



विद्युतीय अभियांत्रिकी विभाग  
भारतीय प्रौद्योगिकी संस्थान (काशी हिन्दू विश्वविद्यालय) वाराणसी- २२१००५

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No. IIT (BHU)/EE/2022-23/04

Date: 28.12.22

**CORRIGENDUM-1**

Ref. No. IIT (BHU)/EE/SERB PROJECT/2022-23/02 Dated 13.12.22

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

S. No	Tender Terms/Specifications for	Modified tender terms/specifications read												
1.	<p><b>At page no. 28 and 29</b></p> <p>(a) <b>Technical Specifications of “Design and retrofitting of ICE car into hybrid Fuel cell Electric vehicle”</b></p> <p>NOTE: 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 1</p> <ol style="list-style-type: none"> <li>1. Bidder need to procure all the bill of material required to convert a ICE vehicle into electric vehicle.</li> <li>2. Bidder need not to procure fuel cell stack that will be provided by the institute (3 kW fuel cell stack Horizon make).</li> <li>3. The successful bidder impart training to the team members of the institute involved in this project.</li> </ol> <p style="text-align: right;"><b>Annexure 1</b></p> <table border="1" style="width: 100%;"> <thead> <tr> <th>Sr. No.</th> <th>Parameter/Feature</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Sr. No.	Parameter/Feature	Specification				<p>(a) <b>Technical Specifications of “Design and retrofitting of ICE car into hybrid Fuel cell Electric vehicle”</b></p> <p>NOTE: IIT BHU intend to select Developer for Design and retrofitting of passenger Bajaj three wheeler auto rickshaw 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 1</p> <ol style="list-style-type: none"> <li>1. Bidder need to procure all the bill of material required to convert a <b>passenger Bajaj three wheeler auto rickshaw</b> into electric vehicle.</li> <li>2. Bidder need not to procure fuel cell stack that will be provided by the institute (3 kW fuel cell stack Horizon make).</li> <li>3. The successful bidder impart training to the team members of the institute involved in this project.</li> </ol> <p style="text-align: right;"><b>Annexure 1</b></p> <table border="1" style="width: 100%;"> <thead> <tr> <th>Sr. No.</th> <th>Parameter/Feature</th> <th>Specification</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Sr. No.	Parameter/Feature	Specification			
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1.	PMSM/BLDC Motor	10 KW peak, with controller at 72 VDC	1.	PMSM Motor	Mid drive PMSM 3000 Watts at 48 Volts
2.	Lithium batteries	Lithium batteries of capacity 8KW or above as per the design at 72V	2.	Lithium batteries	Lithium Ferro Phosphate (LFP) batteries 48V 42AH with BMS
3.	Hydrogen cylinders	No. should be specified with justification as per the requirement of vehicle	3.	Hydrogen cylinders	No. should be specified with justification as per the requirement of vehicle
4.	Bidder need to buy a sedan class car preferred old Maruti Dzire for the conversion from ICE into hybrid Fuel cell retrofit vehicle.	The condition of car should be very good	4.	Bidder need to buy a second hand bajaj passenger auto Rickshaw	The condition of vehicle should be very good
5.	Hydrogen Pressure regulators for the supply of H2 to fuel cell	12 V	5.	Miscellaneous items for retrofitting	1. Hydrogen cylinder, Pressure regulator, 2. piping, sensors and other accessories required for fuel cell operation. 3. DCDC convertor 4. Mounting Plate: MS machined 'L' plate 10mm thick 5. base plate: MS machined 12 mm thick. 6. Timmer pully: 110 mm Dia (Hardened) 7. Timmer pully: 55 mm Dia (Hardened) 8. Timmer belt: 15 mm x 715 mm 9. Gear drive shaft: 25 mm Dia EN 24 hardened 10. Bearings: Ball bearing 6025 11. Studs, bolts, Lock washer 12. Wire Harnessing 13. Dash board 14. Speed accelerator: Hand Throttle or Potentiometer 15. Battery Charger: 150 Amp
6.	Miscellaneous items for retrofitting	1. LED head lights 2. Brake switch / relay 3. Main DC contactor 4. Fast blow fuse of 150 Amps 5. Shaft with mounting plate assembly for clutch, flywheel and pressure plate assembly. 6. Shaft extension housing for motor 7. M14 X 50 Timing pulley set with HTD timing belt. 8. Belt guard.			
7.	Air condition for retrofitted vehicle	1.5KW motor with controller, transmission for AC compressor coupling and other electrical accessories			
8.	Vehicle control unit	As per the requirement with justification			
9.	Dashboard				
2.	<b><u>At Page no. 31 and 32</u></b>				

<b>Annexure- 2</b> <b>TECHNICAL COMPLIANCE STATEMENT</b> (To be submitted by bidder duly filled)			<b>Annexure- 2</b> <b>TECHNICAL COMPLIANCE STATEMENT</b> (To be submitted by bidder duly filled)			
<b>(b) Technical Compliance Statement of “PEM Fuel Cell System 2000 Watts” for Electrical power Generation</b>			<b>(b) Technical Compliance Statement of “Design and retrofitting of ICE car into hybrid Fuel cell Electric vehicle”</b>			
(a)	SL. No.	Technical Requirement	Compliance YES/NO	SL. No.	Technical Requirement	Compliance YES/NO
		<b>Feeder protection over current relay</b>				
	1.	Type of Fuel Cell: PEM		1.	PMSM/BLDC Motor: Mid drive PMSM 3000 Watts at 48 Volts	
	2.	Number of Cells: 48		2.	Lithium batteries: Lithium Ferro Phosphate (LFP) batteries 48V 42AH with BMS	
	3.	Rated Power: 2000 W		3.	Hydrogen cylinders: No. should be specified with justification as per the requirement of vehicle	
	4.	Performance: 28.8 V@70 A		4.	Bidder need to buy a second hand bajaj passenger auto Rickshaw: The condition of vehicle should be very good and specified while submitting the Bid	
	5.	H2 Supply Valve Voltage: 12 V		5.	Miscellaneous items for retrofitting:	
	6.	Purging Valve Voltage: 12 V			1. Hydrogen cylinder, Pressure regulator,	
	7.	Blower Voltage: 12 V			2. piping, sensors and other accessories required for fuel cell operation.	
	8.	Reactants: Hydrogen and Air			3. DCDC convertor	
	9.	External Temperature: 5 to 30 °C			4. Mounting Plate: MS machined 'L' plate 10mm thick	
	10.	Max. Stack Temperature: 65 °C			5. base plate: MS machined 12 mm thick.	
	11.	H2 Pressure: 0.45-0.55 bar			6. Timmer pully: 110 mm Dia (Hardened)	
	12.	Hydrogen Purity: >99.995% dry H2			7. Timmer pully: 55 mm Dia (Hardened)	
	13.	Humidification: Self Humidified			8. Timmer belt: 15 mm x 715 mm	
	14.	Cooling: Air (Integrated cooling fan)			9. Gear drive shaft: 25 mm Dia EN 24 hardened	
	15.	Weight (with fan and casing): 10 Kg (±200g)			10. Bearings: Ball bearing 6025	

16.	Controller: 2.5 Kg ( $\pm 100g$ )		11. Studs, bolts, Lock washer
17.	Dimension: 30.3 cm x 35 cm x 18.3 cm		12. Wire Harnessing
18.	Flow rate at maximum output*: 26 L/Min *The flow rate may change with power output		13. Dash board
19.	Start up Time: Whether the start up time is Less than or equal to 30 Seconds at ambient temperature?		14. Speed accelerator: Hand Throttle or Potentiometer
20.	Efficiency of Stack: Whether the efficiency of stack is 40% @28.8 V?		15. Battery Charger: 150 Amp
21.	Low Voltage Shut Down: 24 V Whether this feature is available?		
22.	Over current shutdown: 90 A Whether this feature is available?		
24.	Over temperature shutdown : 65 °C Is this feature available?		
25.	External Power Supply: 13 V ( $\pm 1$ V), 5A~8A  Whether the external power supply is part of system?		
26.	Whether the "PEM Fuel Cell System 2000 Watts" includes all of the following components:  (i) Connections/Tubing (ii) Electronic Valves (iii) Electronic Control Box (iv) 2000 W stack with blower (v) Fuel cell on/off switch		

		(vi) SCU on/off switch		
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All other contents of the abovementioned Tender Document remain Unchanged.

 Recoverable Signature

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Signed by: e47ee7f4-3262-4ffe-a439-f7b9c9dea065  
Dr. Kalpana Chaudhary  
P.I. of the Project & Associate Professor  
Department of Electrical Engineering