



**Request for Proposal  
Pilot Projects for use of Green Hydrogen  
in the Transport Sector - Phase II**

**by**

**Scheme Implementation Agency (SIA)  
The Automotive Research Association of India (ARAI)**



**30<sup>th</sup> September 2025**

## **1. Introduction and Background:**

- 1.1 The National Green Hydrogen Mission, hereafter mentioned as 'Mission', was launched on 4<sup>th</sup> January 2023 with an outlay of Rs. 19,744 Crore with an aim to make India a Global Hub for production, usage and export of Green Hydrogen (GH<sub>2</sub>) and its derivatives. It will contribute to India's goal to become Aatmanirbhar (self-reliant) through clean energy and serve as an inspiration for the global Clean Energy Transition. The Mission will lead to significant decarbonization of the economy, reduced dependence on fossil fuel imports, and enable India to assume technology and market leadership in GH<sub>2</sub>. Under the Mission, along with other initiatives, the Ministry of New & Renewable Energy (MNRE) proposes to implement pilot projects for replacing fossil fuels and fossil fuel-based feedstock with GH<sub>2</sub> and its derivatives. Pilot projects will help to identify operational issues and gaps in terms of current technology readiness, regulations, implementation methodologies, infrastructure and supply chains.
- 1.2 Transportation is one of the potential sectors where Green Hydrogen can replace fossil fuels. With the falling costs of renewable energy and electrolyzers, it is expected that Green-Hydrogen based vehicles can become cost-competitive over the next few years. Future economies of scale and rapid technological advancements in the field of hydrogen-powered vehicles are likely to further enhance the viability of Green hydrogen-based mobility. To assess the potential for the use of Green Hydrogen in the transportation sector, the Mission supports the setting up of pilot projects in the transport sector. MNRE has issued scheme guidelines for the pilot projects under which the Ministry of Road Transport and Highways (MoRTH) and the Scheme Implementing Agencies (SIAs) will be monitoring and implementing agencies for the trials.

## **2. Pilot Projects in Transport Sector**

- 2.1 Under the Mission document, Para 7.7.2 states that considering Hydrogen's advantages for heavy-duty, long-haul vehicles, certain routes would be designated as Hydrogen Highways. The necessary Green Hydrogen production projects, distribution infrastructure and refueling stations will be built along such highways. This will enable Hydrogen fueled inter-state buses and commercial vehicles to ply on such routes.
- 2.2 The Mission proposes to support deployment of Hydrogen-powered buses, and trucks in a phased manner on pilot basis. Financial assistance will be provided to close the viability gap due to the relatively higher capital cost of hydrogen-powered vehicles in the initial years. The learnings from the pilot projects will help inter-city bus and truck operators (including State Transport Undertakings), and private car users in gaining experience with the deployment and usage of Hydrogen powered vehicles and refueling technologies.

## **3. Vehicles applicable to the scheme**

To leverage the hydrogen infrastructure set up for pilot projects to study the feasibility of hydrogen-powered vehicles in different vehicle segments. The scope of the pilot vehicles limited to gross vehicle weight greater than 3.5 tons (LDVs, MDVs & HDVs - buses, trucks and any other vehicles) and Construction Equipment Vehicles.

#### **4. Objectives of the scheme**

- 4.1 To support the deployment of Green Hydrogen as fuel in gross vehicle weight above 3.5 tones (LDVs, MDVs & HDVs - buses, trucks and any other vehicles), Construction Equipment Vehicles in a phased manner on a pilot basis.
- 4.2 To validate the technical feasibility and performance of hydrogen vehicles under real-world operational conditions.
- 4.3 To evaluate the economic viability of hydrogen-based vehicles.
- 4.4 To assess the performance, and effectiveness of hydrogen refueling station.
- 4.5 To evaluate the performance of hydrogen-based vehicles and identify the areas for improvement.
- 4.6 To demonstrate safe and secure operations of hydrogen-based vehicles and hydrogen refueling stations.

#### **5 Rationale and Salient Features**

- 5.1 The Pilot projects will help identify operational issues and gaps in terms of current technology readiness, regulations, implementation methodologies, infrastructure, and supply chains. These will serve as valuable inputs for future scaling and commercial deployment of Green Hydrogen in the transport sector.
- 5.2 The use of Green Hydrogen in the transport sector via the proposed pilot projects will lead to the development of necessary infrastructure, including the refueling facilities and distribution infrastructure, resulting in the establishment of a Green Hydrogen ecosystem in the transport sector. With the expected reduction in the Green Hydrogen production cost over the years, the utilization in the transport sector is expected to increase.
- 5.3 Further, the learnings from the pilot projects will help operators of vehicles limited to gross vehicle weight greater than 3.5 tons (LDVs, MDVs & HDVs - buses, trucks and any other vehicles) and Construction Equipment Vehicles to gain experience with the deployment and usage of Hydrogen fuel cell vehicles and refueling technologies in Indian conditions.
- 5.4 Salient features of the Scheme are as follows: -
  - 5.4.1 MNRE has issued administrative sanctions for the projects under the '**Scheme Guidelines for Pilot Projects on use of Green Hydrogen in the Transport Sector**' based on recommendations of the Project Appraisal Committee (PAC).
  - 5.4.2 The Scheme aims to leverage existing resources and infrastructure available with MoRTH and its agencies for transport, storage and use of GH2 and its derivatives in the transport sector.
  - 5.4.3 The scheme will provide financial assistance to close the viability gap due to the relatively higher capital cost of hydrogen-powered vehicles in the pilot projects. The expenses on account of hydrogen production, land, operational and maintenance expenses, etc., will not be funded under this scheme. However, capital expenditure for setting up/transport of GH2 may be permitted if it is directly related to the project.
  - 5.4.4 The applicant for the pilot projects through this proposal shall be referred to as the 'bidder', which shall act as the Executing Agency (referred as EA) after its successful selection.

## **6 Scope of Work**

- 6.1 Development/ Selection/ Validation of commercially viable technologies for the utilization of hydrogen in the transport sector through:
  - 6.1.1 Use of Green Hydrogen as fuel in vehicles limited to gross vehicle weight greater than 3.5 tons (LDVs, MDVs & HDVs - buses, trucks, and any other vehicles) and Construction Equipment Vehicles.
  - 6.1.2 Supporting infrastructure like Hydrogen refueling stations.
- 6.2 The Hydrogen-powered vehicles to be used for the pilot projects undergo safety and layout checks from a designated testing agency (under rule 126 of CMVR) before the commencement of the trials.
- 6.3 The Hydrogen-powered vehicles shall run on the selected routes for a period of 24 months and cover a total mileage of a minimum of 60,000 Km or 6000 hrs\*.
- 6.4 The Hydrogen-powered vehicles to be carried out with the performance, emissions, and on-road safety assessment during the trials under SIA monitoring.
- 6.5 Submit the findings and Detailed Project Report (DPR) on its completion containing the necessary details as indicated in clause 15.
- 6.6 The Hydrogen Infrastructure used for the pilot projects shall be evaluated for its functioning and safety assessment by the concerned Testing Agency.
- 6.7 The technical requirements like route flexibility, emission, and safety layout checks before field trials may be assessed by ARAI (SIA), and vehicle decisions can be made based on the assessment. Declaration from the bidders to be sought for completion of certification within the given time period.

\*Note: 6000 operating hours applicable to off-road vehicles only.

## **7 Methodology for the trials**

### **7.1 Eligible Entities**

- 7.1.1 The eligible entities to submit proposal would include CPSUs, State-PSUs, Private sector, State corporations, JVs/Partnerships, startups, logistics operators, and Indian R&D institutions/Research labs/Academic institutions, indigenous equipment design & manufacturing companies of such entities with requisite experience in the relevant field.
- 7.1.2 The necessary capabilities need to exist with the Executing Agency (EA) for taking forward the completed pilot projects towards commercialization.
- 7.1.3 Each submitted project bid should contain the name of Executing Agency (EA). In case of consortium, a lead agency should be identified, which should function as Executing Agency. A consortium agreement outlines the roles and responsibilities that should be submitted along with the bid.
- 7.1.4 The bidder shall submit the bid for the pilot projects as given in Annexure - C of this document.
- 7.1.5 The bidder shall nominate the Lead Executor and submit the details of consortium partners as per Annexure-C.

- 7.1.6 Bids with incomplete information will be rejected.
- 7.1.7 The submitted bids will be screened by the Project Appraisal Committee (PAC) in consultation with SIA. Successful bidder(s) shall be selected through a competitive and transparent process.
- 7.1.8 SIA will issue the LOI specifying the financial terms and declarations. Upon receipt of unconditional acceptance of LOI, SIA will issue the Letter of Award (LOA) to the EA upon receipt of administrative sanction from MNRE.
- 7.1.9 SIA reserves the right to cancel and amend all or any proposal response, without assigning any reason whatsoever.
- 7.1.10 Only assets (example: Vehicle, HRS, etc.) procured after LOA will be considered for funding. Import duties, GST, Cess and any other taxes will not be paid / reimbursed.
- 7.2 **Selection of Routes / Application:** The proposals are invited from the eligible bidders for the proposed following routes.
- 7.2.1 Central region of India
- 7.2.2 North - East Region
- 7.2.3 Leh - Ladakh Region
- 7.2.4 Any other route of at least 200 km long proposed by the bidder (PAC will take a decision on any other routes proposed based on the terrain, region, distance of route, etc.)
- 7.2.5 Route sanctioned in Phase I may be avoided.
- 7.2.6 Hydrogen Corridor may propose (example: DMIC)
- 7.2.7 Route suggested (examples: Indore-Bhopal, Delhi-Chandigarh, Delhi-Jaipur, Amritsar-Chandigarh, Jaipur-Jodhpur, Jodhpur-Jaisalmer, Jaipur-Udaipur-Jodhpur, Gangtok to Darjeeling, Chennai to Pondicherry, Chennai-Bengaluru, Shillong to Cherrapunji, Bengaluru to Ooty, Mumbai -Bengaluru, Mumbai - Hyderabad, any tourist corridors, etc.
- Extension to below Phase-I routes also considered under Phase-II scheme:
- a. Jamshedpur - Kalinga Nagar
  - b. Ahmedabad - Vadodara - Surat
  - c. Sahibabad - Faridabad - Delhi
  - d. Pune - Mumbai
  - e. Jamnagar - Ahmedabad
  - f. Greater Noida - Delhi - Agra
  - g. Bhubaneshwar - Konark - Puri
  - h. Thiruvananthapuram - Kochi
  - i. Kochi - Edappal
  - j. NH16 Visakhapatnam - Bayyavaram

**Note:** Maximum 3-numbers of any vehicle category per route shall be permitted.

- 7.2.8 In case of Construction Equipment Vehicles (CEVs), routes may be considered based on availability of infrastructure for the trials. SIA will make an appropriate decision after discussions with EAs.

### **7.3 Execution and Commissioning**

- 7.3.1 The EA shall Provide Hydrogen vehicle(s) of the mentioned technologies and category as per Clause 14 (Technical/ Regulatory Requirements) of this document
- 7.3.2 The EA shall carry out the performance, efficiency, and safety assessment of vehicles used for the trials with the designated Testing Agency (Testing Agency mentioned under Rule 126 of CMVR 1989, appointed by MoRTH).
- 7.3.3 The EA shall set up the required Hydrogen Infrastructure at the selected routes of trials.
- 7.3.4 The EA shall carry out the performance, efficiency, and safety assessment of the Hydrogen Infrastructure setup used for the trials with the concerned Testing Agency.
- 7.3.5 The EA shall conduct trial according to Clause 15 (Trial Details) of this document.
- 7.3.6 The EA shall provide the periodic reports to SIA.
- 7.3.7 The EA shall be solely responsible for obtaining the safety, environmental and other approvals as required.
- 7.3.8 The EA shall work as per the scope of work mentioned and the deadline to expedite and complete the pilot project, in all aspects, is within 24 months of the letter of award.
- 7.3.9 The Designated Testing Agency mentioned under rule 126 of CMVR 1989 shall undertake periodic tests/reviews to verify the findings of the trials.
- 7.3.10 The EA shall adhere to the terms and conditions mentioned in the Annexure “E”. A separate project agreement (MoU) shall be signed with the successful bidder prior to release of advance.
- 7.3.11 The bidding consortium should include an OEM, hydrogen fuel supplier & distributor and other partners as required.
  - The Executing Agency will identify the Lead Person executing the project, herein, referred as “Lead Executer” and the consortium partners will identify their nodal persons, herein, referred as “Collaborator(s)”.
  - Each submitted project bid should contain the name of Executing Agency (EA). In case of consortium, a lead agency should be identified, which shall function as Executing Agency. A consortium agreement outline roles and responsibilities should be submitted along with the bid.
  - The bidder shall nominate the Lead Executor and submit the details of consortium partners as per Annexure-C & shall follow the guidelines as per Annexure - E of this document.
  - A certified true copy of the incorporation certificate of the Bidding Company. Details of consortium formed, if applicable, may be furnished.

## **8 Financial Support and Funding and Disbursement for Project Implementation**

### **Financial Support under MNRE Scheme Guidelines**

- 8.1 A Central Financial Assistance of Rs. 496 Crores has been provided for the Pilot projects under this scheme till the Financial Year 2025-26.

8.2 The scheme will provide financial assistance to close the viability gap due to the relatively higher capital cost of hydrogen powered vehicles in the pilot projects. The cap on viability gap funding will be finalized at the time of bid approval. Expenses on account of hydrogen production, land, operations and maintenance cost, etc. will not be funded under this scheme.

### **Funding and Disbursement**

8.3 Funds will be released to SIA by MNRE on the recommendation of the Project Appraisal Committee. SIA shall release the funds to the Executing Agency on submission of satisfactory periodic reports and achievement of milestones.

8.4 Milestone-wise disbursement of Central Financial Assistance (CFA) will be given on the basis of Viability Gap funding (VGF) is given below:

| Expense Head    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                  |                        |                                  |   |                    |     |   |                               |     |   |               |     |  |              |             |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------|----------------------------------|---|--------------------|-----|---|-------------------------------|-----|---|---------------|-----|--|--------------|-------------|
| Capital Expense | <ul style="list-style-type: none"><li>• <b>Vehicles</b> - Bidders are required to submit the capital cost difference of hydrogen-powered vehicles (both FCV and H2ICE) to be used for the trial with<ul style="list-style-type: none"><li>- diesel-powered vehicles of similar capacity where gross vehicle weight &gt; 3.5 tons (LDVs, MDVs &amp; HDVs - buses, trucks and any other vehicles.) and Construction Equipment Vehicles.</li></ul></li><li>• <b>Infrastructure</b> - Bidders are required to submit the capital cost difference of hydrogen Infrastructure with conventional (diesel and gasoline) refueling Infrastructure of similar capacity</li><li>• Stages of disbursement of Central Financial Assistance (CFA) is as follows:<table><tr><th>SN.</th><th>Stages of Disbursement</th><th>Percentage of CFA to be released</th></tr><tr><td>1</td><td>On issuance of LOA</td><td>20%</td></tr><tr><td>2</td><td>Milestone based disbursement*</td><td>70%</td></tr><tr><td>3</td><td>On completion</td><td>10%</td></tr><tr><td></td><td><b>Total</b></td><td><b>100%</b></td></tr></table></li></ul> <p>* The milestones for disbursement of funds are as follows:</p> <ul style="list-style-type: none"><li>- 18% of the amount on completion of Milestone 1<br/><br/>Milestone 1 - sixth month of trial and covered mileage of more than 15,000 km or 1500 hrs.</li><li>- 18% of the amount on completion of Milestone 2<br/><br/>Milestone 2 - twelfth month of trial and covered mileage of more than 30,000 km or 3000 hrs.</li><li>- 18% of the amount on completion of Milestone 3<br/><br/>Milestone 3 - eighteenth month of trial and covered mileage of more</li></ul> | SN.                              | Stages of Disbursement | Percentage of CFA to be released | 1 | On issuance of LOA | 20% | 2 | Milestone based disbursement* | 70% | 3 | On completion | 10% |  | <b>Total</b> | <b>100%</b> |
| SN.             | Stages of Disbursement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Percentage of CFA to be released |                        |                                  |   |                    |     |   |                               |     |   |               |     |  |              |             |
| 1               | On issuance of LOA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20%                              |                        |                                  |   |                    |     |   |                               |     |   |               |     |  |              |             |
| 2               | Milestone based disbursement*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 70%                              |                        |                                  |   |                    |     |   |                               |     |   |               |     |  |              |             |
| 3               | On completion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 10%                              |                        |                                  |   |                    |     |   |                               |     |   |               |     |  |              |             |
|                 | <b>Total</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>100%</b>                      |                        |                                  |   |                    |     |   |                               |     |   |               |     |  |              |             |

| Expense Head       | Description                                                                                                                                                                                                                                                                                                                                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <p>than 45000 km or 4500 hrs.</p> <p>– 16% of the amount on completion of Milestone 4</p> <p>Milestone 4 - twenty-fourth month of trial and covered mileage of more than 60000 km or for construction equipment vehicles 6000 hrs.</p> <p>The milestone completion is to be accommodated by periodic reports indicating clear proof of milestone achievements.</p> |
| All other expenses | • To be borne by the Executing Agency                                                                                                                                                                                                                                                                                                                              |

Final consists 10 % shall be made on completion of the trial and submission of final report (DPR) consisting of all the findings of the field trials.

9 **Indicative Timelines for Pilot projects:** A total period of 24 months from the date of issuance of LOA.

**Key Timelines is as under:**

| Sr. No | Description                     | Timeline                                                                                                              |
|--------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| 9.1    | Release of Call for Proposals   | 30 <sup>th</sup> September 2025                                                                                       |
| 9.2    | Scrutiny of Bids & Finalization | <del>15<sup>th</sup> November 2025</del><br><del>10<sup>th</sup> December 2025</del><br>10 <sup>th</sup> January 2026 |
| 9.3    | Commencement of Project         | <del>Feb 2026</del> <b>March 2026</b>                                                                                 |
| 9.4    | Milestone Reviews               | Within 15 days of milestones completion                                                                               |
| 9.5    | End of the trial                | <del>Dec 2027</del> <b>March 2028</b>                                                                                 |
| 9.6    | Submission of the final report  | <del>Feb 2028</del> <b>March 2028</b>                                                                                 |

## 10 **Penalty Provisions**

- 10.1 The grants released shall be exclusively earmarked for the project and should not be diverted for any other purpose.
- 10.2 If an EA fails to utilize the grant for the purpose for which it has been sanctioned or fails to complete the project as per Detailed Project Report (DPR), it shall refund the entire amount of the grant, with interest as per GFR to MNRE.
- 10.3 Extension of up to six months may be granted for completion of the project on the basis of adequate justification, with the approval of the Steering Committee, without any penalty. Any extension beyond six months shall only be granted with the approval of the Hon'ble Minister for New and Renewable Energy, with suitable penalties which shall be specified by SIA in consultation with the ministry. Penalty will be levied based on the delay in timeline in proportion to funding allocation.
- 10.4 MNRE reserves the right to retract sanction or cancel or short-close projects in consultation with the Steering Committee in cases where the EA(s) or the project(s) face unreasonable delays or fail to comply with the objectives/ provisions of this Scheme or the Mission.

## **11 Monitoring framework**

### **11.1 Steering Committee**

- 11.1.1 Overall monitoring of the scheme and projects undertaken will be carried out by a Steering Committee (SC) under the co-chairmanship of Secretary, MoRTH and Secretary, Ministry of New and Renewable Energy (MNRE). The Steering Committee shall be responsible for the overall monitoring and implementation of this scheme and suggest modifications and course corrections for its successful implementation.
- 11.1.2 In case of any ambiguity in the interpretation of any of the provisions of this proposal, the decision of MNRE shall be final. The SC will also facilitate/ recommend measures to resolve difficulties, if any.

### **11.2 Project Appraisal Committee:**

A Project Appraisal Committee (PAC) under the chairpersonship of Additional Secretary/Joint Secretary, MoRTH, with Mission Director, National Green Hydrogen Mission (NGHM) as a member and expert members nominated by MoRTH shall monitor/review/evaluate the project proposals and recommend projects for sanction of CFA. The PAC shall monitor sanctioned projects on a quarterly basis for the allocation of funds based upon the progress of the project. The PAC shall send the recommendation to MNRE for the release of Central Financial Assistance through MoRTH.

### **11.3 Scheme Implementing Agency (SIA)**

- 11.3.1 The SIAs shall define a field data monitoring mechanism to track the progress of pilot projects with Quarterly monitoring reports to MoRTH and MNRE through PAC.
- 11.3.2 SIA shall provide the performance and safety monitoring parameters list to EA. EAs shall make provisions to acquire the necessary measurement of Engine / Fuel Cell / vehicle level parameters, etc. after discussions with SIA
- 11.3.3 SIA can recommend any additional parameters other than Annexure B and EAs shall make provision for the same upon feasibility or mutual understanding.
- 11.3.4 EA shall submit the invoices along with the statement of expenditure which duly certified by Statutory Auditor / Internal Auditor appointed by EA, compliance with the project milestones and other applicable conditions mentioned in RFP.

## **12 Guidelines for safeguard of Intellectual property as per MNRE Scheme Guidelines:**

- 12.1 The EA shall maintain confidentiality of the outcomes of trials at all stages and proprietary information that is disclosed to the EA or that the EA otherwise learns during the course or as the direct or indirect result from time-to-time trials.
- 12.2 Confidential Information here will include all the test results, periodic checks, technical and financial information, exchange of information or queries on mail or hardcopies, and incident reports that are designed, authored, created, distributed, or produced during the term of trials.
- 12.3 Bidder should have 'Ownership' or 'Right to use' the system and should declare the same and indemnify the officials according to permissions for the trial against any liability arising out of loss of life, property during trials.

### **13 Power to amend guidelines as per MNRE Scheme Guidelines:**

MNRE may make the necessary amendments in the Scheme Guidelines, as and when required, with the approval of the Minister for New & Renewable Energy.

### **14 Technical/Regulatory Requirements:**

| Cl.No | Details                                                                                                                                                                                                                                                                    |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14.1  | The EA shall provide Hydrogen Fuel Cell / H <sub>2</sub> -Internal Combustion Engine vehicle(s) of all categories of vehicles as defined in CMVR, 1989:                                                                                                                    |
| 14.2  | The onboard storage system to be used in the vehicles shall be PESO approved Type 3 / Type 4 cylinders with a minimum of 350 bar of storage pressure.                                                                                                                      |
| 14.3  | The bidder shall provide the technical specifications of Hydrogen Fuel Cell Vehicles (FCV) and Hydrogen Internal Combustion Engine Vehicles (H <sub>2</sub> -ICE) as specified in AIS 157/157A and AIS 195/195A, respectively.                                             |
| 14.4  | The EA shall carry out the component level certification of the Hydrogen Fuel Cell Vehicle (FCV) and the Hydrogen Internal Combustion Engine Vehicle (H <sub>2</sub> -ICE) as specified in 157/157A and AIS 195/195A, respectively, before the commencement of the trials. |
| 14.5  | The vehicle(s) to be tested with dummy loads with different percentage of loads for trials in consultation with SIA.                                                                                                                                                       |

The additional details of the technical requirements of the vehicle shall be as per format specified in Annexure A. If some vehicle details are not available at the time of submission, the same may be submitted during the evaluation of the proposal.

### **15 Trial Details:**

| Cl.No | Details                                                                                                                                                                                                                                                                                                          |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 15.1  | The EA shall prepare an execution plan and monitoring mechanism to ensure the timely completion of the projects. The same shall be informed to SIA to plan monitoring activities.                                                                                                                                |
| 15.2  | Prior to the commencement of the trials, vehicle safety and layout checks shall be undertaken by the designated testing agency in accordance with the provisions of AIS.                                                                                                                                         |
| 15.3  | The technical requirements like route flexibility, emission, and safety layout checks during the field trials will be assessed by SIA (ARAI), and vehicle decisions can be made based on the assessment. Declaration from the bidders to be sought for completion of certification within the given time period. |
| 15.4  | The duration of the trials shall be of 24 months, covering a total mileage min.                                                                                                                                                                                                                                  |

|       |                                                                                                                                                                                                                         |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       | 60,000 km or 6000 hrs for construction vehicles.                                                                                                                                                                        |
| 15.5  | The EA shall be solely responsible for the transportation, operations and maintenance of the vehicles during the trials.                                                                                                |
| 15.6  | The EA shall arrange the manpower with requisite experience required to operate the vehicle.                                                                                                                            |
| 15.7  | Speed of the vehicle during the trials shall be maintained as per SO 1552 dated 06.04.2018 of this Ministry and the orders issued by states/UTs in this regard from time to time.                                       |
| 15.8  | The Hydrogen fuel specification to be used for the trials shall be according to Annexure IV-W of CMVR, Rule 115(18).                                                                                                    |
| 15.9  | The EA shall process the necessary documentation like a trade certificate, vehicular details, etc. before plying on the public road.                                                                                    |
| 15.10 | The vehicle drivers used for the trials must have a required vehicle category license.                                                                                                                                  |
| 15.11 | The vehicle(s) under trial shall be fitted with a Vehicle Location Tracking System. Telematics shall be provided for remote data acquisition. The pilot vehicles shall be loaded with dummy loads for all field trials. |
| 15.12 | The SIA will provide a list of parameters to be monitored during the field trials and data sharing mechanism for analysis.                                                                                              |

## **16 Periodic assessments of the vehicle and report submission:**

- 16.1 The EA shall carry out the periodic assessment of the vehicles under trial as per the list of monitoring parameters given in Annexure B and report any unusual findings at aggregate/ component to the SIA.
- 16.2 EA shall share the field data with SIA. Frequency and mechanism of data sharing can be mutually discussed and agreed.
- 16.3 The SIA along with the EA shall carry out the verification of the trial reports at least once every month.
- 16.4 The EA shall prepare the quarterly monitoring report and submit it to SIA. The SIA shall promptly notify the EA of any unusual findings within those reports and advise on the necessary actions to be taken.
- 16.5 The SIA, based on the report submitted by the EA, will submit the knowledge and outcome of the pilot projects through monitoring reports to PAC.
- 16.6 **Project Completion:** The EA shall submit the DPR to SIA within 1 month from the completion of the project, which shall, among other details, include the following:
  - 16.6.1 Technical aspects of the project, including the hardware, software, and other technologies used.

- 16.6.2 Technical challenges encountered during the project, and how they were overcome.
- 16.6.3 Outcome of the project comprising of technical knowhow generated along with the data collected during the execution of the project
- 16.6.4 Performance/behavior of the vehicle under different terrains and weather conditions
- 16.6.5 Costs encountered for the pilot project and comparisons with the conventional technology to find the total cost of ownership of hydrogen-powered vehicles.
- 16.6.6 Recommendations for future projects based on the lessons learned from the project.
- 16.6.7 Regulatory gaps.
- 16.6.8 Infrastructure and supply chain issues, if any.

## 17 Bid Submission Guidelines

The complete proposal bid as per the specified format in Annexure - C should be submitted on or before ~~31<sup>st</sup> October 2025~~ 17<sup>th</sup> November 2025 2<sup>nd</sup> December 2025 (before 17:00 hr) to the Authorised Signatory:

|                  |                                                                                            |
|------------------|--------------------------------------------------------------------------------------------|
| Name             | Dr. Reji Mathai                                                                            |
| Designation      | Director                                                                                   |
| Email ID         | director@araiindia.com                                                                     |
| Organisation     | Automotive Research Association of India (ARAI)                                            |
| Official Address | Survey No.102, Vetel Hill, off, Paud Rd, Rambaug Colony, Kothrud, Pune, Maharashtra 411038 |

## 18 Bid Scrutiny Procedure

The bid scrutiny will be done by the Scheme Implementing agency (SIA) and will be submitted to Project Appraisal committee for approval. The scrutiny will be done in two stages viz. Technical and Financial

- 18.1 The technical scrutiny will be done on the basis of the technical parameters listed in the vehicle technical chart listed in Annexure D. The bidders qualifying successfully in the technical bid will be eligible for further financial scrutiny and remaining bidders will be disqualified.
- 18.2 The PAC will approve the funding for bidders successful in financial scrutiny.
- 18.3 QCBS methodology may be used for financial scrutiny. The weightage of technical to financial parameters will be 60:40 to arrive at final rating for approval
- 18.4 EA may promote the use of GH2 in the pilot project trial.
- 18.5 After selection of EAs, LOI will be issued by SIA. Once acceptance of LOI received from EAs, LOA will be issued upon administrative sanction from MNRE.
- 18.6 Any project-related expenditure such as vehicle, components, HRS, etc. will be considered only after date of LOA.
- 18.7 Selected EAs under this scheme shall submit the Performance Bank Guarantee (PBG)/ Insurance Guarantee (IG) for the release of 1<sup>st</sup> instalment only.

**Annexure-A**

| Technical Specification of Vehicle |                                                      |       |
|------------------------------------|------------------------------------------------------|-------|
| Sr. No.                            | Item                                                 | Input |
| 1.                                 | <b>General Description of the vehicle</b>            |       |
| i.                                 | Name of the Manufacturer                             |       |
| ii.                                | Vehicle Model Name                                   |       |
| iii.                               | Vehicle Type and Category                            |       |
| iv.                                | Serial Number                                        |       |
| v.                                 | Date of manufacture                                  |       |
| vi.                                | Hydrogen System Type (H2-ICE/ FCV)                   |       |
| 2.                                 | <b>Hydrogen Cylinder/tank detail (PESO approved)</b> |       |
| i.                                 | Make                                                 |       |
| ii.                                | Identification No.                                   |       |
| iii.                               | Working pressure (kg/cm2)                            |       |
| iv.                                | Max. test pressure (kg/cm2)                          |       |
| v.                                 | Tank Type (Type III/IV)                              |       |
| vi.                                | Tank Capacity (water equivalent)                     |       |
| vii.                               | Tank Dimensions                                      |       |
| viii.                              | Approval No.                                         |       |
| 3.                                 | <b>Cylinder Valves</b>                               |       |
| i.                                 | Make                                                 |       |
| ii.                                | Identification No.                                   |       |
| iii.                               | Type                                                 |       |
| iv.                                | Working pressure (kg/cm2)                            |       |
| v.                                 | Approval No.                                         |       |
| 4.                                 | <b>Fuel Cell Details (For FCV only)</b>              |       |
| i.                                 | Make, Trade name and mark of the fuel cell           |       |
| ii.                                | Types of fuel cell                                   |       |
| iii.                               | Nominal voltage (V)                                  |       |
| iv.                                | Number of cells                                      |       |
| v.                                 | Type of cooling system (if any)                      |       |
| vi.                                | Max Power (kW)                                       |       |
| 5.                                 | <b>Battery Pack Details (if applicable)</b>          |       |
| i.                                 | Make and Trade name (If any)                         |       |
| ii.                                | Battery Type                                         |       |
| iii.                               | Number of Cells/Modules and its Configuration        |       |
| iv.                                | Battery Energy (kWh)                                 |       |
| v.                                 | Battery Capacity (C5)                                |       |

## **Annexure-B : Performance and Safety Monitoring Parameters**

**Table B1: H2ICE Engine data**

|          |                                                                 |  |
|----------|-----------------------------------------------------------------|--|
| <b>1</b> | <b>Engine full and part load performance</b>                    |  |
| 1.1      | In-cylinder pressure                                            |  |
| 1.2      | H2 line pressure                                                |  |
| 1.3      | H2 injection pulse width                                        |  |
| 1.4      | Hydrogen flow rate                                              |  |
| 1.5      | Air flow rate                                                   |  |
| 1.6      | Engine Oil Pressure & Temperature                               |  |
| 1.7      | Engine oil consumption                                          |  |
| 1.8      | Engine blow-by                                                  |  |
| 1.9      | EGR flow rate and temperatures, if used                         |  |
| 1.10     | Exhaust lambda (H2 in exhaust system)                           |  |
| 1.11     | Water-in temp.                                                  |  |
| 1.12     | Water-out temp.                                                 |  |
| 1.13     | Boost pressure                                                  |  |
| 1.14     | Engine knock Sensor data                                        |  |
| 1.15     | Backfire detection sensor data                                  |  |
| 1.16     | Aftertreatment details & measurements (Temperature & Pressures) |  |
| 1.17     | Exhaust gas temperature before turbocharger                     |  |
| 1.18     | Manifold temperature                                            |  |
| 2        | WHSC emissions report                                           |  |
| 3        | WHTC emissions report                                           |  |

**Note:** Engine specific performance and safety parameters mentioned in Table B1 are for ready reference. Based on feasibility, addition or deletion of parameters SIA will take decisions accordingly.

**Table B2: H2ICE Vehicle Level monitoring Parameters**

| Daily Check |                            |  |
|-------------|----------------------------|--|
|             | <b>General Information</b> |  |
|             | Date of Trial              |  |
|             | Driver Name                |  |
|             | At Start of trial          |  |
|             | Time                       |  |
|             | Odometer Reading           |  |
|             | Hydrogen Tank Reading      |  |
|             | At End of trial            |  |
|             | Time                       |  |
|             | Odometer Reading           |  |
|             | Hydrogen Tank Reading      |  |
| <b>1</b>    | <b>Vehicle Performance</b> |  |
| 1.1         | Vehicle Range (Km)         |  |
| 1.2         | Hydrogen Fuel Consumption  |  |

|          |                                                                                    |  |
|----------|------------------------------------------------------------------------------------|--|
| 1.3      | Indication of Reduced Power                                                        |  |
| 1.4      | Driving Backward                                                                   |  |
| 1.5      | Unintentional Driver behavior                                                      |  |
| 1.6      | Overall Drivability feedback                                                       |  |
| 1.7      | Any other specific observation during the overload                                 |  |
| 1.8      | Vehicle Speed                                                                      |  |
| 1.9      | GPS coordinates - Longitude, latitude and altitude                                 |  |
| 1.10     | A/B/C pedal position                                                               |  |
| 1.11     | H2 leak in cabin                                                                   |  |
| 1.12     | H2 leak in passenger compartment                                                   |  |
| <b>2</b> | <b>Fuel tank /Fuel Lines</b>                                                       |  |
| 2.1      | Any leak in fuel line (leak check with leak detector)                              |  |
| 2.2      | Integrity of fuel circuit- Check any damages /kinks / bulge in flexible fuel lines |  |
| 2.3      | Details of Safety devices used in vehicle (attach separate sheet)                  |  |
| 2.4      | Details Hydrogen Kit (attach separate sheet)                                       |  |
| 2.5      | Tank working Pressure (nominal) profile                                            |  |
| 2.6      | Temperature sensors - Tank, H2gas, nozzle, pump, etc. (depending on technology)    |  |
| 2.7      | Flame detector sensors data                                                        |  |
| 2.8      | Boil-off management system (BMS) data (standstill condition)                       |  |
| 2.9      | Hydrogen fill level monitoring                                                     |  |
| 2.10     | ESD - Electrostatic Discharge Prevention                                           |  |
| <b>3</b> | <b>During H2 Fuel tank filling</b>                                                 |  |
| 3.1      | H2 filling monitoring                                                              |  |
| 3.2      | Ambient Temperature at the time of filling                                         |  |
| 3.3      | Nominal Working pressure of H2 cylinder (NWP)                                      |  |
| 3.4      | H2 inlet temperature i.e., at the outlet of fuel station hose pipe or density      |  |
| 3.5      | Vehicle H2 cylinder initial Pressure i.e., at start of filling                     |  |
| 3.6      | H2 Filling flow rate or Average Pressure Rise Rate                                 |  |
| 3.7      | Cyl. Temperature of the H2 cylinder during filling w.r.t time                      |  |
| 3.8      | Cyl. Pressure of the H2 cylinder during filling w.r.t time                         |  |
| 3.9      | Total Filling time                                                                 |  |
| 3.10     | SOC (State of Charge) w.r.t volume of cylinder                                     |  |
| 3.11     | Time taken to get stabilization of cylinder pressure after H2 filling              |  |
| 3.12     | H2 Filling Date & Time                                                             |  |
| 3.13     | H2 Filling Location (GPS coordinates - Longitude, latitude and altitude)           |  |
| 3.14     | Odometer Reading at that time of filling                                           |  |
| 3.15     | Total mass of H2 filled                                                            |  |
| <b>4</b> | <b>Engine Oil</b>                                                                  |  |
| 4.1      | Oil pressure - any change?                                                         |  |
| 4.2      | Oil level in Dipstick - Increase / Decrease?                                       |  |
| 4.3      | Condition of oil - any water traces, emulsion?                                     |  |
| <b>5</b> | <b>Powertrain components</b>                                                       |  |

|                          |                                                                                                 |                    |
|--------------------------|-------------------------------------------------------------------------------------------------|--------------------|
| 5.1                      | Any abnormal noise from the engine                                                              |                    |
| 5.2                      | External periodic check                                                                         |                    |
| 5.3                      | Daily Cold and hot Startability on test vehicles                                                |                    |
| <b>Fortnightly Check</b> |                                                                                                 |                    |
| 1                        | Leak check of the Hydrogen tank, HP Line to regulator (with leak detector)                      |                    |
| 2                        | Any issues in fuel system, leak etc...                                                          |                    |
| 3                        | Safety sensors alarm if any                                                                     |                    |
| 4                        | OBD /MIL condition                                                                              |                    |
| <b>Monthly Check</b>     |                                                                                                 |                    |
| 1                        | Safety issues                                                                                   |                    |
| 2                        | Durability                                                                                      |                    |
| 3                        | Engine Oil Consumption and analysis                                                             |                    |
| <b>Six Monthly Check</b> |                                                                                                 |                    |
| 1                        | Hydrogen Fueling Equipment                                                                      |                    |
| 2                        | Degradation of Engine Components                                                                |                    |
| <b>Other Information</b> |                                                                                                 |                    |
| 1                        | Any Engine components issue reported                                                            |                    |
| 2                        | Frequency of water draining in oil - Last attention date/ Km                                    |                    |
| 3                        | Oil Grade /specification / make used                                                            |                    |
| 4                        | water dilution in oil                                                                           |                    |
| 5                        | Oil last change kms (Servicing Details)                                                         |                    |
| 6                        | Oil sampling after a cumulative run of 1000kms/2000kms (kms to be decided regulatory authority) |                    |
| 7                        | Critical components calibration report                                                          |                    |
| 8                        | Scheduled calibration report on leak and flame detectors                                        |                    |
| <b>Checked by</b>        |                                                                                                 | <b>Reviewed by</b> |
|                          |                                                                                                 |                    |

**Table B3:**H2 fuel Cell Performance Report

| S. No: | Base Fuel Cell Stack Test Data Before Start of Trials |  |
|--------|-------------------------------------------------------|--|
| 1      | <b>Electrical measurements:</b>                       |  |
| 1.1    | Fuel Cell Stack Voltage output                        |  |
| 1.2    | Fuel Cell Stack Current out                           |  |
| 2      | Hydrogen flow rate                                    |  |
| 3      | Air flow measurements                                 |  |
| 4      | Fuel Cell stack temperature                           |  |
| 5      | Hydrogen injection pressure in FC                     |  |
| 6      | Humidity                                              |  |
| 7      | FC Load Curve                                         |  |
| 8      | Fuel Cell stack coolant-in temp.                      |  |
| 9      | Fuel Cell stack coolant-out temp.                     |  |

**Table B4:**H2 fuel Cell Vehicle Safety and Performance Monitoring Parameters

| Daily Check |                                                                                    |  |
|-------------|------------------------------------------------------------------------------------|--|
|             | <b>General Information</b>                                                         |  |
|             | Date of Trial                                                                      |  |
|             | Driver Name                                                                        |  |
|             | At Start of trial                                                                  |  |
|             | Time                                                                               |  |
|             | Odometer Reading                                                                   |  |
|             | Hydrogen Tank Reading                                                              |  |
|             | Battery SOC (if applicable)                                                        |  |
|             | At End of trial                                                                    |  |
|             | Time                                                                               |  |
|             | Odometer Reading                                                                   |  |
|             | Hydrogen Tank Reading                                                              |  |
|             | Battery SOC (if applicable)                                                        |  |
| <b>1</b>    | <b>Vehicle Performance</b>                                                         |  |
| 1.1         | Vehicle Range (Km)                                                                 |  |
| 1.2         | Hydrogen Fuel Consumption                                                          |  |
| 1.3         | Indication of Reduced Power                                                        |  |
| 1.4         | Driving Backward                                                                   |  |
| 1.5         | Unintentional Driver behavior                                                      |  |
| 1.6         | Overall Drivability feedback                                                       |  |
| 1.7         | Any other specific observation during the overload                                 |  |
| 1.8         | Fuel Cell Stack Voltage output                                                     |  |
| 1.9         | Fuel Cell Stack Current out                                                        |  |
| 1.10        | Hydrogen flow rate                                                                 |  |
| 1.11        | Air flow measurements                                                              |  |
| 1.12        | Fuel Cell stack temperature                                                        |  |
| 1.13        | Hydrogen injection pressure in FC                                                  |  |
| 1.14        | Humidity                                                                           |  |
| 1.15        | FC Load Curve                                                                      |  |
| 1.16        | Fuel Cell stack coolant-in temp.                                                   |  |
| 1.17        | Fuel Cell stack coolant-out temp.                                                  |  |
| 1.18        | Power steering - duty cycle                                                        |  |
| 1.19        | Vehicle Speed                                                                      |  |
| 1.20        | Propeller rpm                                                                      |  |
| 1.21        | GPS coordinates - Longitude, latitude and altitude                                 |  |
| 1.22        | A/B/C pedal position                                                               |  |
| 1.23        | H2 leak in cabin                                                                   |  |
| 1.24        | H2 leak in passenger compartment                                                   |  |
| <b>2</b>    | <b>Fuel tank /Fuel Lines</b>                                                       |  |
| 2.1         | Any leak in fuel line (leak check with leak detector)                              |  |
| 2.2         | Integrity of fuel circuit- Check any damages /kinks / bulge in flexible fuel lines |  |
| 2.3         | Details of Safety devices used in vehicle (attach separate sheet)                  |  |
| 2.4         | Details Hydrogen Kit (attach separate sheet)                                       |  |
| 2.5         | Tank working Pressure (nominal) profile                                            |  |
| 2.6         | Temperature sensors - Tank, H2gas, nozzle, pump, etc. (depending on technology)    |  |
| 2.7         | Flame detector sensors data                                                        |  |
| 2.8         | Boil-off management system (BMS) data (standstill condition)                       |  |
| 2.9         | Hydrogen fill level monitoring                                                     |  |
| 2.10        | ESD - Electrostatic Discharge Prevention                                           |  |
| <b>3</b>    | <b>During H2 Fuel tank filling</b>                                                 |  |

|                   |                                                                               |             |
|-------------------|-------------------------------------------------------------------------------|-------------|
| 3.1               | H2 filling tank number                                                        |             |
| 3.2               | Ambient Temperature at the time of filling                                    |             |
| 3.3               | Nominal Working pressure of H2 cylinder (NWP)                                 |             |
| 3.4               | H2 inlet temperature i.e., at the outlet of fuel station hose pipe or density |             |
| 3.5               | Vehicle H2 cylinder initial Pressure i.e., at start of filling                |             |
| 3.6               | H2 Filling flow rate or Average Pressure Rise Rate                            |             |
| 3.7               | Cyl. Temperature of the H2 cylinder during filling w.r.t time                 |             |
| 3.8               | Cyl. Pressure of the H2 cylinder during filling w.r.t time                    |             |
| 3.9               | Total Filling time                                                            |             |
| 3.10              | SOC (State of Charge) w.r.t volume of cylinder                                |             |
| 3.11              | Time taken to get stabilization of cylinder pressure after H2 filling         |             |
| 3.12              | H2 Filling Date & Time                                                        |             |
| 3.13              | H2 Filling Location (GPS coordinates - Longitude, latitude and altitude)      |             |
| 3.14              | Odometer Reading at that time of filling                                      |             |
| 3.15              | Total mass of H2 filled                                                       |             |
| 4                 | <b>Motor and Battery parameters</b>                                           |             |
| 4.1               | Battery charging                                                              |             |
| 4.2               | Battery Discharging                                                           |             |
| 4.3               | Battery Temperature                                                           |             |
| 4.4               | Battery Coolant-in temp                                                       |             |
| 4.5               | Battery Coolant-out temp                                                      |             |
| 4.6               | Motor torque mapping                                                          |             |
| 4.7               | Motor Coolant-in temp                                                         |             |
| 4.8               | Motor Coolant-out temp                                                        |             |
| 4.9               | Motor Temperature                                                             |             |
| 5                 | <b>Other OBD checks</b>                                                       |             |
| 5.1               | Safety sensors alarm if any                                                   |             |
| 5.2               | OBD /MIL Data Monitoring                                                      |             |
| 5.3               | Hydrogen Fueling Equipment periodic checks                                    |             |
| 5.4               | FC stacks failure report                                                      |             |
| 5.5               | Oil last change kms (Servicing Details)                                       |             |
| 5.6               | Emergency shut-off mechanisms                                                 |             |
| 5.7               | Ventilation systems                                                           |             |
| 5.8               | Wiring harness checks                                                         |             |
| Fortnightly Check |                                                                               |             |
| 1                 | Leak check of the Hydrogen tank, HP Line to regulator (with leak detector)    |             |
| 2                 | Any issues in fuel system, leak etc...                                        |             |
| 3                 | Safety sensors alarm if any                                                   |             |
| 4                 | OBD /MIL condition                                                            |             |
| Monthly Check     |                                                                               |             |
| 1                 | Safety issues                                                                 |             |
| 2                 | Durability                                                                    |             |
| 3                 | Fuel Cell Stack Inspection                                                    |             |
| Six Monthly Check |                                                                               |             |
| 1                 | Hydrogen Fueling Equipment                                                    |             |
| 2                 | Fuel Cell Cooling System                                                      |             |
| Other Information |                                                                               |             |
| 1                 | H2 kit Component testing as per Annex II of AIS 157/AIS 195                   |             |
| Checked by        |                                                                               | Reviewed by |
|                   |                                                                               |             |

**Table B5:** HRS Safety and Performance Monitoring Parameters

| HRS Safety and Performance Monitoring Parameters |                                                                    |           |
|--------------------------------------------------|--------------------------------------------------------------------|-----------|
| S.No                                             | Parameter                                                          | units     |
| 1                                                | Ambient Temperature sensor monitoring while filling                | K         |
| 2                                                | Dispenser pressure and temperature sensor monitoring while filling | bar and K |
| 3                                                | Gas management panels maintenance report                           |           |
| 4                                                | Selection of H2 compatible materials                               |           |
| 5                                                | Pressure Measurements of HRS storage system                        | bar       |
| 6                                                | Monitoring of flowrate of dispenser                                |           |
| 7                                                | Breakaway and automatic shut off valves calibration                |           |
| 8                                                | Grounding and ESD protection                                       |           |
| 9                                                | Explosion proof (insulated) of electrical components               |           |
| 10                                               | Regular inspection for H2 leak sensor sensibility                  |           |
| 11                                               | Dispenser periodic calibration for its operating pressures         |           |
| 12                                               | Periodic calibration of all sensors and instruments                |           |
| 13                                               | Regular cleaning or replacement of H2 filters                      |           |
| 14                                               | Inspection of grounding and electrical components                  |           |
| 15                                               | Periodic software updates for dispenser functionality and safety   |           |
| 16                                               | Employee trainings report on up to date safety knowledge           |           |
| 17                                               | Emergency shutdown systems periodic checks                         |           |
| 18                                               | FIRE suppression systems periodic checks                           |           |
| 19                                               | Periodic H2 cooling system maintenance report                      |           |
| 20                                               | High pressure Compressor calibration                               |           |

## Annexure - C

### Format for submission of Bid

| S.No | ITEMS                                                 | Page Numbers |
|------|-------------------------------------------------------|--------------|
| 1    | Cover Sheet & Bidder Details                          |              |
| 2    | Technical Proposal                                    |              |
| 3    | Budgetary Submission                                  |              |
| 4    | Bio-Data of the Lead Executor<br>/ Consortium Partner |              |
| 5    | Lead Executor / Bidder Undertaking                    |              |
| 6    | Endorsement from Executing Agency (EA)                |              |

### 1. Cover Sheet & Bidder details

| Sr No | Item                        | Description                                                                                                             |
|-------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 1     | Pilot Project Title         | <i>Pilot Project for use of Green Hydrogen in Transport Sector for (Specify Categories) of Vehicle(s).</i>              |
| 2     | Route Applied               | <i>(mention for all applied routes)</i>                                                                                 |
| 3     | Vehicle Category            | <i>(mention for all applied vehicle categories)</i>                                                                     |
| 4     | Project Bidder (s)          | <i>(mention for all bidders in case of a consortium)</i>                                                                |
|       | Executing Agency            | <i>(in case of a single bidder - same as project bidder, in case of consortium - mention the Lead Executing agency)</i> |
| 5     | PI and CO-PI (s)<br>Details | <i>PI</i>                                                                                                               |
|       |                             | <i>CO-PI</i>                                                                                                            |
|       |                             | <i>Name</i>                                                                                                             |
|       |                             | <i>Name</i>                                                                                                             |
|       |                             | <i>Email ID</i>                                                                                                         |
|       |                             | <i>Email ID</i>                                                                                                         |
|       |                             | <i>Phone Number</i>                                                                                                     |
|       |                             | <i>Phone Number</i>                                                                                                     |
|       |                             |                                                                                                                         |
|       |                             |                                                                                                                         |

### 2. Technical Proposal

- 1 Technical Specification of Vehicles: (as per Annexure -A)
- 2 Outline of the Project:
- 3 Outcome/ Deliverables of the Project:
- 4 Project Methodology & Execution - Responsibility Matrix
- 5 Project Milestones & PERT Chart
- 6 Infrastructure Support for Trials
- 7 Vehicle Maintenance and Data Logging
- 8 Analysis & Reporting Strategy
- 9 Any Additional Information:

### 3. Budgetary Submission

| Sr. No | Item Description #    | Cost in INR                       |                                                           |
|--------|-----------------------|-----------------------------------|-----------------------------------------------------------|
| 1      | Vehicle Cost *        | (Hydrogen Vehicle Cost)           | (Diesel / Conventional Vehicle of Similar Capacity)       |
| 2      | Hydrogen Station Cost | (Hydrogen Refueling station Cost) | (Conventional Refueling Station Cost of Similar Capacity) |

\* Separate line entry to be added for each vehicle category and technology

# Detailed estimates of each item are to be provided in the proposal.

### 4. Details of Lead Executor & Consortium Partners

| Sr. No | Description of PI                             | Details |
|--------|-----------------------------------------------|---------|
| 1      | Name                                          |         |
| 2      | Organization                                  |         |
| 3      | Designation & Affiliation                     |         |
| 4      | Postal Address                                |         |
| 5      | Mobile / Phone                                |         |
| 6      | Email ID                                      |         |
| 7      | Qualifications                                |         |
| 8      | Experience                                    |         |
| 9      | List of Govt Funded Projects Executed in Past |         |

### 5. Lead Executor / Bidder Undertaking

#### **Project Title:**

1. I have carefully read the terms and conditions of the Green Hydrogen Pilot Trials Program and I agree to abide by them.
2. I have not submitted this or a similar Project Proposal elsewhere for financial support.
3. I shall ensure all regulatory approvals are obtained prior to starting of the trials
4. I shall ensure the fitness of the vehicle in the field and will ensure full compliance to SIA and Ministry directives.
5. I have enclosed the following:
  - a. Endorsement from the Consortium partners (Industry/Agency)
  - b. Project Proposal complete in all respect (*5 hard copies and 1 soft copy*)

**Lead Executor:**

**Name**

**Signature & Stamp**

**Date**

**Place**

## **6. Endorsement from Executing Agency (On the official letter- head)**

I have gone through the Project Proposal entitled..... submitted by ..... (*Name of Lead Executor*) of ..... (*Name of the Organization*) for Ministry funding and noted the obligations and responsibilities indicated in our name as stated below

1. Contribution in financial terms (*INR Lakhs*)

2. Contribution in kind (*List activities*)

I hereby affirm that my Organization/Industry is committed to participate in the Project to the full extent as indicated in the Project Proposal including the financial liabilities accruing therefrom as detailed above.

A summary profile of my organization is given below

Name of Organization:

Nature of Business :

Number of Employees :

Annual Turn over:

The Annual Report for the preceding financial year is enclosed.

**(Head of the Industry/Agency)**

**Seal/Stamp**

**Date**

**Place**

**Annexure - D**

**Hydrogen ICE vehicles limited to gross vehicle weight greater than 3.5 tons (LDVs, MDVs & HDVs - buses, trucks and any other vehicles) and Construction Equipment Vehicles: Details Required for Evaluation**

| Sr. No. | Vehicle Parameters                      | Description                                              | Bidder Response |
|---------|-----------------------------------------|----------------------------------------------------------|-----------------|
| 1       | Company Turnover                        | Turnover in Cr for financial Year 2024-25                |                 |
|         |                                         |                                                          |                 |
| 2       | Experience with Hydrogen Project        | Number of Projects and proof                             |                 |
|         |                                         |                                                          |                 |
| 3       | Service centres along the project route | Number of service centres on project routes              |                 |
|         |                                         |                                                          |                 |
| 4       | Performance (Power)                     | Specific power in kW/ltr                                 |                 |
|         |                                         |                                                          |                 |
| 5       | Refuelling time                         | Refuelling time in minutes                               |                 |
|         | .                                       |                                                          |                 |
| 6       | Fuel Storage and Vehicle Range          | Vehicle Range in Kms. / Fuel Efficiency                  |                 |
|         |                                         |                                                          |                 |
| 7       | Emissions                               | Emission compliance to BSVI / Bharat Stage IV/V          |                 |
|         |                                         |                                                          |                 |
| 8       | Vehicle payload                         | Vehicle payload in Tons / Tonnage handling capacity      |                 |
|         |                                         |                                                          |                 |
| 9       | Fire Fighting Measures                  | FDSS / Fire Extinguishers                                |                 |
|         |                                         |                                                          |                 |
| 10      | Onboard Data Generation (Real time)     | Onboard Data Generation (Real time) - Automated / Manual |                 |
|         |                                         |                                                          |                 |

**Note:** Bidder may provide additional information if any related to experience on Hydrogen Fuel, H2ICE vehicle and operation.

**Hydrogen Fuel Cell vehicles limited to gross vehicle weight greater than 3.5 tons (LDVs, MDVs & HDVs - buses, trucks and any other vehicles) and Construction Equipment Vehicles: Details Required for Evaluation**

| Sr. No. | Vehicle Parameters                      | Description                                              | Bidder Response |
|---------|-----------------------------------------|----------------------------------------------------------|-----------------|
| 1       | Company Turnover                        | Turnover in Cr for financial Year 2024-25                |                 |
| 2       | Experience with Hydrogen Project        | Number of Projects and proof                             |                 |
| 3       | Service centres along the project route | Number of service centres on project routes              |                 |
| 4       | Performance (Power)                     | Power in kW                                              |                 |
| 5       | Refuelling time                         | Refuelling time in minutes                               |                 |
| 6       | Fuel Storage and Vehicle Range          | Vehicle Range in Kms. / Vehicle operation time           |                 |
| 7       | Fuel cell vehicle service life          | Total Kms                                                |                 |
| 8       | Vehicle payload                         | Vehicle payload in Tons / Load carrying capacity in Tons |                 |
| 9       | Fire Fighting Measures                  | FDSS / Fire Extinguishers                                |                 |
| 10      | Onboard Data Generation (Real time)     | Onboard Data Generation (Real time) - Automated / Manual |                 |

**Note:** Bidder may provide additional information if any related to the experience on Hydrogen Fuel, H2ICE vehicle and operation.

### Details Required for HRS Setup

| Sr. No. | Vehicle Parameters                                     | Description                                                                                                                                                              | Bidder Response |
|---------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| 1       | Company Turnover                                       | Turnover in Cr for Financial Year 2024-25                                                                                                                                |                 |
| 2       | Number of hydrogen demo station /installation in India | Provide Details                                                                                                                                                          |                 |
| 3       | Number of filling centre on the project route          | Mention numbers of filling stations proposed, Provide Details of the facility                                                                                            |                 |
| 4       | Hydrogen vehicle filling experience                    | Mention from below options for hydrogen experience:<br>A. More than 2 years<br>B. Between 1 Year to 2 Years;<br>C. Between 6 months to 1 Year;<br>D. Less Than 6 Months. |                 |
| 5       | Trained manpower availability                          | Hydrogen Fuel Station Trained Manpower<br>Mention from below options:<br>A. More than 10 Employees;<br>B. Between 5 to 10 employees;<br>C. Less Than 5 employees;        |                 |
| 6       | Owned / Leased land (minimum 5 years tenure)           | Mention from below options:<br>A. Minimum 5 years tenure;<br>B. Less than 5 Years tenure.<br>(Provide details on Lease/Rented)                                           |                 |
| 7       | Frontage                                               | Mention from below options:<br>A. More than 1000 sq. M;<br>B. Between 700 - 1000 sq. M;<br>C. Less than 700 sq. M.                                                       |                 |
| 8       | Earth moving required                                  | Mention from below options:<br>Ease of vehicle entrance and all safety distances achieved<br>A. As per PESO guidelines;<br>B. Non-PESO Approved;                         |                 |
| 9       | Availability of power                                  | Mention from below options:<br>A. Uninterrupted power supply with Power backup;<br>B. Uninterrupted power supply without Power backup;                                   |                 |
| 10      | Availability of water                                  | Mention the water availability                                                                                                                                           |                 |

**Note:** Bidder may provide additional information if any related to experience on HRS, Hydrogen Fuel, H2ICE vehicle and operation.

## Annexure - E

### Miscellaneous Terms and Conditions

#### 1. Role of EA

The EA shall be responsible for the following activities, under the Pilot Projects for the use of Green Hydrogen in the Transport Sector.

- a. EA shall co-operate with SIA for smooth functioning of the Project and provide necessary and prompt response to the SIA's requirements and to adhere to all the stipulates of RFP and sanction guidelines forming part of this Agreement.
- b. EA shall request SIA for release of funds after achieving milestones as enshrined in this Agreement upon submission of invoices along with statement of expenditure duly certified by Statutory Auditor / Internal Auditor appointed by EA compliance with the project milestones and other applicable conditions mentioned in RFP.
- c. Upon intimation of SIA in case of non-compliance with the guidelines of the scheme/sanction, EA shall be liable for refund of whole or part amount of the grant/subsidy disbursed to the EA along with applicable penal interest to MNRE.
- d. EAs will be added as vender in PFMS portal.
- e. EAs will raise invoice against actual procurement to SIA.
- f. EAs will furnish the Audited Statement of Expenditure (ASoE) **along with detailed technical progress report** periodically as per provision of the scheme **to The Automotive Research Association of India (SIA)**. SIA will reimburse the amount to EA's based on milestones achieved.
- g. EAs should submit the undertaking that expenditures incurred by EA are attributable to the project only and the same has been incurred by following all due diligence and required processes by obtaining necessary approvals which are required for spending public money.
- h. Whenever assets procured under this fund need to be disposed, necessary approval from MNRE needs to be sought by EA.
- i. Performance bank guarantee for 5 % of contract value may be required to be provided by EA subject to approval from PAC.

#### 2. Miscellaneous Provisions

- a. In case the actual project cost exceeds the VGF, the EA shall not be eligible for any additional financial assistance either from SIA or MNRE and shall arrange the additional funds on its own.
- b. The Executing Agency (EA) needs to open a separate dedicated account in a scheduled commercial bank for receipt of Govt. Fund. All expenditures related to the pilot project shall be made through the dedicated account only. No other transactions shall be routed through this bank account. Details of the dedicated account shall be intimated to SIA & MNRE by an authorized person of the EA.
- c. The said account shall be mapped in the Public Financial Management System (PFMS) of Solar Energy Corporation of India (SECI) or SIA.
- d. The sanctioned amount includes GST. Hence, GST (as applicable) payable to the vendors shall be borne by the EA and shall not be reimbursed by SIA.
- e. Interest accrued in the commercial bank account shall be deposited in Consolidated Fund of India as per provisions of GFR, whether applicable to EA or not.
- f. The EA shall furnish the Audited Statement of Expenditure (ASoE) **along with detailed technical progress report** periodically as per provision of the scheme to raise claim on Company's Letter Head and along with invoice details. While raising claim, the EA shall give an undertaking in the letter that "We ensure that the central fund shall be used for the specific approved project and shall not be used for any other purpose. In case of non-compliance of the provision of the scheme / sanction, we shall refund the whole / part amount of the sanction with applicable penal interest". Undertaking to be also given by EA while claiming fund that "Amount given/dispursed as CFA (Central Financial Assistance) shall be utilized with all due diligence which is required for spending public money".
- g. In case, EA fails to utilize the fund for the purpose for which it has been sanctioned or fails to complete the project and achieve the desired results as per RFP, EA shall refund the entire amount of the fund disbursed, with applicable penal interest. If EA fails to adhere to the terms and conditions for refund of such amount, it will be liable for legal actions / proceedings by MNRE.
- h. In case, EA fails to complete the project as per the RFP and proposal submitted by EA the time line committed by them, a suitable penalty shall be imposed on them as approved by PAC/Steering

Committee/MNRE. However, extension of timeline shall be allowed only on approval of PAC/Steering Committee/MNRE.

- i. The EA shall be responsible for adhering to all other terms & conditions forming part of the Scheme Guidelines, RFP document.
- j. The authority (SIA, MoRTH, MNRE, PAC & Steering Committee) reserves the right to make necessary amendments in the scheme guidelines from time to time and to monitor the project, as and when required.
- k. Disbursement of central financial assistance shall be limited to the sanctioned amount for this pilot project. Disbursement of fund to the EA shall be as per the milestone activities as mentioned in RFP based on the documentary proof against each claim and statement of expenditure duly certified by Statutory Auditor / Internal Auditor appointed by EA.
- l. Project Duration: EA shall work as per the mentioned scope of work and the deadline to expedite and complete the pilot project, in all aspects, within 24 months from the date of signing of project agreement.
- m. Safety Standards: - EA shall comply with all applicable health and safety laws and requirements for the execution of this Project and SIA has right to inspect compliance thereof during the project term.
- n. Safeguarding of Intellectual property and maintaining confidentiality as per MNRE Scheme Guidelines
- o. The EA shall maintain confidentiality of the outcomes of trials at all stages and proprietary information that is disclosed to the EA or that the EA otherwise learns during the course or as the direct or indirect result from time to time trials.
- p. Confidential Information here will include all the test results, periodic checks, technical, financial information, exchange of information or queries on mail or hardcopies, incident reports that are designed, authored, created, distributed or produce during the term of trials.
  - Confidentiality obligations set forth above shall survive expiration or termination of this Agreement.
  - EA will provide online access to the data generated during the trials to SIA for monitoring.
  - Assets created under this program shall be capitalized by respective EA in their book of accounts.
- q. If the MNRE/SIA, at any stage, finds or comes to know and is satisfied that eligibility under the Scheme and/ or disbursement of funds have been obtained by manipulation of misrepresentation or by furnishing false information, the MNRE/SIA may direct the EA or its successors or assigns to refund the funds along with interest as per GFR, after giving an opportunity to the EA of being heard by the competent authority. MNRE/SIA may also resort to any other remedy against the selected EA and its other consortium members or its successors or assigns, as the case may be, in accordance with the Scheme as amended from time to time.
- r. MNRE/SIA reserves the right to issue addendum containing further instructions/ changes with regard to various provisions, to be notified as part of guidelines for the scheme.
- s. For any financial matters/clarifications/deviations arising under this scheme, the same will be put up to PAC for decision on the matter.
- t. After signing agreement, the parties involved shall develop a protocol for communication amongst them. The communication protocol shall, amongst others, designate the Parties, Coordinators for any and all activities to be performed under this Agreement, as per RFP.
- u. Neither Party shall be liable (whether based on contract, warranty, indemnity, tort (including negligence), strict liability or otherwise) to the other Party for loss of opportunity or profit, including loss of the Project, or any special, indirect exemplary, consequential or incidental damages.
- v. EA agrees to indemnify and hold The Automotive Research Association of India (“SIA”), MNRE and / or SECI, its Directors, officers, employees, and representatives harmless from any liability, loss or damage they may suffer as a result of claims, demands, costs or judgments against them arising out of the activities to be carried out pursuant to the obligations of this Agreement, including, but not limited to consequences of non-utilization of the funds, non-compliance with the terms of the project, accidents which may occur during trials causing damage to the persons or property, unauthorized use of the Vehicles during the trials etc.
- w. All other terms & conditions of the Request for Proposal (RFP) and subsequent corrigendum issued from time to time constitutes an integral part and shall form part of the Agreement.

For and on behalf of

(Signature with Seal)

(AS EXECUTING AGENCY-EA)

----- End of Document -----