Expression of Interest

Supply, installation and commissioning of an experimental IC engine test set-up for hydrogen-blended fuel

A. Introduction

CSIR-CMERI, a Constituent Laboratory of the Council of Scientific and Industrial Research (CSIR), is actively engaged in cutting-edge research and development in the field of energy and environmental technologies. In alignment with national priorities on clean energy transition and alternative fuels, the Institute intends to develop an experimental Internal Combustion (IC) engine test set-up capable of operating on hydrogen-blended fuel. The objective is to support advanced research and performance evaluation of hydrogen-based fuel systems as a sustainable and low-emission alternative to conventional fossil fuels.

To this end, CSIR-CMERI seeks to engage competent and experienced external entities/partners with expertise in IC engine testing, hydrogen fuel handling, and experimental set-up development. This activity will focus on fabricating, installing, and commissioning a state-of-the-art experimental test set-up that can accommodate various hydrogen blending ratios and enable performance analysis under controlled laboratory conditions.

This Expression of Interest (EOI) aims to identify the eligible parties who can offer technical competence, innovation capability, and hands-on experience for the successful execution of the project, which will be undertaken on a time-bound, project-specific basis.

B. Scope of Work

The scope of work under this Expression of Interest (EOI) includes, but is not limited to, the following activities:

a) Engineering and development of an experimental IC engine test set-up suitable for operation with hydrogen-blended fuel at varying blending ratios;

b) Selection and integration of a suitable IC engine, fuel supply system, hydrogen blending unit, safety systems, and instrumentation required for performance testing;

c) Fabrication, assembly, and installation of the complete test set-up, including necessary fixtures, piping, control systems, and safety enclosures at CSIR-CMERI;

d) Development and integration of a fuel delivery and blending system with precise control over hydrogen-natural gas ratios;

e) Incorporation of real-time data acquisition systems for monitoring engine parameters such as torque, RPM, emissions (NOx, CO, HC), air and fuel consumption, and thermal performance;
f) Conducting trial runs and demonstration of the system under various hydrogen blending ratios to validate operational readiness and performance;
g) Preparation and submission of technical documentation, including user manuals, standard operating procedures (SOPs), and test protocols;
h) Training of CSIR-CMERI personnel on system operation, safety procedures, and routine maintenance.

C. <u>Broad Technical Specifications</u>

The experimental IC engine test set-up is proposed to be developed around a single-cylinder, spark ignition (SI) engine suitable for operation with hydrogen-blended gaseous fuel mixtures. The following are the indicative, broad-level specifications for the engine and associated systems. The final specifications will be finalized in consultation with the shortlisted bidders during the detailed technical discussions.

- **Working Principle:** Four-stroke
- **Ignition Type:** Spark Plug Ignition (SI)
- **Type of Fuel:** Gaseous fuel mixture (e.g., hydrogen-natural gas blends)
- **Gross Rated Power:** Up to 10 hp (maximum)
- **Rated Speed:** 1500 RPM
- **Governing Class:** Electronic Governor
- **Cooling System:** Liquid cooled, engine-mounted radiator
- **Lubrication System:** Forced lubrication
- **Dynamometer Type:** Eddy-current type dynamometer for variable load testing
- **Measurement Capabilities:**
    - Air flow rate
    - Fuel flow rate
    - Torque
    - Engine speed (RPM)
    - Emissions (e.g., NOx, CO, HC)
- **Instrumentation:** Suitable sensors and data acquisition system for real-time monitoring and logging of performance parameters

- **Safety Features:** Basic hydrogen safety provisions including flame arrestors, gas leak detectors, and emergency shutdown systems (to be defined in detail during finalization of technical specification phase)
- **Mounting:** Engine should be skid-mounted or base-mounted on vibration-isolated test bed

These specifications are indicative and may be refined or optimized during the design and implementation phase in consultation with technically qualified parties.

D. Delivery Period

The complete scope of work, including fabrication, installation, commissioning, and successful demonstration of the IC engine test set-up as per the broad technical specifications, shall be completed within 180 (One Hundred Eighty) days from the date of issuance of the Purchase Order.

E. Payment Terms

100% payment shall be released in the following two stages:

(i) Eighty percent (80%) of the contract price of the goods dispatched, plus 100% of applicable taxes, shall be paid upon delivery and inspection of all ordered goods at site. The purchaser reserves the right to conduct a joint inspection with the supplier's representative to verify the delivered items. All charges related to such inspection shall be borne by the supplier.

(ii) The remaining twenty percent (20%) of the contract price of the goods received and accepted shall be paid within 30 days of successful commissioning and final acceptance, upon submission of a payment claim supported by an Acceptance Certificate issued by the purchaser, and submission of a Performance Security amounting to 3% of the Purchase Order value / contract price.

F. Qualification criteria

Each eligible bidder should meet all of the following qualification criteria. Responses not meeting the minimum qualification criteria will be rejected and will not be evaluated.

S. No.	Pre-Qualification Criteria	Supporting/Compliance Documents
1	Details of the Organization/Entity: Type of Organization and Primary Areas of Business. The applicant may be any legal entity such as a Proprietorship, Partnership, LLP, Private/Public Limited Company, or Government-registered R&D Institution/Start-up experienced in engineering,	Certificate of Incorporation/ Registration, GST Registration, PAN, or any other applicable legal document.

	fabrication, and system integration activities related to engine testing or hydrogen applications.	
2	Relevant Experience in Similar Projects: The bidder should have experience in development/fabrication /integration of engine test rigs or fuel system-based experimental set-ups involving gaseous/alternative fuels/hydrogen/CNG, with at least 1 completed project in the last 5 years (as on the date of publication of the bid).	Work Completion Certificate or Copy of Purchase Order/Work Order issued by client; certification by authorized signatory for successful completion of project. Refer Annexure-2.
3	Technical Capability and Key Personnel: The bidder should have in-house or associated technical personnel with qualifications and experience relevant to engine testing/hydrogen fuel handling/ instrumentation, and safety systems. The key personnel should be on payroll of the organization/entity.	CVs/Biodata of key personnel along with details of roles and responsibilities. Refer Annexure-3.
4	Financial Standing: The bidder should have an average annual turnover of at least ₹25 lakhs during the last 3 financial years.	Audited financial statements or CA-certified turnover certificate. Refer Annexure-4.
5	Declaration of Non-Blacklisting: The entity should not be blacklisted or debarred by any government department, public sector unit, or financial institution at the time of submission.	Self-declaration certificate signed by the authorized signatory. Refer Annexure-5.

G. EOI Processing Fee: NIL

H. Venue & Timeline for Submission of Proposal

The Expression of Interest (EOI), complete in all respects as specified in this document, must be submitted only through the Central Public Procurement (CPP) Portal at:

☞ https://etenders.gov.in/eprocure/app

Interested parties are advised to regularly visit the portal for updates, clarifications, corrigenda, and detailed submission instructions. The Institute will not be responsible for any delays or technical issues in submission.

In exceptional circumstances and at its discretion, CSIR-CMERI may extend the timeline for submission of proposals by issuing an amendment on the CPP portal and/or the institute's website.

I. Last Date of Submission

The last date and time for submission of the proposal shall be as per the deadline specified in the EoI document available on the CPP Portal. Bidders are requested to refer to the portal for accurate and updated information regarding submission timelines.

FORMATS FOR SUBMISSION

Annexure - 1

APPLICANT'S EXPRESSSION OF INTEREST

To,

The Director **Date:**

CSIR-Central Mechanical Engineering Research Institute

Mahatma Gandhi Avenue, Durgapur-713209, West Bengal

Subject: Submission of Expression of Interest for the supply, installation and commissioning of an experimental IC engine test set-up for hydrogen-blended fuel

Dear Sir,

In response to the Invitation for Expression of Interest (EOI) published on _____for the above-mentioned purpose, we hereby submit our expression of interest to undertake the proposed task. As instructed, we are submitting the following documents as part of our application:

i. Details of the Organization – Annexure 2

ii. Experience in Related Fields – Annexure 3

iii. Experience of Key Personnel – Annexure 4

iv. Financial Strength of the Organization/Firm – Annexure 5

v. Additional Information, if applicable – Annexure 6

vi. Declaration - Annexure-7

We look forward to the opportunity to contribute to this important initiative.

Yours faithfully,

(Signature of the Applicant)

Name: {Full Name of the Applicant}

Designation:

Stamp/Seal of the Organization:

Encl.: As above

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

Annexure – 2

Details of the Organization/Entity

S. No.	Particulars	
1.	Name of the Organization / Firm / Entity	
2.	Core Areas of Business / Relevant Experience (especially in engineering systems, engine testing, hydrogen fuel applications, or similar domains)	
3.	Type of Entity (Company / Partnership / LLP / Proprietorship / Government Institution / Others – please specify)	
4.	Has the organization / entity ever been blacklisted or debarred by any Central / State Government, Public Sector Undertaking, Financial Institution, or other agency? If yes, please provide details.	
5.	Registered Office Address with contact number(s), name(s) of contact person(s), and email ID(s)	

Signature of the Applicant

{Full Name of the Applicant}

Designation:

Stamp / Seal of the Organization

Enclosures:

i) Copy of Certificate of Incorporation / Registration

ii) Copy of Memorandum and Articles of Association / Partnership Deed / Equivalent document

Annexure -3

Experience in the Related Fields			
Overview of the past experience of the Organization in respects of similar experimental IC engine test set-up			
S. No.	**Items**	**Particulars: Number of Assignments handled/completed during last 05 (five) years, Purchase Order for each assigned work, Mention the Name of the Customer/ Organization** {Enclose copy of each order}	**Remarks, if any**
1.	Experience & details of work done for providing similar experimental IC engine test set-up		
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 5 years) **Note:** Information regarding more than one key personnel may be provided. They should be on the payroll 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

Financial Strength of the Organization				
S. No.	**Financial Year**	**Whether Profitable (Yes/No)**	**Annual Net Profit (Rs. in lacs)**	**Annual Turnover (Rs. in lacs)**
1	2023-24			
2	2022-23			
3	2021-22			
Note: Please enclose auditors' certificate in support of your claim.				

Annexure -6

Additional Information

1. List all attachments related to the previous sections.

S. 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

Declaration
We hereby confirm that we are interested to work with CSIR-CMERI 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.