quality monitoring units/ devices.
- The participant should not have been blacklisted or debarred from participating in tenders/ EOI by any Central / State Government agencies or BMC or autonomous bodies or universities/ institutions. (An undertaking to this effect should be furnished).

6. Documents To Be Submitted

The participant shall submit the following documents:

- Registration document with Registrar of Companies (ROC) or as applicable.
- PAN Card of the participating firm.
- In case of authorized dealer, the authorized dealership letter from the equipment manufacturer.
- Relevant documents/records in support of Experience of the participating firm in the field, client list etc.
- Audited Balance Sheets certified by ‘Chartered Accountant or turnover certificate issued by the Chartered Accountant for the last three financial years.
- Brochure, Literature or Pamphlet of the unit/device considered for participation
- Participating firm details.
- Appendix 1: Cover Letter
- Proforma A
- Proforma B
- Proforma C

7. SUBMISSION DETAILS

7.1 Validity of EOI

The EOI shall be valid for a period of not less than 180 days from the EOI due date. BMC reserves the right to reject any EOI which does not meet the requirement.

7.2 Submission of EOI

The agencies fulfilling the eligibility criteria may submit their application in respect to this EOI as per proforma attached to this document (Appendix I) together with requisite documents up to 16:00 hrs. on 03.03.2025 physically at the below mentioned address in a sealed envelope, clearly mentioning on the envelope:

“EXPRESSION OF INTEREST FOR SELECTING SENSOR BASED AIR POLLUTANTS (PM 2.5 & PM 10) MEASURING UNITS/DEVICES”

To:

**Office of Chief Engineer (Environment & Climate Change),
3rd Floor, Worli Garage Building, Dr. E. Moses Road
Worli, Mumbai – 400018**

From:

M/S.....

Contact No.:

Email ID:

Your sealed envelope shall contain:

- 7.3.1 Downloaded EOI documents, all pages signed
- 7.3.2 Cover Letter (Appendix-1)
- 7.3.3 Proforma 'A', 'B' and 'C'
- 7.3.4 Documents mentioned in point no. 6 of this document.

8. Specific Conditions: -

- This EOI intends to shortlist technology and make & model of sensor based air pollutants (PM 2.5 & PM 10) measuring units/device to be installed on construction sites and to display the readings thereof. The handheld units/devices shall not be acceptable.
- BMC reserves the rights to terminate the procedure for invitation of EOI for selection sensor based air pollutants (PM 2.5 & PM 10) measuring units/devices
- The shortlisted participating firms shall be informed in writing by BMC. The shortlisting will be for period of 3 years.
- The participating firm shall appoint one representative as a Nodal person to co-ordinate with BMC officials. His contact details will have to be shared with BMC.
- The participating firm shall arrange transportation of offered units/devices upto the CAAQMS to check the accuracy level of the unit/device by co-locating it for the period of about 15 days. The installation of the unit/device and its safety & security during the said period of 15 days shall be the responsibility of the participating firm. Further, the transportation, installation, safety, security etc. of the unit/device during the said period of the 15 days shall be provided by the participating firm at their own cost (i.e. no cost to the BMC). BMC shall be no way responsible for the same.
- The participating firm will ensure that during the collocating study, none of the representative of the participating firm will tamper the existing CAAQMS. In case of any mishap, the participating firm will be held responsible and action deemed fit may be initiated.
- The participating firm will be blacklisted/debarred if found tempering their units/devices either during the co-locating process.
- 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.

After shortlisting

- The shortlisted firm shall pay security deposit of Rs. 5 lakhs in the form of bank guarantee to BMC within the period of one month from the date of intimation of shortlisting. The said security deposit shall be forfeited in case of breach of terms & conditions of the EOI under reference. The bank guarantee towards security deposit of remaining shortlisted firms shall be released after completion of the time period of three years.
- BMC reserves the rights to terminate the shortlisted firm during the period of three years for fraud & corrupt practices, willful misconduct including tampering of units/ devices, records.
- The shortlisted firm will be blacklisted/debarred if found tempering their units/devices while actual usage at construction sites, and the security deposit of the shortlisted firms shall be forfeited.

9. General Terms and Conditions

- Participating firms are solely responsible for timely delivery of the responses to the above-mentioned address and are solely responsible for delays in receipt. Responses not received on or before the last date and time of submission will not be considered. Postal delay shall not be entertained.
- The response to this EOI notice should be full and complete in all respects. BMC may summarily reject the incomplete or partial responses.
- The participating firm shall bear all costs associated with the preparation and submission of the EOI, including cost of presentation for the purposes of clarification of the response, if so desired by BMC. BMC will in no case be responsible or liable for any costs involved in this activity, regardless of the conduct or outcome of the process of checking accuracy of the unit device by co-locating near CAAQMS.
- The EOI response shall be signed on each page by the authorized representative of the participating firm and a copy of the power of attorney of the authorized signatory to be attached.
- BMC reserves the rights to accept or reject any EOI without assigning any reason thereof.
- The decision of Municipal Commissioner of BMC will be final, in case of any dispute.

Appendix 1: Cover Letter

Date:

To,
Chief Engineer (Environment & Climate Change),
3rd Floor, Worli Garage Building, Dr. E. Moses Road
Worli, Mumbai – 400018

Subject: Expression Of Interest (EOI) For Selecting Sensor Based Air Pollutants
Measuring Units/Devices (Pm 2.5 & Pm 10)

Respected Sir,

Having examined the EOI document, I/ we, the undersigned, offer my/ our Expression of Interest and undertake that the information submitted in the EOI is correct & true to the best of my/ our knowledge.

I/ We agree to the terms and conditions mentioned in the EOI document.

Yours faithfully,

(Signature) Name:
For and on behalf of:

Contact Details:

1. Name and Address of the Company

Name:

Address:

Telephone No. :

Fax:

E-mail:

2. Name and Address of the Contact

Person Name:

Address:

Direct Telephone No. :

Mobile No.:

Fax:

E-mail:

PROFORMA 'A'

DATA SHEET (to be filled by Participating Firm)

Make:			Model:		
Parameter	PM2.5	PM10	Temperature	Humidity	Operating conditions
Measurement Range					
Accuracy					
Response Time (sec)					
Life of sensor (months)					
Operating conditions					

Yours faithfully,

(Signature) Name:

For and on behalf of:

PROFORMA 'B'

Technical/ Physical details (to be filled by Participating Firm)

Sr. No.	Description	Provide the details
1.	Working Principle	
2.	Certification	
3.	Micro Controller	
4.	Communication module	
5.	Cloud server	
6.	Third party software support	
7.	Power supply	
8.	Internal memory	
9.	Enclosure	
10.	Dehumidifiers (optional)	
11.	Sensor Calibration & Data Accuracy	
12.	Accuracy Calculation Methodology	
13.	Data Collection, Transmission, and Validation	

Yours faithfully,

(Signature) Name:

For and on behalf of:

PROFORMA 'C'

TO WHOMSOEVER IT MAY CONCERN

I / we hereby assure the following: -

- 1) I / we shall ensure to arrange transportation for sensor based Air Pollutant (PM 2.5 & PM 10) measuring units/device, its safety & security on site during the period of 15 days installation near CAAQMS for co locating and shall submit the data / record thereof for the analyzing. I/we shall bear all the cost involved for all above mentioned activities.
- 2) I / we shall ensure that, our representatives entering sites will not tamper existing CAAQMS. In case of any mishap the participating firm will be held responsible.
- 3) I / we shall abide by the general & specific conditions of the said EOI as well as the instructions from the BMC as received time to time.
- 4) I/We confirm that the product offered is not at "End of Life Cycle" and manufacturer will support for spare parts/maintenance service for next five years.

Yours faithfully,

(Signature) Name:

For and on behalf of: