Extension of EoI Due Date

Subject: Technology Tie-up for IGBT based Propulsion System including TCMS

This has reference to the Expression of Interest (EoI) published on BHEL's website www.bhel.com for technology tie-up for IGBT based Propulsion System including TCMS on long term basis to enable BHEL to design, engineer, manufacture, assemble, quality control, test, supply, install, commission, repair, service and retrofit state of the art IGBT based Propulsion System including Train Control and Management System (TCMS) and Auxiliary Converter.

The subject EoI is hosted on BHEL's website and can be accessed using following link:
http://www.bhel.com//assets/downloads/5efc153c1683bEOI_for_Propulsion_System.pdf

The revised due date for receiving the proposals against the EoI has now been extended up to **August 31, 2020 (Monday)**.

The interested prospective collaborators shall ensure that their response along with Annexures as mentioned in the EoI are received by BHEL on or before August 31, 2020. The response shall necessarily be accompanied with details on company background, technical features/ product catalogue, information on market share, copy of reference list, copy of annual audited financial reports for last 5 (five) years including copy of auditor's report etc.

In case any further information is needed, kindly feel free to contact us.

The respondent shall submit their offer with all annexures duly signed to the following address:

Deputy General Manager (Technology Licensing)
Corporate Technology Management
Bharat Heavy Electricals Limited
BHEL House, Siri Fort
New Delhi – 110049, India
Phone: +91 11 66337213 / 7339
Mobile: +91 9818103430/ +91 7838293011
Fax: +91 11 26492974
Email: techeoi@bhel.in

Subject: Technology Collaboration for IGBT based Propulsion System including Train Control and Management System (TCMS)

1) Introduction:

This Expression of Interest (EoI) seeks response from Original Equipment Manufacturers (OEMs), who are willing to be associated with BHEL through a license & technology collaboration agreement on long term basis, to enable BHEL to design, engineer, manufacture, assemble, quality control, test, supply, install, commission, repair, service and retrofit state of the art IGBT based Propulsion System including Train Control and Management System (TCMS) and Auxiliary Converter.

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, defense, 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's account for more than 59% (approx. 190 GW) of the total thermal power generating capacity in India. BHEL is also listed in both major Indian stock exchanges. BHEL has 16 manufacturing units, 4 power sector regions, 8 service centre, 1 overseas office and 15 regional offices besides host of project sites spread all over India and abroad. The annual turnover of BHEL for the year 2019-20 was around USD 2.85 billion. BHEL's highly skilled and committed manpower of approx. 34000; state-of-the-art manufacturing 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.

Our ongoing technology tie-ups with leading technology providers are GE Technology GmbH, Switzerland (for Once through Boilers and Coal Pulverisers); Siemens, Germany (for Steam Turbines, Generators and Condensers); MHI, Japan (for Pumps); MHPS, Japan (for Flue Gas Desulfurization Systems); Vogt Power International, USA (for HRSG); OTO Melara, Italy (for SRGM); ISRO, India (for space grade li Ion cells); BPE, USA (for SCR System), NANO, Korea (for SCR Catalyst); HLB Power Co. Ltd., Korea (for Gates and Dampers) and Kawasaki Heavy Industries Ltd., Japan (for Stainless Steel Metro Coaches & Bogies).

More details about the entire range of BHEL's products and operations are available at www.bhel.com.

2) BHEL's Credentials in Rail Business:

BHEL has been designing and manufacturing rolling stock for rail and urban transportation. BHEL has also been manufacturing Motors, Power electronics and Controllers for various transportation applications at its various factories.

In transportation sector, BHEL is into the manufacturing of complete electric and diesel electric locomotives and electrical assemblies/components including traction motors, traction transformers, power & auxiliary converters and controls, gear wheels etc. BHEL is a regular supplier of propulsion equipment of ACEMU/MEMU.

At Jhansi Plant, BHEL is manufacturing complete Electric Locomotives upto 6000 HP rating for mainline application of Indian Railways, Diesel Electric Locomotives from 350 HP to 3250 BHP rating. Till date, BHEL has supplied cumulatively more than 725 nos. of main line electric locomotives to Indian Railways and diesel electric locomotives for shunting operations to various industries.

BHEL's Jhansi plant has an installed capacity of 75 nos. locomotives per year. At Jhansi, BHEL has complete state-of-the-art facilities for manufacturing, fabrication and testing of bogies, loco shells, under frames and other mechanical components of locomotives. BHEL has recently developed India's first state-of-the-art WAG7 Electric Locomotive with regenerative capabilities. BHEL has also developed India's first Traction Motor for 9000HP Electric Locomotives.

Among electrical propulsion equipment, BHEL manufacture and supply traction motors, traction transformers, power converters (IGBT) & controls, auxiliary converters (IGBT) and vehicle control units for electric locomotives, diesel electric locomotives, EMUs, DEMUs & and metros trains of Indian Railways. BHEL's manufacturing range includes complete solution for ACEMU/MEMU, IGBT based 3-phase drive equipment upto 6000HP rating. BHEL has also been in the forefront of providing maintenance and spares/replacement support to Indian Railways for their locomotive fleet. BHEL has full-fledged service department located at major centres in the country.

BHEL is establishing state-of-the-art design, engineering and manufacturing facility, which is presently under progress at BHEL, Bhopal Unit, to cater the requirements of Stainless Steel Coaches for EMUs for urban transportation and Trainsets for semi high-speed Rail transportation.

BHEL's Electronics division (EDN) at Bengaluru is the nodal agency for electronics in BHEL & it provides a strong base in the areas of Automation and Power Electronics and to supplement the Company's pioneering efforts in the core sectors. Many of the power plants and industries in the country today are equipped with electronic products and systems that have been manufactured and supplied by BHEL EDN. EDN supplied equipment accounts for about 63 % of total Control & Instrumentation (C&I) equipment in the country and continue to be the leader in power industry for past several decades.

3) Scope of Cooperation

In order to meet upcoming market requirements in 3-phase IGBT based propulsion system including TCMS for various EMUs like Metro / Metrolite / Semi high speed Trainsets and Rapid Rail Transit System (RRTS) segment in India and abroad, BHEL intends to enter into a Technology Collaboration Agreement(TCA) with a leading Original Equipment Manufacturer (OEM). Propulsion system would mean Power Converter/Inverter, Aux Converter, Traction Motor with its mechanical transmission system to axle & Transformer (wherever required).

BHEL seeks a Prospective Collaborator for entering into a TCA which will provide support for integration of Propulsion system and TCMS with BHEL built Coaches, system testing and proving of train performance parameters including specific energy consumption etc. The Prospective Collaborator is also required to have experience in the design of auxiliary converter / battery charging system and interfacing through TCMS with air supply system, door system, Heating Ventilation and Air Conditioning System (HVAC), communication (PA/PIS & CCTV), couplers and draft gear, lighting etc. systems.

The TCA shall enable BHEL to design, engineer, manufacture, assemble, quality control, test, supply, install, commission, repair, service and retrofit state of the art IGBT based Propulsion System including Train Control and Management System (TCMS) and Auxiliary Converter along with its seamless integration with BHEL built Coaches.

The detailed terms and conditions for such a paid-up license agreement shall be mutually agreed upon. Indicative scope of technology transfer for IGBT based propulsion system including TCMS (along with its integration with BHEL built Coaches) are given in **Annexure-1.**

4) Prequalification requirements (PQR)

The Prospective Collaborator (Applicant) shall meet the following conditions as on the date of submission of EoI: (to be substantiated with documentary evidence)

4.1 The Prospective Collaborator shall have cumulative experience of minimum ten (10) years in the Design and Manufacturing of propulsion system equipment (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) for Metro rolling stock and its supplied propulsion system should have been in satisfactory revenue operation for at least five (5) years in minimum aggregate 500 cars comprising of both powered and non-powered cars, supplied against minimum five (5) different contracts in the Metros (i.e. MRT, LRT, Sub-urban Railways and high speed railways) propulsion system of minimum two (2) different countries outside the country of origin. Out of the above 500 cars, EMU based train sets should have design/operating speed of 180/160 kmph or more in minimum aggregate 250 cars (comprising of powered and non-powered cars) in three different contracts either in i) India or ii) country other than the country of origin which are in satisfactory revenue operation for at least three years.

4.2 The Prospective Collaborator is also required to meet certain financial parameters as per following:

a. Net worth {to be obtained from balance sheet} should be positive at end of last Financial Year.

b. Profitability (Earnings or Profit before tax but after interest) shall be positive in at least two financial years out of last five financial years.

c. Liquidity (>1800 million INR (Equivalent to USD 23.92 Million based on exchange rate of 1 USD = INR 75.25 as on 30.06.2020)).

Note: Net current assets {(Current assets + loans & advances) – (current liabilities + provision)} or documents including banking reference, should show that the Prospective Collaborator has access to or has available liquid assets, lines of credit and other financial means to meet cash flow INR 1800 million(equivalent to USD 23.92 Million). Banking reference should contain in clear terms the amount that bank will be in a position to lend for this work. In case the Net Current Assets (as seen from the Balance Sheets) are negative, only the Banking references will be considered. Otherwise the aggregate of the Net Current Assets and submitted Banking references will be considered for working out the Liquidity.

d. The Average Annual Turnover for the last five financial years for Rolling Stock manufacture only {(5250 million INR (Equivalent to USD 69.75 Million based on exchange rate of 1 USD = INR 75.25 as on 30.06.2020)} average per annum over last 5 years).

The Applicant claiming Technical Capability in respect of Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) along with TCMS for various EMUs (as per above clause) shall have designed such Propulsion Equipments (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor, TCMS etc.) for Metro rolling stock/ RRTS/ Metrolite and manufactured the same. An Applicant who has procured the design from a third party shall not be eligible for claiming the experience here above. Collaborator's Experience in the field of IGBT based propulsion system including TCMS may please be provided as per **Annexure-2** and Product reference of Prospective Collaborator for major supplies in last 10 years may please be provided as per **Annexure- 3.**

5) Selection of Prospective Collaborator

Based on the information provided under this EoI, the Prospective Collaborators (Applicant) shall be technically shortlisted on the basis of the technical evaluation criteria specified in PQR. Prospective Collaborators (Applicant) not meeting any of the parameters of technical evaluation criteria of this EoI shall not be considered. The Prospective Collaborators (Applicant) who are technically qualified may be further evaluated on the basis of commercial proposals which shall be invited for the second stage of evaluation.

6) Brief Description of EoI Process:

The interested parties shall ensure that their response, along with details requested as per the Annexures of this EoI, is received by BHEL on or before **22th July 2020**. The response shall necessarily be accompanied with details on company background, technical features/ product catalogue, information on market share, copy of reference list, copy of annual audited financial reports for last 5 (five) years including copy of auditor's report etc. The responding parties, on submission of their response, can be called for further discussions to India at short notice.

The respondent shall submit their offer with all Annexures duly signed. In case any further information is needed, kindly feel free to contact us.

BHEL at its discretion may extend the due date for submission of EoI and the decision of BHEL in this respect would be final & binding on the respondents.

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

7) Schedule of EoI & contact details:

7.1 Schedule of EoI:

The schedule of EoI shall be as follows :

Sl. No.	Description	Date
1.	Issue of EoI document	01.07.2020
2.	Last date for submission of EoI response	22.07.2020

7.2 Contact Details:

The respondent shall submit their response with all annexures duly signed to the following official:

Deputy General Manager (Technology Licensing)
Corporate Technology Management
Bharat Heavy Electricals Limited
BHEL House, Siri Fort
New Delhi – 110049, India
Phone: +91 11 66337213 / 7339
Mobile:+91 9818103430/ +91 7838293011
Fax: +91 11 26492974
Email: techeoi@bhel.in

8) Miscellaneous:

8.1. Right to accept or reject any or all Applications:

a) Notwithstanding anything contained in this EoI, BHEL reserves the right to accept or reject any Application and to annul the EoI 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 therefore. In the event that BHEL rejects or annuls all the Applications, it may, at its discretion, invite all eligible OEMs/Suppliers to submit fresh Applications.

b) BHEL reserves the right to disqualify any Applicant during or after completion of EoI 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.

c) BHEL reserves the right to verify all statements, information and documents submitted by the Applicant in response to the EoI. 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.

8.2 Governing Laws & Jurisdiction

The EoI 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 EoI process.

Indicative Scope of Technology Transfer

(a)	Licensing & transfer of state of the art technology relating to the design, engineer, manufacture, assemble, quality control, test, supply, install, commission, repair, service and retrofit state of the art IGBT based Propulsion System including Train Control and Management System (TCMS) and Auxiliary Converter {including integration with other subsystems such as Air Supply System, Door System, Heating Ventilation and Air Conditioning (HVAC), Communication (PA/PIS & CCTV), Couplers and Draft Gear, Lighting, Train Radio etc.}.
(b)	Assistance in planning & establishing the new manufacturing, testing and assembly facilities & processes/ suitable augmentation at BHEL's existing facilities/processes by way of expert advice in terms of identifying, sizing & selection of equipment / machinery required for manufacturing, their layout and foundation etc. Assistance for commissioning of the manufacturing facilities, design of special tools and dies, jigs & fixtures etc.
(c)	Transfer of applicable computer programs including Logics & Source Code (wherever applicable).
(d)	Prototype manufacture, integration in Coach and complete testing at BHEL Works as per specifications of Indian or other Customers as well as providing assistance in according approvals of prototype from Customers.
(e)	Transfer of improvements/modifications/developments/up gradations to be carried out by the Applicant during the period of TCA for taking care of new market requirements and obsolescence. Subsequent updates required due to component obsolescence or updates implemented by Applicant due to safety consideration would also be provided.
(f)	During the field trials and regular operation if any modifications/updations are carried out to improve the performance/reliability of the system the same shall also be transferred to BHEL with complete know-how.
(g)	Training of BHEL engineers in the design, engineer, manufacture, assembly, quality control/quality assurance, testing, installation, commissioning, maintenance & operation of the IGBT based propulsion system including TCMS, Traction Converter/Inverter, Auxiliary Converter/Inverter and Traction Motor with its mechanical transmission system to axle & transformer (wherever required) along with its integration with BHEL built Coaches.
(h)	Deputation of Collaborator's experts to assist BHEL in absorbing the technology for licensed products.
(i)	Support through engineering services from Collaborator's design office / manufacturing facilities for licensed products.
(j)	Transfer of information to enable BHEL to source/procure those items, which Prospective Collaborator sources from other vendors (as these are not manufactured by the prospective Collaborator) for use in the IGBT based propulsion system including TCMS along with its integration with BHEL built Coaches.

(SIGNATURE)

Collaborator's Experience in the field of IGBT based propulsion system including TCMS

Sl. No.	Requirement	OEM's response YES/NO and remarks if any
(a)	Whether the Prospective Collaborator is an Original Equipment Manufacturer (OEM) of **IGBT based propulsion system including TCMS**	
(b)	Whether Prospective Collaborator is OEM for : i) 25kV AC OHE catenary system ii) 1500 V DC OHE catenary system iii) 750 V DC traction with third rail	
(c)	Whether documentary evidence to substantiate the below PQR has been submitted by Prospective Collaborator: "The Prospective Collaborator shall have cumulative experience of minimum ten (10) years in the Design and Manufacturing of propulsion system equipment (Traction Converter Inverter, Auxiliary Converter Inverter and Traction Motor) for Metro rolling stock and its supplied propulsion system should have been in satisfactory revenue operation for at least five (5) years in minimum aggregate 500 cars comprising of both powered and non-powered cars, supplied against minimum five (5) different contracts in the Metros (i.e. MRT, LRT, Sub-urban Railways and high speed railways) propulsion system of minimum two (2) different countries outside the country of origin. Out of the above 500 cars, EMU based train sets should have design/operating speed of 180/160 kmph or more in minimum aggregate 250 cars (comprising of powered and non-powered cars) in three different contracts either in i) India or ii) country other than the country of origin which are in satisfactory revenue operation for at least three years."	
(d)	Whether documentary evidence for financial parameters as per following has been submitted: i. Net worth {to be obtained from balance sheet} should be Positive at end of last Financial Year. ii. Profitability (Earnings or Profit before tax but after interest) shall be positive in at least two financial years out of last five financial years. iii. Liquidity (>1800 million INR (Equivalent to USD 23.92 Million based on exchange rate of 1 USD = INR 75.25 as on 30.06.2020). iv. The Average Annual Turnover for the last five financial years for Rolling Stock manufacture only {(5250 million INR (Equivalent to USD 69.75 Million based on exchange rate of 1 USD = INR 75.25 as on 30.06.2020)} average per annum over last 5 years)	
(e)	Whether the Prospective Collaborator confirmed the willingness to facilitate BHEL in establishing required manufacturing facilities & processes of **IGBT based propulsion system including TCMS** at BHEL as per various customers in Indian market.	
(f)	Whether the Prospective Collaborator abandoned any work in the last ten (10) years.	
(g)	Whether the Prospective Collaborator delayed any work in the last ten (10) years by more than 75% of the original period of completion due to his default.	
(h)	Whether the Prospective Collaborator delayed by more than 50% of original period of completion in more than 20% of the number of works in the last ten(10) years due to his default.	

Sl. No.	Requirement	OEM's response YES/NO and remarks if any
(i)	Whether the Prospective Collaborator suffered bankruptcy / insolvency in the last ten (10) years.	
(j)	Whether the Prospective Collaborator has been debarred by Government of India/any State Government in India/Central or State Government undertaking as on the due date of submission of bid (Bidder to furnish a specific undertaking to this effect).	
(k)	Whether the Prospective Collaborator certified that no agent / middleman has been or will be engaged or any agency commission been or will be paid.	
(l)	Whether the Prospective Collaborator currently in the process of financial restructuring under Corporate Debt Restructuring Act.	
(m)	Whether details of company background, product catalogues have been enclosed.	
(n)	Whether information on market share has been enclosed.	
(o)	Whether copy of Prospective Collaborator's detailed reference list has been enclosed.	
(p)	Whether copy of Prospective Collaborator's annual audited financial reports for last 5 years has been enclosed.	
(q)	Whether a summary of experience & references have been enclosed.	
(r)	Whether the Prospective Collaborator owns the IPRs for the technology being proposed for transfer under the Technology Collaboration Agreement (TCA) or have unencumbered right from the owner of the IPRs to sub-license the technology, if applicable. If yes, list of such IPRs to be enclosed.	
(s)	Whether the Prospective Collaborator confirmed the Transfer of essential technology to BHEL to enable BHEL to design, engineer, manufacture, assemble, quality control, test, supply, install, commission, repair, service and retrofit state of the art IGBT based propulsion system including Train Control and Management System (TCMS) and Auxiliary Converter.	

(SIGNATURE)

Annexure -3

Reference List: The Prospective Collaborator shall furnish a summary of their product reference as detailed below for major supplies in last 10 years

S.No.	Year of Supply (Year 10 as the latest completed Calendar / Financial Year)	Description of Items	No. of IGBT based Propulsion Systems supplied for Metro (i.e. MRT, LRT, Sub-urban Railways or high speed railways)	Name of Customer	Remarks
1	Year 10	IGBT based Propulsion Systems including TCMS			
2	Year 9				
3	Year 8				
4	Year 7				
5	Year 6				
6	Year 5				
7	Year 4				
8	Year 3				
9	Year 2				
10	Year 1				
	Total				

(SIGNATURE)