



**CHANDIGARH POLLUTION CONTROL COMMITTEE**  
*Paryavaran Bhawan, Sector 19-B, Chandigarh*

**INVITATION FOR EXPRESSION OF INTEREST (EOI) FOR SOURCE APPORTIONMENT AND EMISSION INVENTORY STUDY ON THE LEVELS AND SOURCES OF POLLUTION IN CHANDIGARH**

1. Chandigarh Pollution Control Committee (CPCC) intends to engage Educational and Research Institutions of National and International repute and Environmental Laboratories, to carry out a Source Apportionment and Emission Inventory Study on the level and Source of Pollution and prepare strategy for cost effective measures for abatement of air pollution in Union Territory of Chandigarh. The study will be for a period of one year.
2. CPCC proposes to conduct the above study through reputed educational and research institutions and undertakings of the State/Central Government and Ministry of Environment, Forest and Climate Change notified environmental laboratories.
3. Expression of Interest (EOI) for carrying out the proposed study for U.T. of Chandigarh indicating the interest in carrying out source apportionment and emission inventory study prescribing cost effective measures for abatement of air pollution in the above area from such institution are hereby invited.
4. The interested institutions/laboratories may submit the Expression of Interest (EOI) by providing required information as per the prescribed format, **which may be downloaded from the website of the Chandigarh ENVIS i.e. [www.chandigarhenvis.gov.in](http://www.chandigarhenvis.gov.in).**
5. The duly filled EOI, supported with relevant documents, must reach the office of **Member Secretary, Chandigarh Pollution Control Committee, Ground Floor, Paryavaran Bhawan, Sector 19-B, Chandigarh - 160019** on or **before 31.01.2020, 03.00 PM**. The envelope must be clearly superscripted as **“EXPRESSION OF INTEREST FOR SOURCE APPORTIONMENT AND EMISSION INVENTORY STUDY ON THE LEVEL AND SOURCE OF POLLUTION IN U.T. CHANDIGARH”**.
6. The EOI can be submitted through Registered Post/Speed Post. CPCC shall not be held responsible for any postal delay for non-receipt of EOI within scheduled date and time.
7. CPCC reserves the right to reject EOI without assigning any reasons thereof. The decision of the Member Secretary, Chandigarh Pollution Control Committee is final in this regard.

**Member Secretary**

**EXPRESSION OF INTEREST (EOI)**  
**DOCUMENT FOR**  
**ENGAGEMENT OF REPUTED EDUCATIONAL AND**  
**RESEARCH INSTITUTIONS OF CENTRAL / STATE**  
**GOVERNMENT AND MINISTRY OF ENVIRONMENT,**  
**FOREST AND CLIMATE CHANGE NOTIFIED**  
**ENVIRONMENTAL LABORATORIES**  
**FOR**  
**SOURCE APPORTIONMENT**  
**AND EMISSION INVENTORY STUDY**  
**FOR**  
**U.T. OF CHANDIGARH**

**GUIDANCE DOCUMENT FOR THE EDUCATIONAL/RESEARCH INSTITUTIONS AND FOR MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFIED ENVIRONMENTAL LABORATORIES FOR SUBMISSION OF EXPRESSION OF INTEREST (EOI) FOR SOURCE APPORTIONMENT AND EMISSION INVENTORY STUDY IN U.T. OF CHANDIGARH**

**OBJECTIVE OF THE STUDY**

Since, air quality in urban centers are affected by a variety of complex sources, detailed scientific studies are required for identification of major sources, assessing their contributions to urban air pollution and suggest mitigation measures taking into consideration the techno-economic feasibility and other social factors. Accordingly, this study has been initiated to promote and demonstrate a more rational & proactive approach to air quality management in U.T. Chandigarh.

**STUDY OBJECTIVES**

- To profile Ground Level Concentration (GLC) of air pollutants in different parts of the city along with air shed of the city including background, residential, commercial/mixed areas and source specific “hot spots” viz. kerbside/roadside, industrial zones etc.
- To select “Emission Factors” (EF) for different categories of vehicles with due consideration to variations in fuel quality, technology, size and vintage of sources, control systems etc.
- To select appropriate emission factors for other non-vehicular sources viz. industries, industrial & domestic fuel combustions, roadside dust, construction activities, generator sets etc.
- To prepare inventory for different air pollutants, their emission rates & pollution loads from various sources along with spatial and temporal distribution in the city including its air shed covered under this project.
- To profile the source emission characteristics of different possible sources.
- To conduct source apportionment studies for PM10 and PM2.5 and prioritize the source categories for evolving cost-effective air pollution mitigation strategies/plans.
- To assess the impact of sources on ambient air quality under different management/interventions/control options and draw a roadmap of short term and long term measures as considered appropriate and cost effective to ensure “Cleaner air in U.T. Chandigarh”.

## **SCOPE OF THE PROJECT**

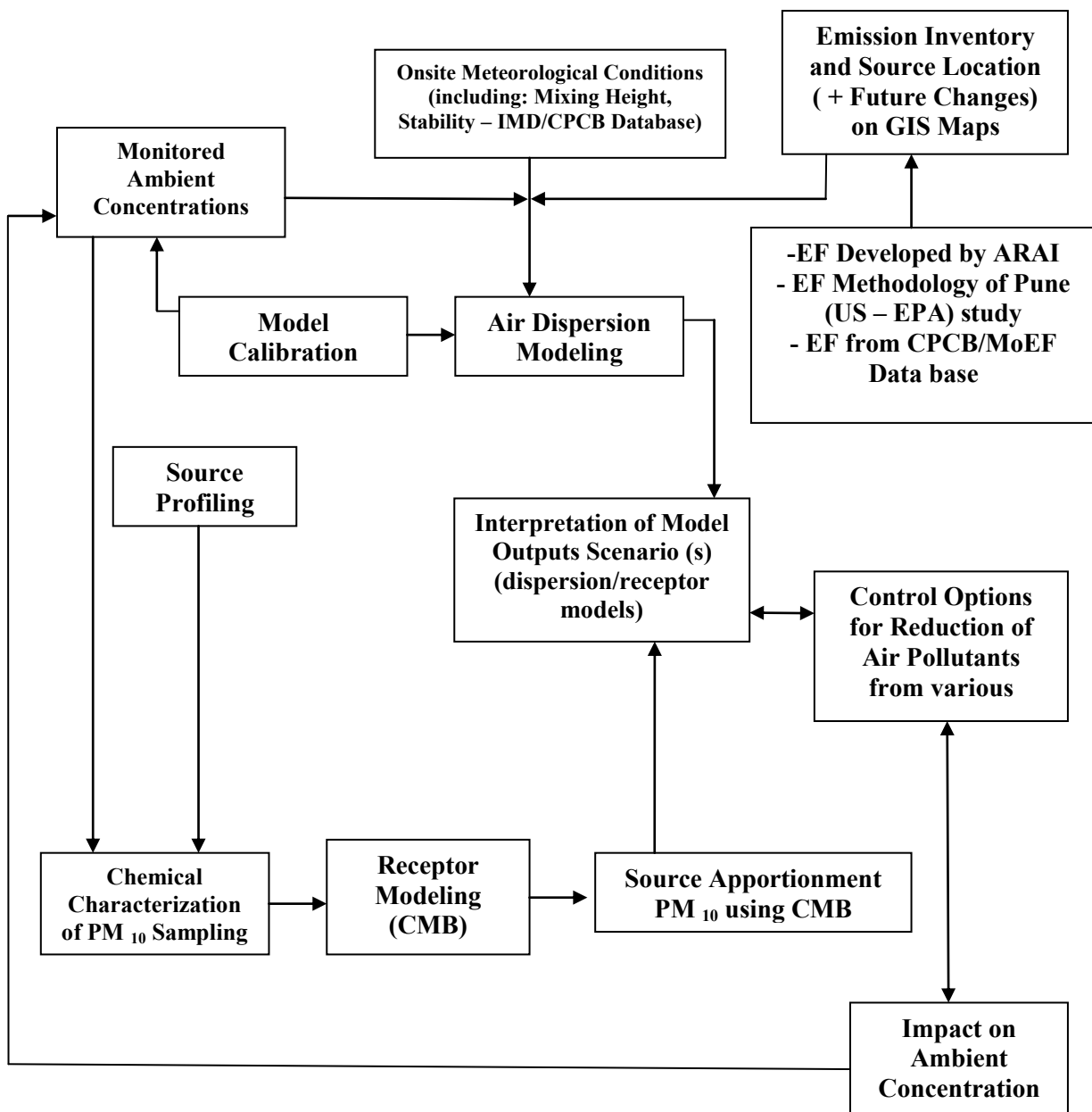
The proposed study is being executed under Comprehensive Action Plan for the Control of Air Pollution in U.T. of Chandigarh. The proposed study will be city-specific, drawn on the basis of scientific study with adequate & representative set of quality data/information. The scope of the study shall focus on following:

- The overall project scope includes city-specific air quality monitoring, complete characterization of ambient dust (PM10 and PM2.5), emission inventory, source profiling, source apportionment using dispersion & chemical mass balance models.
- To address all the expected anthropogenic emission sources in Chandigarh city, it is planned to include many non-criteria pollutants in the study for understanding the extent of problem and comparison with earlier data base. The major air pollutants covered in this project include SO<sub>2</sub>, NO<sub>x</sub>, CO, Benzene, Aldehydes, Alkenes, NMHC, THC, PAH, PM10, PM 2.5.
- The ambient air monitoring will be carried out over a period covering all three seasons in a year to get representative data on seasonal variations in meteorology as well as activities that have bearing on air quality. The purpose of ambient air quality monitoring is not compliance verification. Therefore, it is proposed to carry out continuous monitoring for one month in each season for three seasons covering the whole year at all the monitoring locations.
- Air monitoring stations will be installed at locations such as kerbside, residential, industrial and background (away from all the sources and in upwind direction). Chandigarh city will have at least five to seven air monitoring stations.
- In order to catch the diurnal variations of sources as well as the typical meteorological changes, it is proposed to conduct 8-hourly monitoring (06.00 to 14.00s, 14.00-22.00, 22.00-06.00 hrs.) in a day. The sampling shall be done continuously for 30 days in a season. Thus, for three seasons there would be 90 sampling days. Thus, total 90 sampling days would cover the all days of week to give a fair representation of three seasons of a year.
- Monitoring of meteorological parameters would be carried out simultaneously at each station at same height of ambient air monitoring to ensure proper representation of the activities of the surrounding area for a given monitoring location. Additional meteorological data for the study period will also be collected from Indian Meteorological Department (IMD).
- A detailed emission inventory would be carried out for line, point and area sources. Data on emission inventory, available through secondary sources, will be collected. Besides, primary surveys shall be carried out for identification & spatial distribution of sources and preparation of detailed emission inventory for zone of influence (2km x 2km area) around each ambient air quality monitoring location.

City level emission inventory, available through secondary sources, shall be refined based on the data generated through primary surveys carried out within the zone of influence around each monitoring location.

- In order to get a wider cross section of vehicles in-use or on-road and the actual distance travelled by each sample vehicle, inspection & maintenance practices being adopted etc., a systematic survey of vehicle population will be undertaken in the city. Also, special emphasis will be laid on the emissions from vehicles of pre Euro/India 2000 for assessing cost-effective solutions as these represent major segment in total vehicle population.
- Emission factors developed by ARAI for each representative vehicles considering vehicle technology, age, fuel, traffic conditions and prevailing Inspection & Maintenance practices including influence of fuel quality with or without tail pipe treatment, will be used for estimating vehicular emission.
- Emission inventory of industrial and other sources will be prepared through secondary sources. Primary surveys may also be conducted to crosscheck and validate the secondary data.
- With regard to emission factors for point sources, firstly the database available on emission characteristics with Chandigarh Pollution Control Committee and other sources (particularly for small-scale industries) would be scanned. For area sources, certain database generated in a few US-EPA studies (for India, Bangladesh and other countries of the region) would also be reviewed. For other source types, for which information is not available, the factor developed by US-EPA, EU, WHO would be scanned and then their normalization for Indian conditions have to be done.
- The Emission inventory (EI) data will be analyzed using appropriate technique like IPIECA tool, IVE model or other equivalent technique being used by reputed organizations like CARB, US EPA or EPEFE.
- Source apportionment analysis will be carried out for PM10 and PM2.5 using receptor model like CMB model. For this purpose, detailed analysis of PM10 and PM2.5 will be carried out.
- The study on source profiling of various polluting sources in Indian context will be considered to be used as input to CMB model for source apportionment study.
- With regard to dispersion modeling and intervention analysis, refined city-level emission inventory will be used.
- On completion of data collection, validation and interpretation of the assimilated information, a detailed road map will be drawn considering all possible measures for air quality improvement. These measures will be classified into short and long term with due priority to low cost measures that give maximum benefits.

## STUDY FRAMEWORK



## EXPECTED DELIVERABLES OF THE ASSIGNMENT

Each assignment shall be for a period of 12 months and the delivery schedule shall be as follows:-

- Interim Report after completing field visits and monitoring of environmental parameters- 6 months
- Draft final report - 8 months
- Final report after incorporating modifications suggested by the Committee - 12 months

## **AREA DETAILS**

The study area shall be the city/ municipal limit of Chandigarh city and including its air shed.

## **INSTRUCTION TO REPUTED EDUCATIONAL/RESEARCH INSTITUTION AND MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFIED ENVIRONMENTAL LABORATORIES**

1. Reputed educational/research institutions and Ministry of Environment, Forest and Climate Change notified environmental laboratories are requested to submit Expression of Interest (EOI) for carrying out the proposed study of “Source Apportionment and Emission Inventory (SA & EI) Study for the U.T. of Chandigarh”. The EOI shall indicate their interest in carrying out SA & EI and measures for cost effective abatement of air pollution in the study area.
2. Interested educational/ research institutions and Ministry of Environment, Forest and Climate Change notified environmental laboratories may submit the Expression of Interest (EOI) by providing required information as per the prescribed format, which may be downloaded from the website of Chandigarh ENVIS i.e. <http://chandigarhenvi.gov.in>.
3. The EOI filled in as per the prescribed format and supported with relevant documents must reach the Office of Member Secretary, Chandigarh Pollution Control Committee, Paryavaran Bhawan, Sector 19-B, Chandigarh on or before 31-01-2020, 3.00 P.M. The envelope must be clearly superscripted as “EXPRESSION OF INTEREST FOR SOURCE APPORTIOMENT AND EMISSION INVENTORY STUDY FOR U.T. CHANDIGARH.
4. The EOI can also be submitted through Registered Post/ Speed Post. But the authority shall not be held responsible for any postal delay for non-receipt of EOI within scheduled date and time.
5. Interested educational/research institutions and Ministry of Environment, Forest and Climate Change notified environmental laboratories are advised to visit the site before submission of EOI. Once EOI received; it will be presumed that the institute has visited the site and collected relevant information for submission of his EOI.
6. The Chandigarh Pollution Control Committee reserves the right to reject any or all EOIs without assigning any reasons thereof.

7. The EOIs will be evaluated by an Evaluation Committee (EC) constituted for the specific purpose. The scores will be assigned to the response of each institution based on the weightage assigned to each of the criteria in EOI. The weightage criteria will be followed as per following Table.

<b>The scoring criteria</b>	<b>SI No.</b>	<b>Sub Criteria</b>	<b>Marks</b>	<b>Total Marks</b>
Past Experience of the Institute	1.	Past experience of studies of similar nature	36 (Upto 05 studies = 12) (05 to 10 studies = 24) (More than 10 studies=36)	
	2.	Sector Past experience of studies in related sector	18 (Upto 05 studies = 6) (05 to 10 studies = 12) (More than 10 studies=18)	
	3.	Studies carried out in India	06	
	<b>Total</b>			<b>60</b>
Experience of Key Personnel	1.	Qualification	07	
	2.	Relevant Experience	18	
	<b>Total</b>			<b>25</b>
Facility available for conducting such studies	1.	Rating of the educational and research institution	15	
	<b>Total</b>			<b>15</b>
<b>Grand Total Marks</b>				<b>100</b>

- The assignment of marks within each criterion and final qualifying marks will be decided by the Evaluation Committee.
- The shortlisted educational, research institutions and Ministry of Environment, Forest and Climate Change notified environmental laboratories for final selection process will be called for submission of technical and financial bids through Request for Proposals (RFPs)



**ELIGIBILITY/ PREQUALIFICATION CRITERIA OF SHORT LISTING EDUCATIONAL, RESEARCH INSTITUTION AND MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE NOTIFIED ENVIRONMENTAL LABORATORIES**

- Educational or research institute like IIT, NIT or CSIR laboratory or Ministry of Environment, Forest and Climate Change notified environmental laboratories or any other similar institutions.
- The institution must have similar type of experience in conducting Source Apportionment & Emission Inventory (SA & EI) or other such Air Pollution Control related and metrological studies.
- The institution should have capacity to undertake all type of measurement on atmospheric phenomena, Climate and weather monitoring facility survey of area, modeling studies and other related measurement towards execution of the project.
- The institutions should have qualified & experienced Environmental Engineers/ Meteorologists/ Atmospheric Experts, Surveyor etc. to conduct the field work as well as preparation of SA & EI. The educational qualification of functional experts, area of specialization and technical skill, experience and expertise in relevant field will be criteria for selection of institution.

**FORMAT FOR SUBMISSION OF EXPRESSION OF INTEREST (EOI) FOR SOURCE APPORTIONMENT AND EMISSION INVENTORY STUDY IN U.T. CHANDIGARH**

Name of the Educational/Research Institute/ Environmental Laboratory		:			
Year of Registration/Incorporation/Establishment of the Institute		:			
Address of communication		:			
Phone	Fax		E-mail	Website	
Core area of specialization ( <input type="checkbox"/> in appropriate box)		:			
			<input type="checkbox"/> Meteorological and tropical weather <input type="checkbox"/> Study Climatological studies <input type="checkbox"/> Source Apportionment and source profiling <input type="checkbox"/> Study Industrial Process Analysis <input type="checkbox"/> Emission Inventory Study <input type="checkbox"/> Analysis and evaluation of air pollution <input type="checkbox"/> Models Any other similar studies		
Key persons for above areas of specialization (Pls enclose separate sheets if space provided is inadequate)		:			
Name	Highest Educational qualification	Area of specialization	Experience	Year of association with the institute	
Project executed by the Institute on Source Apportionment, Emission Inventory, study (during last ten years) (Pls enclose separate sheets if space provided is inadequate)					
<b>Name of the project</b>	<b>Description of project</b>	<b>Name of the Client</b>	<b>Date of completion / or on-going</b>		
The Bio-data of the principal investigator of the above projects and research papers published in peer reviewed journals.					
Details of facility available to conduct such type of studies (please present brief description of offices, laboratory etc.)					
I hereby declare that the above information is true to the best of my knowledge and I am authorized by my firm to fill up and submit on its behalf.					
<b>Authorized Signatory</b>					