



BHARAT HEAVY ELECTRICALS LIMITED
(A Government of India Undertaking)
Delhi – 110 049
India

Request for Partnership (RfP)
for
Technology Tie-up
w.r.t.
Fuel Cell System

RfP Ref No.: AA/TL/2402

Date: January 12, 2022



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SECTION-1
DISCLAIMER

The information contained in this Request for Partnership (RfP) document provided to the Prospective Collaborator(s), by or on behalf of Bharat Heavy Electricals Limited (BHEL) or any of its employees or advisors, is provided to the Prospective Collaborator on the terms and conditions set out in this RfP document and all other terms and conditions subject to which such information is provided.

1. The purpose of this RfP document is to provide the Prospective Collaborator with information to assist the formulation of their proposal. This RfP document does not purport to contain all the information each Prospective Collaborator may require. This RfP document may not be appropriate for all persons, and it is not possible for BHEL, its employees or advisors to consider the business/investment objectives, financial situation and particular needs of each Prospective Collaborator who reads or uses this RfP document. Each Prospective Collaborator should conduct his own investigations and analysis and should check the accuracy, reliability and completeness of the information in this RfP document and where necessary obtain independent advice from appropriate sources.
2. BHEL, its employees and advisors make no representation or warranty and shall incur no liability under any law, statute, rules or regulations as to the accuracy, reliability or completeness of the RfP document.
3. BHEL may, in its absolute discretion, but without being under any obligation to do so, modify, amend or supplement the information in this RfP document.
4. The issue of this RfP does not imply that BHEL is bound to select and shortlist any or all the Prospective Collaborator(s). Even after selection of suitable Prospective Collaborator BHEL is not bound to proceed ahead with the Prospective Collaborator and in no case be responsible or liable for any commercial and consequential liabilities in any manner whatsoever.
5. The Prospective Collaborator shall bear all costs associated with the preparation, technical discussion/presentation and submission of response against this RfP. BHEL shall in no case be responsible or liable for these costs regardless of the conduct or outcome of the RfP process.
6. Canvassing in any form by the Prospective Collaborator or by any other agency on their behalf shall lead to disqualification of their RfP.
7. Notwithstanding anything contained in this RfP, BHEL reserves the right to accept or reject any application and to annul the RfP process and reject all applications, at any time without any liability or any obligation for such acceptance, rejection or annulment and without assigning any reasons, thereof. In the event that BHEL rejects or annuls all the applications, it may at its discretion, invite all eligible Prospective Collaborator(s) to submit fresh applications.
8. BHEL reserves the right to disqualify any applicant during or after completion of RfP process, if it is found there was a material misrepresentation by any such applicant or the applicant fails to provide within the specified time, supplemental information sought by BHEL.
9. BHEL reserves the right to verify all statements, information and documents submitted by the applicant in response to the RfP. Any such verification or lack of such verification by BHEL shall not relieve the applicant of his obligations or liabilities hereunder nor will it affect any rights of BHEL.



SECTION-2

SCHEDULE OF RfP PROCESS & CONTACT DETAILS

A. SCHEDULE OF RfP PROCESS:

The schedule of activities during the RfP Process shall be as follows -

S. No.	Description	Date
1.	Issue of RfP document	12.01.2022
2.	Last date of submission of RfP response	03.02.2022

B. CONTACT DETAILS:

Senior Deputy General Manager (CTM)
Corporate Technology Management,
Bharat Heavy Electricals Limited (BHEL),
BHEL House, Siri Fort, New Delhi 110049
Tel: +91-11- 6633- 7218 /7198 /7323 /7220
Mobile: +91 9810072480
E-Mail: techeoi@bhel.in

SECTION - 3

DETAILS OF REQUEST FOR PARTNERSHIP (RfP)

3.1 INTRODUCTION:

This Request for Partnership (RfP) seeks response from Original Equipment Manufacturers (OEMs) of Fuel Cell System who are meeting the requirements of this RfP and are willing to be associated with BHEL through a License & Technology Collaboration Agreement (TCA) on long term basis to enable BHEL to design, engineer, manufacture, assemble, install, commission, integrate, quality control, test, supply, maintain, operate, repair, service, troubleshoot and sell fuel cell system for various applications, like road transport, railways, stationary etc.

Here, Fuel Cell System means Proton Exchange Membrane (PEM) fuel cell stack including Air supply subsystem with its controller and filter, Hydrogen supply subsystem with recirculation unit, Suitable humidifiers and water separation unit if needed, Thermal management system to maintain the temperature of fuel cell stack, Safety and warning system, Control and instrumentation for automatic trouble free operation and Power management system for providing required DC/AC output along with the fuel cell stack for various applications, like road transport, railways, stationary etc.

3.2 ABOUT BHEL:

BHEL is a leading state owned company, wherein Government of India is holding 63.17% of its equity. BHEL is an integrated power plant equipment manufacturer and one of the largest engineering and manufacturing organization in India, catering to the core infrastructure sectors of Indian economy viz. energy, transportation, heavy engineering industry, defence, renewable and non-conventional energy. The energy sector covers generation, transmission and distribution equipment for thermal, gas, hydro, nuclear and solar photo voltaic. BHEL has been in this business for more than 50 years and BHEL supplied equipment account for more than 57% (approx. 180 GW) of the total thermal generating capacity in India. BHEL is also listed in Indian stock exchanges. BHEL has 16 manufacturing units, 4 power sector regions, 8 service centres and 15 regional offices besides host of project sites spread all over India and abroad. BHEL has its footprint in all the inhabited continents with references in 86 countries including Malaysia, Oman, Iraq, Syria Sudan, Libya, Cyprus, Malta, Afghanistan, Bangladesh, Bhutan, New Zealand etc. with cumulative overseas installed capacity of BHEL manufactured power plants nearing 10,000 MW. The annual turnover of BHEL for the year 2020-21 was around US\$ 2.3 Billion. BHEL's highly skilled and committed manpower of approx. 31000; state-of-the-art manufacturing, R&D facilities and latest technologies helped BHEL to deliver a consistent track record of performance since long. To position leading state-owned companies as Global Industrial giant and as a recognition for their exemplary performance, Government of India categorized BHEL as "Maharatna Company" in 2013.

The high level of quality & reliability of BHEL products is due to adherence to international standards by acquiring and adapting some of the best technologies from leading companies in the world, together with technologies developed in its own R&D centres.

BHEL Corporate R&D, Hyderabad has requisite know-how in end-use application of Hydrogen Economy i.e. for Proton Exchange Membrane Fuel Cells (PEMFC) technology and



has developed and demonstrated PEMFC system upto 5 KW for stationary application and upto 1.25 KW for mobility application.

Our ongoing major technology tie-ups include agreements with Siemens Energy Global GmbH & Co. KG., Germany (for Steam Turbines, Generators and Condensers); MHI, Japan (for Pumps); MPL, Japan (for Flue Gas Desulfurization Systems); Leonardo S.p.A, Italy (for Super Rapid Gun Mount); GE Tech. GmbH, Switzerland (for Steam Turbine for Nuclear Power Plant); Vogt Power International, USA (for Heat Recovery Steam Generators); Indian Space Research Organization (ISRO) (for Space Grade Lithium-Ion Cells); NANO Company Ltd., Korea (for SCR Catalysts); HLB Power Company Ltd., Korea (for Gates and Dampers); Kawasaki Heavy Industries, Japan (for Stainless Steel Coaches for Metros); Valmet Automation Oy, Finland (for DCS System) and Babcock Power Environmental Inc., USA (for Selective Catalytic Reduction Systems).

* More details about the entire range of BHEL's products and operations can be viewed by visiting our web site www.bhel.com

3.3 SCOPE OF COOPERATION:

BHEL intends to shortlist the Original Equipment Manufacturers (OEMs) based on this RfP and to subsequently select a suitable partner for a long term License & Technology Collaboration Agreement (TCA) for complete Fuel Cell System as per indicative scope of technology licensing at Annexure-1.

BHEL shall receive applications pursuant to this RfP in accordance with the terms set forth herein, as modified, altered, amended and clarified from time to time by BHEL, and all applications shall be submitted in accordance with such terms on or before the date specified in this RfP for submission of applications.

Upon receipt of responses against this RfP, BHEL will review the responses to ascertain suitability of the offer and shortlist Prospective Collaborators for further discussions. Detailed discussions on commercial and other terms and conditions to finalize the Technology Collaboration Agreement (TCA) shall be held with shortlisted Prospective Collaborators. The detailed terms and conditions for such a paid-up license agreement shall be mutually agreed upon. Prospective collaborators shall be responsible for sharing necessary know-how & know-why with BHEL for Fuel Cell System.

Business sharing option, during the initial period of technology assimilation by BHEL may also be considered.

3.4 PREQUALIFICATION REQUIREMENTS (PQRs):

- a) The Prospective Collaborator should have at least 3 years of experience of designing, engineering, manufacturing, assembling, testing, supply, installation and commissioning of Fuel Cell System, as on the closing date of this RfP. *(Suitable/relevant documentary evidence to substantiate the fulfilment of this PQR is to be submitted along with RfP).*

AND

- b) The Prospective Collaborator should have designed, engineered, manufactured, assembled, supplied, installed and commissioned at least one (01) Fuel Cell System in last 5 years for use in either traction or road transportation or stationary application with single stack capacity of 30 kW or more and the system should have been in successful operation for at least 1000 hours as on the closing date of this RfP. ***(Requisite performance certificate from the end client/customer as documentary evidence to substantiate the fulfilment of this PQR is to be submitted along with RfP)***

3.5 INSTRUCTIONS:

- 3.5.1 The interested Prospective Collaborators shall ensure that their duly filled up complete response along with following annexures are received by BHEL on or before **03.02.2022**.

Annexure 1- Indicative Scope of Technology Licensing

Annexure 2- Details required from Prospective Collaborator

Annexure 3- Information on various parameters of Fuel Cell System

- 3.5.2 The response to RfP shall also be accompanied with details on **company background, technical features/ product catalogue, reference list of customers, details of current manufacturing facilities and relevant certificates, annual audited financial reports for last three (3) years.**
- 3.5.3 **Language:** All correspondences and documents related to the RfP response shall be in English language, provided that any printed literature furnished by the Prospective Collaborator may be written in another language, as long as such literature is accompanied by a translation of its pertinent passages in English language in which case, for purposes of interpretation of the bid, the English translation shall govern.
- 3.5.4 The Prospective Collaborator(s) shall abide by the terms & conditions, as applicable, of the RfP.
- 3.5.5 All pages of the response against this RfP shall be duly signed by the authorised signatory.
- 3.5.6 Multiple proposals from the same Prospective Collaborator should not be submitted.
- 3.5.7 BHEL at its discretion shall inspect the Prospective Collaborator's works/office/reference site premises for the purpose of evaluation, as deemed necessary before selection of Partner. BHEL's decision in this regard shall be final.
- 3.5.8 Any Prospective Collaborator which has been debarred/blacklisted by Indian Central/State Governments or by any entity controlled by Indian Central/State Governments from participating in any of their project, as on date of submission of RfP, shall not be eligible to submit the RfP.
- 3.5.9 BHEL shall receive applications pursuant to this RfP in accordance with the terms set forth herein, as modified, altered, amended and clarified from time to time by BHEL, and all applications shall be submitted in accordance with such terms on or before the date specified in this RfP for submission of applications.



In case any amendment/corrigendum to this RfP is issued, it shall be notified only at www.bhel.com

3.6 CONFIDENTIALITY:

Information relating to the examination, clarification, evaluation and comparison of RfP and recommendations shall not be disclosed to Prospective Collaborator(s). Any effort by Prospective Collaborator(s) to influence BHEL in processing of RfP or selection decisions may result in the rejection of the response against RfP.

3.7 GOVERNING LAWS & JURISDICTION:

The RfP process shall be governed by, and construed in accordance with the laws of India and the Courts at New Delhi (India) shall have exclusive jurisdiction over all disputes arising under, pursuant to and / or in connection with the RfP process.

Annexure-1

Indicative Scope of Technology Licensing

a)	<p>Licensing & sharing of the state-of-art technology relating to design, engineer, manufacture, assemble, install, commission, integrate, quality control, test, supply, maintain, operate, repair, service, troubleshoot and sell Fuel Cell system including fuel cell stack and all its sub-systems for fuel supply, thermal management, humidification, control, instrumentation, safety, power electronics. The fuel cell system should be suitable for various applications like road transport, stationary, railways etc.</p> <p>Sharing of know-how for mechanical and electrical integration /interfacing of fuel cell stack & its subsystems with other sub systems/aggregates of Electric Vehicle/Energy Storage System/ Rail etc.</p>
b)	Sharing of applicable computer programs including logics and source code, if any
c)	Sharing of improvements/modifications/developments/up-gradations carried out by the prospective collaborator over the duration of the technology licensing agreement for taking care of new market requirements and obsolescence of components used in the system
d)	Assistance in planning & setting up of the facilities by way of expert advice in terms of identifying, sizing & selection of equipment required for manufacturing and assembly, their layout and foundation etc.
e)	Assistance for establishing manufacturing processes, commissioning of the manufacturing facilities, design of special tools and dies, jigs & fixtures etc. by way of deputation of experts for mutually agreed number of man days as and when required by BHEL.
f)	Sharing of Site feedback and troubleshooting information
g)	Training in the design, engineering, manufacturing, assembly, installation, commissioning, integration, quality control/ quality assurance, testing, supply, maintenance, operation, repair, service and troubleshoot
h)	Deputation of prospective collaborator's experts to assist BHEL in absorbing the technology for licensed products.
i)	Support through engineering services from prospective collaborator's design office / manufacturing facilities for licensed products.
j)	Sharing of information to enable BHEL to source/procure those items, which the prospective collaborator sources from outside (as they are not manufactured by the prospective collaborator) for use in the fuel cell system.

(SIGNATURE)

Annexure-2

Details required from Prospective Collaborator

S No.	Requirement	Prospective Collaborator's response (YES/NO) and remarks if any
1.	Whether the Prospective Collaborator is an Original Equipment Manufacturer (OEM) of fuel cell stack and system	
2.	For how many years, Prospective Collaborator is in business of fuel cells	
3.	Whether the prospective collaborator has capability of engineering and product development of fuel cell system	
4.	Whether the Company background and its product profile/ catalogues along with technical details of fuel cell system, which is being offered to BHEL under this RfP, enclosed	
5.	Whether product data sheet has been enclosed	
6.	Whether information on competitors/market share has been enclosed	
7.	Whether Prospective Collaborator's detailed reference list (including performance certificates, satisfactory operation certificates etc.) have been enclosed	
8.	Whether Prospective Collaborator's annual audited financial reports including auditor's report for last 3 years have been enclosed	
9.	Whether the Prospective Collaborator owns the Intellectual Property Rights for the technology being proposed for licensing under the Technology Collaboration Agreement (TCA) or has an unencumbered right from the owner of the Intellectual Property Rights to sub-license the technology, if applicable. If yes, whether list of such Intellectual Property Rights enclosed.	
10.	Whether the Prospective Collaborator has any experience in establishing new manufacturing, testing and assembly facilities, if so please specify.	
11.	Whether Prospective Collaborator has offered technology license to any other company in the world for supply of Fuel Cells. If so, please specify.	



S No.	Requirement	Prospective Collaborator's response (YES/NO) and remarks if any
12.	<p>The Prospective Collaborator should have at least 3 years of experience of designing, engineering, manufacturing, assembling, testing, supply, installation and commissioning of Fuel Cell System, as on the closing date of this RfP.</p> <p><i>Whether the Prospective Collaborator meets above PQR and suitable/relevant documentary evidence to substantiate the fulfilment of above PQR has been submitted.</i></p>	
13.	<p>The Prospective Collaborator should have designed, engineered, manufactured, assembled, supplied, installed and commissioned at least one (01) Fuel Cell System in last 5 years for use in either traction or road transportation or stationary application with single stack capacity of 30 kW or more and the system should have been in successful operation for at least 1000 hours as on the closing date of this RfP.</p> <p><i>Whether the Prospective Collaborator meets above PQR and requisite performance certificate from the end client/customer as documentary evidence to substantiate the fulfilment of above PQR has been submitted.</i></p>	
14.	<p>Whether the fuel cell system being proposed for technology licensing to BHEL is approved for all necessary certifications for use in traction, road transportation and stationary applications <i>(to be substantiated with necessary certificates)</i></p>	
15.	<p>Details about the total Strength of Engineering/ Technical Personnel</p>	
16.	<p>Whether the Prospective Collaborator has any presence in India. If so, please specify.</p>	

(SIGNATURE)

Annexure -3

Information on Various Parameters of Fuel Cell System

S No.	Specifications / Parameters	Prospective Collaborator's response (YES/NO) and remarks if any
1.	Whether the Membrane Electrode Assemblies (MEAs) are manufactured in-house or bought out	
2.	If MEAs are manufactured in-house, then specify details about procurement of raw materials like catalyst, electrolyte membrane and porous conducting electrode, backing layer etc.	
3.	If MEAs are bought out, then details about the process for procurement of the raw materials by BHEL	
4.	Whether the Bipolar plates and cooling plates are manufactured in-house or bought-out	
5.	If plates are manufactured in-house, then details about procurement of raw materials like carbon powder, binder etc.	
6.	If plates are bought out, then details about the process for procurement of raw materials by BHEL	
7.	Whether the Prospective Collaborator has in-house capability for all sub-components (current collectors, end plates and Insulation sheet, tie-rods etc.) of stack	
8.	Whether the Prospective Collaborator has in-house capability for all other sub-systems (Anode and cathode humidifiers, thermal management system, control and safety system, reactant supply system etc.)	
9.	Whether any agreement / technology tie-up with a third party is required for any item/material used in manufacturing of fuel cell system. If yes, please specify.	
10.	Manufacturing capacity of MEAs/Stack/System	
11.	Stack and system rating (Range)	
12.	Current density: Amp/cm ²	

S No.	Specifications / Parameters	Prospective Collaborator's response (YES/NO) and remarks if any
13.	Voltage/cell at rated current density	
14.	Operating pressure at anode and cathode	
15.	Power density of stack: kW/lit and kW/kg	
16.	Life of fuel cell stack in hours for automobile applications and for stationary applications	
17.	Degradation rate mV/1000hours	
18.	Whether the Prospective Collaborator has the capability of making fuel cell stack and system of 25 kW rating or more	
19.	Whether the Prospective Collaborator has supplied fuel cell stack and systems of at least 30 kW rating for E-Bus or e-truck application	
20.	Volume of fuel cell stacks and system supplied (numbers with capacity) in last three years	
21.	Cumulative Operational hours/kms of fuel cell systems supplied by the Prospective Collaborator in last three years	
22.	Minimum operational durability of fuel cell stacks and systems with degradation rate	
23.	Auxiliary power consumption for various sub-systems in fuel cell system.	
24.	Operating temperature range of fuel cell system including extreme weather conditions	

(SIGNATURE)