EXPRESSION OF INTEREST TENDER DOCUMENT FOR

Submission of Express of Interest

To Design and Retrofitting of ICE Car into Hybrid Fuel Cell Electric Vehicle

Introduction

India's Hydrogen Fuel Cell Vehicle Market is estimated to be USD 820.12 Mn in 2022 and is expected to reach USD 1340.14 Mn by 2027, growing at a CAGR of 10.32%.

Hydrogen fuel cell vehicles are similar to electric cars. Both use an electric motor for propulsion instead of an internal combustion engine. But the similarities end there because an EV needs an external power source to recharge the battery. In contrast, a hydrogen-powered vehicle can generate electricity on board with the help of a fuel cell.

A hydrogen car also has an onboard battery to store electricity produced by the fuel cell. Typically, the fuel cell directly powers the motor. However, when there is more demand for power, the electricity stored in the battery is utilised or at the time of more power requirement by motor the power is supplied by the batteries.

An FCEV is similar to an electric vehicle as both use a similar propulsion system. Powering the fuel cell car is hydrogen stored in the vehicle's fuel tank. Hydrogen is converted to electricity to propel the car. A hydrogen fuel engine car produces zero tailpipe emissions. Hydrogen is one of the alternative fuels of the future, and car manufacturers are working on making this technology feasible for the masses.

As mentioned earlier, a fuel cell car runs on pure hydrogen. The pressurised fuel tank holds hydrogen onboard.

One can fuel up hydrogen similar to conventional fuels like petrol or diesel.

The hydrogen fuel is fed into the fuel cell to begin the process of converting hydrogen to electricity.

A fuel cell comprises liquid (polymer electrolyte), a positively charged electrode (anode) and a negatively charged electrode (cathode).

An electrochemical reaction converts hydrogen to electricity when hydrogen enters the fuel cell.

Along with hydrogen, oxygen is also introduced into the fuel cell to aid the chemical reaction.

During the reaction, hydrogen atoms split to form protons and electrons. Here, protons turn into the exhaust (water), and the electrons produce an electric current.

The fuel cell can directly power the electric motor or store the electricity onboard via a battery.

A fuel cell acts as a power generation system in an FCEV. The combination of hydrogen fuel and a fuel cell results in the onboard generation of electricity. The only tailpipe exhaust is pure water. Hence, fuel cell cars are environment-friendly, similar to electric vehicles.

Advantages of hydrogen fuel cell vehicles

- Hydrogen fuel cell cars deliver excellent performance with full torque available at low speeds.
- With no internal combustion engine, an FCEV is quiet in operation. It's an experience similar to an electric car.
- Another main advantage of a fuel cell vehicle is the quick refuelling time. One can refuel hydrogen in a matter of a few minutes.
- Hydrogen-powered cars deliver a longer driving range than electric vehicles.
- The driving range does not depend on the atmospheric temperature. Hence, the driving range does not reduce in cold temperatures.
- A hydrogen fuel car produces zero carbon emissions as the only exhaust produced is water.

The whole purpose of a hydrogen vehicle is that it has no emissions versus an ICE counterpart, yet the vast majority of the energy used to create hydrogen (it's not an available resource, it must be extracted/created using existing resources) comes from natural gas.

In the endeavour to boost EV adoption in the country, many state governments have given a go ahead to retro fitment services, wherein ICE vehicle users can convert their vehicles to EVs.

SCOPE of WORK

IIT BHU intend to select Developer for Design and retrofitting of ICE car into hybrid Fuel cell Electric vehicle on Turnkey basis. The successful bidder shall procure the required motors, batteries, controllers, chargers submit the proforma as per the Annexure-I

a) Bidder need to buy a sedan class car preferred old Maruti Dzire for the conversion from ICE into hybrid Fuel cell retrofit vehicle.

b) Bidder need to procure all the bill of material required to convert a ICE vehicle into electric vehicle.

c) Bidder need not to procure fuel cell stack that will be provided by the institute (3 kW fuel cell stack Horizon make).

d) The successful bidder impart training to the team members of the institute involved in this project.

e)The bidder will be selected based on the prequalification, technical qualification criteria and lowest project cost.

e) Details specification and Bill of material are given in Annexure-I

Annexure-1

Detail Specifications and Bill of Material

1. PMSM/BLDC Motor 10 KW peak, with controller at 72 VDC
2. Lithium batteries of capacity 8KW or above as per the design at 72V
3. Hydrogen cylinders
4. Hydrogen Pressure regulators for the supply of H2 to fuel cell
5. Foot paddle throttle
6. DC to DC converter of 20 Amps
7. LED head lights
8. Brake switch / relay
9. Main DC contactor
10. Fast blow fuse of 150 Amps
11. Shaft with mounting plate assembly for clutch, flywheel and pressure plate assembly.
12. Shaft extension housing for motor
13. M14 X 50 Timing pulley set with HTD timing belt.
14. Belt guard.
15. Air condition with 1.5KW motor with controller, transmission for AC compressor coupling and other electrical accessories
16. Vehicle control unit
17. Dash board.
18. Second hand Maruti Dzire car or equivalent.

EOI Validation

The Bidder shall submit its EOI in response to EOI document which shall remain valid up to ninety (90) days from the Deadline. Authorized Representative reserves the right to reject EOI which does not meet the validity requirement.

Evaluation of EoI: The EoI document will be evaluated based on the following eligibility criteria .All bidders who meet the minimum requirement, as specified, shall be shortlisted. The short listed should comprise at least four firms for further stag.

Eligibility Criteria

i. Any Bidder including its Associate Company /Parent Company/ Ultimate Parent Company cannot submit more than one Bid under this BID.'

ii. Bidder can use the technical strength of its Associate Company /Parent Company/Ultimate Parent Company to fulfill the Technical Eligibility criteria mentioned. In such case, Bidders shall submit a certificate of relationship of Associate Company/Parent Company/ Ultimate Parent Company with the Bidding Company as per Format.

iii. Bidders in Conflict of Interest with one another shall be liable for disqualification/rejection under the sole discretion of the Authorized Representative.

iv. Bidder shall be engaged in manufacturing of fuel cells or in EV retrofitting business since past 3 years.

Stages involved in Expression of Interest Tenders

- In the first stage EoI bids have been invited containing the broad objectives, technical and financial eligibility criteria, terms and conditions of the proposed procurement etc without a bid price. On receipt of the Expressions

of Interest, received bids will be evaluated on the basis of requirement mentioned in EOI and result of the same shall be notified.

- In the second stage of the bidding process, the Procuring Entity shall invite bids from all those bidders whose bids at the first stage were not rejected, to present final bid with bid prices in response to a revised set of terms and conditions of the procurement;
- If the Procuring Entity is of the view that after EoI stage, there is likelihood of further participation by many more bidders and to avoid getting trapped into a legacy technology, the second stage bidding may not be restricted only to the shortlisted bidders of EoI stage and it may be so declared in the EoI document ab-initio. Thereafter in the second stage, normal Advertised Tendering may be done.

Recoverable Signature

X 

Signed by: e47ee7f4-3262-4ffe-a439-f7b9c9dea065

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CRITICAL DATE SHEET

Published Date	**4-11-2022 (05:00 PM)**
Bid Document Download Start Date	**4-11-2022 (05:00 PM)**
Bid Submission Start Date	**4-11-2022 (05:00 PM)**
Bid Document Download End Date	**25-11-2022 (04:00 PM)**
Bid Submission End Date	**25-11-2022 (04:00 PM)**
Bid Opening Date	**26-11-2022 (04:00 PM)**

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