

Expression of Interest (EoI) for "Development of an Autonomous AI-Enabled Direct Airborne Dust Capture (DADC) System for Coal Mine Environments"

A. Introduction:

Central Mechanical Engineering Research Institute (CMERI), a constituent laboratory of the Council of Scientific & Industrial Research (CSIR), is proposing to undertake a system development project entitled “**Development of an Autonomous AI-Enabled Direct Airborne Dust Capture (DADC) System for Coal Mine Environments.**”

Under this project, an electromechanical system will be developed for the **Direct Airborne Dust Capture (DADC)** from open-cast mining environments. The electro-mechanical design, fabrication, assembly, and integration of the proposed system are intended to be carried out through a suitable **vendor/developer/fabricator located anywhere in India.**

The participating vendor/developer/fabricator should possess adequate expertise and experience in **electro-mechanical system development, fabrication, assembly, and/or allied areas** essential for the successful development and integration of the customized system.

Through this **Expression of Interest (EoI)**, CSIR-CMERI intends to identify technically competent and suitable vendors/developers/fabricators capable of undertaking the above-mentioned customized development of the **Autonomous AI-Enabled Electro-mechanical DADC System.**

Based on the technical evaluation of the responses received, only the technically suitable participants will subsequently be requested to submit their **budgetary offers** later on as and when required basis.

The EoI is therefore intended solely for the **identification and short listing of technically suitable vendors/developers/fabricators** for the proposed system development and does not constitute a commitment for award of work.

B. Eligibility

The **vendors/developers/fabricators** must have at least one year of experience in electro-mechanical and manufacturing works along with minimal electrical/electronic subsystems, assembly and integration.

C. Scope of Work:

C.1 CSIR-CMERI:

- Design and manufacturing drawings of the Direct Airborne Dust Capture (DADC) system
- List of bill of materials (BOM) along with specifications and source of components
- Handing over drawing, design concepts, schemes etc
- Supervision during development work
- Participation during assembly and integration of the system
- Field trials, demonstration, and testing

C.2 Vendor/Service Provider:

- Signing of a NDA to execute the time bound project activities as per the terms and conditions
- Manufacturing of all components as per drawings
- Procurement and supply of materials as per BOM and specifications
- Manufacturing/fabrication of the subsystem and modification, if any
- Assembly and Integration as per design/architecture of mechanical/electrical/electronic subsystems and full assembly of the system
- System integration, testing of system and modification if any
- Delivery of the system and installation at assigned coal mine site of ECL after validation of system in presence of CSIR-CMERI officials
- Participation in field trials, testing and demonstration, modification if any

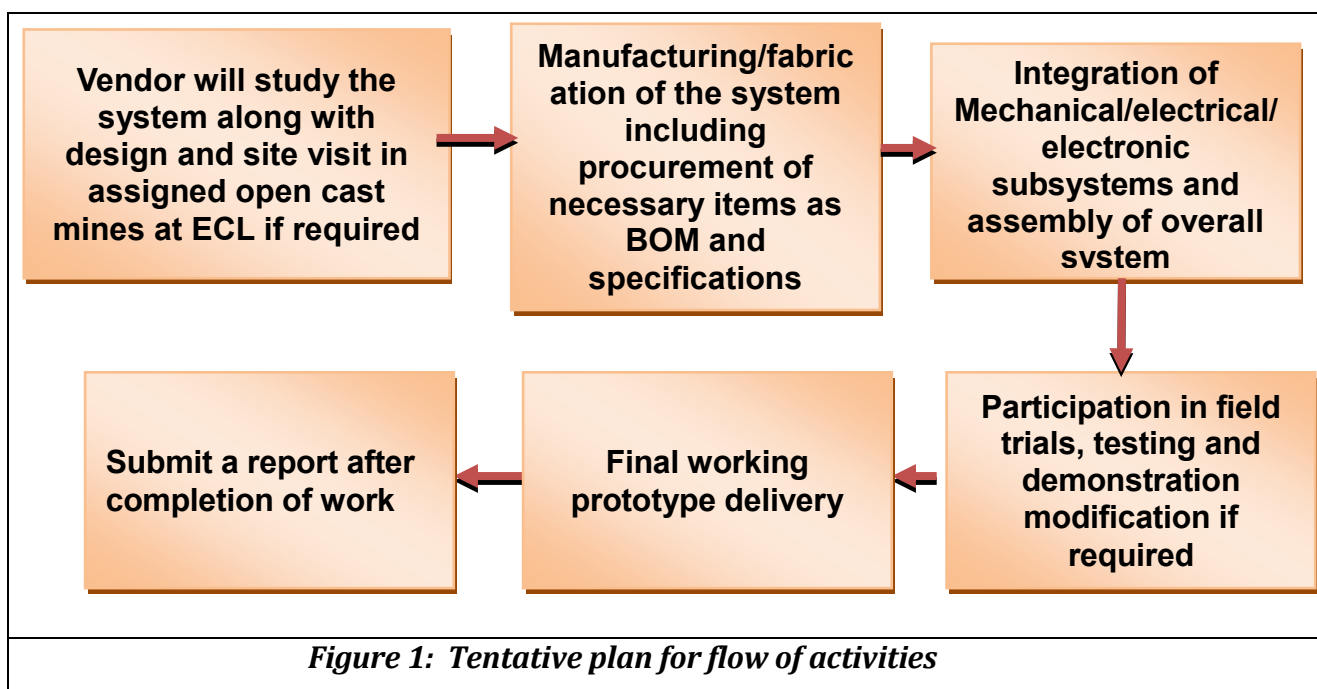
C.3 Details of Direct Airborne Dust Capture (DADC) system:

The Direct Airborne Dust Capture (DADC) System will be developed where the environmental data from integrated sensors, including PM2.5, PM10, temperature, humidity, wind speed and direction, gas concentration, and GPS modules, will be collected. The collected data are processed through an edge computing unit, where AI and machine learning algorithms perform sensor fusion, identify dust hotspots, and predict dust dispersion patterns. Based on the AI-generated decisions, the blower will be started. After reaching the threshold value, the intelligent dust

capture module is activated by employing a hybrid mechanism. This hybrid mechanism consists of electrostatic precipitation, cyclonic separation, high-efficiency particulate air (HEPA) filtration, and negative-pressure suction to efficiently remove suspended airborne dust particles. The cleaned air is then released back into the environment, while the captured dust is collected for safe disposal. During operation, the system continuously monitors its performance, which adjusts operating parameters according to changing environmental conditions. This closed-loop intelligent system provides autonomous operation, real-time decision-making, efficient airborne dust capture, low-cost maintenance, and continuous environmental monitoring.

- Upon receipt of fabrication work intimation (i) Vendor will study the system along with design and visit if required(ii) Manufacturing/fabrication of the system including procurement of necessary items which consists of ID fan driving assembly, Inlet duct mechanism, Air header, outlet duct, hand rail, bag (cage), pipelines arrangement with solenoids valves, dust blowers with hopper assembly, airborne dust collection and filtration mechanism along with support items etc. including modifications if required. (iii) Procurement and supply of materials as per BOM and specifications.(iv)Integration of Mechanical/electrical/electronic subsystems and assembly of overall system. (v) System integration, testing of system and modifications if any. (v) Delivery of the system and installation of system at assigned coal mine site of ECL after validation of system in presence of CSIR-CMERI officials. (vi) Participation in field trials, testing and demonstration, and modification if any. (vii) Final working prototype delivery (viii) Submit a report after completion of work.

C.4 Tentative plan for flow of activities:



C.5 Deliverables

- Final working prototype to be delivered at assigned ECL Coal mine site in West Bengal
- Submit a report after completion of the work.

D. Qualification Criteria

Each eligible **vendors/developers/fabricators** should possess all the following pre-qualification criteria. Responses not meeting the minimum pre-qualification criteria summarily will be rejected and will not be evaluated.

Sl. No.	<u>Pre-Qualification Criteria</u>	<u>Compliance Documents</u>
1.	The Firms/ Companies/ Societies/ Trusts etc could be any group of specialists/experts in the domain of mechanical fabrication/electronic/electrical integration, assembly integration.	Certificate of Registration of the Firm/ Companies/ Societies/ Trusts, Legal documents i.e. GST certificate, PAN certificate, whichever is/are applicable.

2.	The entity/ firm should be in the business of providing similar mechanical fabrication/electronic/electrical integration, assembly integration work for at least 01 years as on 01.08.2026.	Certificate by the Competent Authority/ Authorized Signatory of the participating entity, Copy of the previous work orders/ contracts.
3.	The entity/firm should not be blacklisted by any Central/ State body or Financial institution/ Bank.	Certificate/Declaration duly signed by the authorized signatory.
4.	The entity/firm should certify no part of the development work/support data generated during the job work will strictly not be shared/reproduced for any R & D or commercial activity	Certificate/Declaration duly signed by the authorized signatory.

E. Selection Criteria

CSIR-CMERI will assign scores to the response of each qualified firm based on weightage assigned to each of the criteria as under. CSIR-CMERI may request the shortlisted applicants for presentation before expert committee and qualifying marks are 60 out of 100 marks based on the evaluation of the submitted documents. All the applicants who have got the minimum threshold of marks as above will be qualified. Evaluation will be based on the supporting document submitted by the vendor.

Rated Criteria	Weightage (%)
Technical Design Capability, Qualifications including Team Competence	30
Experience in manufacturing and sales of similar/relevant products	30
Manufacturing and Testing Infrastructure related infrastructure	20
Experience of the Key Personnel	20
Overall	100

F. EOI Processing Fee: NIL

G. Venue & Timeline for Submission of Proposal.

Proposal in complete form in all respects as specified in the EOI, must be submitted to:

**The Head,
Business Development Unit (BDU),
CSIR-CMERI Durgapur,
M. G. Avenue, Durgapur-713209
e-mail: bdg.cmeri@csir.res.in
Phone: +91-9474546419**

The EoI shall be submitted to the following address on or before 5:00 PM of last date of submission during the working days and working hours through E- mail/courier. In exceptional circumstances and at its discretion, CSIR-CMERI may extend the timeline for submission of proposals by issuing amendment to be made available on the website of the institute. CSIR-CMERI reserves the right to modify partially or fully or cancel the EoI at any time without showing any reason. The decision of CSIR-CMERI in regard to any dispute will be final.

H. Last Date of Submission: 01st September, 2026

FORMATS FOR SUBMISSION

Annexure-1

APPLICANT'S EXPRESSION OF INTEREST

To,

The Head,
Business Development Unit (BDU),
CSIR-CMERI Durgapur,
M. G. Avenue, Durgapur-713209.

Date:

**Reg. Submission of Expression of Interest for electro-
mechanical fabricator/vendor in regard to "Development of an
Autonomous AI-Enabled Direct Airborne Dust Capture
(DADC) System for Coal Mine Environments"**

Dear Sir,

In response to the Invitation for Expression of Interest (EOI) published on _____ for the above purpose, we would like to express interest to carry out the above proposed task. As instructed, we have attached the following documents in a sealed envelope:

- i. Organizational Details:Annexure-2;
- ii. Experience in related fields:Annexure-3;
- iii. Experience of Key Personnel: Annexure-4
- iii. Financial strength of the organization/ firm/ entity: Annexure-5;
- iv. Additional Information, if applicable:Annexure-6;
- v. Declaration:Annexure-7.

Yours Truly,

Signature of the Applicant

(Full Name of the Applicant)

Stamp.

Encl. As above

Note: The application is to be submitted on the letterhead of the organization/firm/entity.

Annexure-2

<u>S. No.</u>	<u>Organizational Details</u>	
1.	Name of the Organization	
2.	Main areas of Business	
3.	Type of Organization: Company/partnership/LLP	
4.	Whether the entity/firm has been blacklisted by any Central Government/ State Government/ PSU / Bank/ Financial Institution/ others. If yes, details thereof.	
5.	Address of registered office with contact numbers and contact persons and email address/es	
6.	Address of Office/s in India	

Signature of the Applicant

(Full Name of the Applicant)

Stamp.

Enclosures:

- i) Copy of the Certificate of Incorporation
- ii) Copy of Articles & Memorandum of Association

Annexure-3

Experience in the Related Fields			
Overview of the past experience of the Organization in respects of similar area			
S. No.	Items	Particulars: Number of Assignments/ work- contracts handled for fabrication of similar kind of system/ completed at least during last 01 (one years), Order value of each assigned work contract, Mention the Name of the Customer/ Organization {Enclose copy of each order}	Remarks, if any
1.	Experience& details of work done for providing similar technical and business development consultancy services/ assignments		
2.	Other relevant experiences		
Decision of Evaluating Committee in ascertaining “similar nature” and “similar assignments” will be final. Signature of the Applicant (Full Name of the Applicant) Stamp & Date.			

Annexure-4

Experience of Key Personnel

Overview of the qualification and past experience of the key personnel

Name: _____

Designation: _____

Date of Birth: _____

Qualifications: _____

Experience _____

(Activities carried out in last 1 years)

Note: Information regarding more than one key personnel may be provided. They should be on the pay roll of the applicant. Separate sheet may be used for each individual. Each individual will be evaluated separately and then average of the all personnel will be taken for final evaluation.

Signature of the applicant

[Full name of applicant] Stamp & date

Annexure-5

<u>Financial Strength of the Organization</u>						
S. No.	<u>Financial Year</u>	<u>Whether Profitable; Yes/ No</u>	<u>Annual Net Profit</u> (Rs. in lacs)	<u>Overall Annual Turnover</u> (Rs. in lacs)	<u>Annual Turnover from similar work/Services</u> (Rs. in lacs)	<u>Annual Turnover from Other Sources/Service s/Business Segments</u> (Rs. in lacs)
1.	2025-26					
2.	2024-25					
3.	2023-24					
Note. Please enclose auditors' certificate/GST returns/IT files in support of your claim.						

Annexure-6

Additional Information

1. List all attachments related to the previous sections.

Sl.No.	Description	No. of pages (From-to)

2. Additional information to support the eligibility. (Not more than 2 pages).

Signature of the applicant

[Full name of applicant] Stamp & date

Note: Separate sheet may be used if necessary.

Annexure-7

<u>Declaration</u>
We here by confirm that we are interested to work with CSIR-CMERI as a vendor/electro-mechanical fabricator under all categories of scope of work and all the information provided herewith is genuine and accurate to the best of our knowledge. We also confirm that our firm has not been blacklisted or has any litigation or any conflict of interest that may impact on the delivery of the services. Authorized Person's Signature Name & Designation Date: Note: The declaration is to be furnished on the letter head of the organization.