



**EXPRESSION OF INTEREST**

**FOR**

**JOINT WORKING / PARTNERING WITH BHEL**

**IN**

**INDIAN RAILWAY RFP No. 2022/Elect (Dev)/440/5**

**FOR**

**Manufacturing and Maintenance of 12000 HP Electric locomotives**

**Issued by:**

**Bharat Heavy Electricals Limited, having registered office at**

**BHEL House, Siri Fort New Delhi-110049 and**

**also office at**

**TBSG, Industry Sector, 7th floor, Integrated Office Complex, Lodhi Road,**

**NEW DELHI-110 003, INDIA**

**(hereinafter referred to as 'BHEL')**



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**DISCLAIMER**

*All information contained in this EOI provided / clarified are in good interest and faith. The information contained in this Expression of Interest document or subsequently provided to Applicant(s), whether verbally or in documentary or any other form, by or on behalf of BHEL, is provided on the terms and conditions set out in this EOI and such other terms and conditions subject to which such information is provided.*

*The purpose of this EOI is to provide interested parties with information that may be useful to them in the formulation of their application for qualification and subsequent selection pursuant to this EOI. This EOI is not an offer by BHEL to the prospective Applicant(s) or any other person. This EOI is neither intended nor shall it be construed as creating or requiring any ongoing or continuing relationship or commitment with any party or person. This is not an offer or invitation to enter into an agreement of any kind with any party.*

*Though adequate care has been taken in the preparation of this EOI document, the interested firms shall satisfy themselves that the document is complete in all respects. The information is not intended to be exhaustive. Interested Agencies are required to make their own enquiries and assumptions wherever required. Intimation of discrepancy, if any, should be given to the specified office immediately. If no intimation is received by this office by the date mentioned in the document, it shall be deemed that the EOI document is complete in all respects and firms submitting their interest are satisfied with the EOI document in all respects.*

*The issue of this EOI does not imply that BHEL is bound to select and shortlist Applicant(s) for next stage or to enter into any agreement(s) with any Applicant(s). BHEL reserves all right to reject any applications submitted in response to this EOI document at any stage without assigning any reasons thereof. BHEL also reserves the right to withhold or withdraw the process at any stage. Neither BHEL nor its employees and associates will have any liability, loss, expense or damage which may arise from or be incurred or suffered in connection with anything contained in this EOI document or any matter deemed to form part of this EOI document, the information and any other information supplied by or on behalf of BHEL. BHEL accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance/use of any statements/information contained in this EOI by the Applicant. BHEL is not making any representation or warranty, express or implied, as to the accuracy or completeness of any information/statements made in this EOI.*

*The Applicant shall bear all its costs associated with or relating to the preparation and submission of its Application including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by BHEL or any other costs incurred in connection with or relating to its Application. All such costs and expenses will remain with the Applicant and BHEL shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by an Applicant in preparation or submission of the Application, regardless of the conduct or outcome of the EOI.*



## **1.0 INTRODUCTION**

Railway board has floated a RFP No.2022/Elect (Dev)/440/5 of MINISTRY OF RAILWAYS for: -

- i. Design, manufacture, supply, testing and commissioning of 12000 HP electric locomotives conforming to the Specifications and Standards set forth in the RFP.
- ii. Maintenance of Locomotives in accordance with the provisions RFP.
- iii. Up-gradation of the available existing infrastructure/facilities and development of additional infrastructure/facilities to meet the requirement to manufacture the Locomotives (120 Locomotives per annum) at nominated site of Government Manufacturing Unit at Banaras Locomotive Works, Varanasi, for manufacture, assembly and supply of Locomotives in accordance with the provisions of RFP;
- iv. Up-gradation of the available existing infrastructure/facilities and development of additional infrastructure/facilities to meet to maintain the Locomotives at 3 (three) Nominated Government Maintenance Depots of Indian Railways in accordance with the provisions RFP.
- v. Any other obligations to meet the objective either implied or deemed necessary as per the RFP.

## **2.0 ABOUT BHEL**

Bharat Heavy Electricals Limited (BHEL) is a Central Public Sector Enterprise, wherein Government of India is holding 63.17% of its equity. One of the largest engineering and manufacturing companies of its kind in India having a turnover of around USD 5 billion. The company is engaged in the design, engineering, manufacture, construction, testing, commissioning and servicing of a wide range of products and services for the core sectors of the economy, viz. Power, Transmission, Industry, Transportation, Renewable Energy, Oil & Gas and Defence with over 180 product offerings to meet the needs of these sectors.

Since its inception in 1964, BHEL has been the solid bedrock of evolution of India's Heavy Electrical Equipment industry. BHEL has a mammoth 20,000 MW per annum capability for manufacturing of power generation equipment. A widespread network of 17 manufacturing units, 2 repair units, 4 regional offices, 8 service centres, 1 subsidiary, 4 overseas offices, 6 joint ventures, 15 regional marketing centres and current project execution at more than 150 project sites across India and abroad corroborates the humongous scale and size of its operations. BHEL manufactures a wide range of high quality & reliable products adhering to national and international standards.

With key focus on project execution, the worldwide installed base of power generating equipment supplied by BHEL has exceeded 185 GW. BHEL's equipment that account for about 60% of the country's total generation from thermal utility sets (coal based), stand a testimony to its valuable contribution towards nation building. BHEL's global competitiveness has established its footprint in all the inhabited continents with references in 83 countries.

The high level of quality & reliability of BHEL products is a testimony to its adherence to international standards by acquiring and adapting some of the best technologies from leading companies in the world including General Electric, Siemens AG, Mitsubishi Heavy Industries Ltd. etc., together with technologies developed in its own R&D centers. BHEL invests more than 2.5% of turnover on R&D and innovation.

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.



## **Expression of Interest (Eoi) for 12000HP Propulsion System** *Power Electronic Systems*

In transportation sector, BHEL is into the manufacture of complete electric and diesel electric locomotives and electrical assemblies/components including traction motors, traction transformers, power & auxiliary converters and controls, gear wheels etc. We are a regular supplier of propulsion equipment of ACEMU/MEMU. India's first air-conditioned ACEMU train operational in Mumbai is equipped with BHEL's electrics and propulsion system.

At our Jhansi plant, we manufacture 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, we have supplied cumulatively more than 800 nos. of main line electric locomotives to Indian Railways and diesel electric locomotives for shunting operations to various industries.

Our Jhansi plant have an installed capacity of 75 nos. locomotives per year. At Jhansi, we have complete state-of-the-art facilities for manufacturing, fabrication and testing of bogies, loco shells, under frames and other mechanical components of locomotives. We have recently developed India's first state-of-the-art WAG7 Electric Locomotive with regenerative capabilities. We have also developed India's first Traction Motor for 12000HP Electric Locomotives.

Among electrical propulsion equipment, we 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. Our 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. We have full-fledged service department located at major centres in the country.

We are establishing state-of-the-art design, engineering and manufacturing facility at BHEL, which is presently under progress at Bhopal Unit. The upcoming facilities shall be able to cater requirement of Stainless Steel Coaches for EMUs for urban transportation and Trainsets for semi high-speed Rail transportation.

**More details about the entire range of BHEL's products and operations can be obtained by visiting our web site [www.bhel.com](http://www.bhel.com).**



### **3.0 PURPOSE**

- 3.1 The Ministry of Railways “Railway Board” is engaged in the development of Indian railways and as part of this endeavor, they have invited RFP for Manufacturing cum maintenance agreement for 12000 HP electric locomotives.
- 3.2 Railway Board’s tender is for Manufacturing cum Maintenance Agreement of the 12000 HP electric locomotives. The selected bidder shall manufacture 800 nos. 12000 HP electric locomotives, at Banaras Locomotive Works, Varanasi, and supply the same spread over a period of 10 years and undertake comprehensive maintenance of the Locomotives at 3 (three) Nominated Government Maintenance Depots of Indian Railways thereof for a period of 35 years.
- 3.3 The intent of this Expression of Interest hereinafter referred to as the “EOI” is to invite applications from interested Party/Parties who are willing to Partner / Work Jointly with BHEL for developing **Propulsion system comprising of Traction Converter, Auxiliary Converter and Vehicle Control Unit** against the INDIAN RAILWAY RFP No.2022/Elect (Dev)/440/5 for Manufacture and supply of 800 Electric Locomotive of 12,000 horse power, B0-B0 configuration spread over a period of 10 (ten) years at Banaras Locomotive Works, Varanasi and Maintenance at nominated Government Depots over Indian Railways on the basis of a long term manufacture and maintenance contract including upgradation of the Government Manufacturing Units & Maintenance Depots in India. For reference and further details, complete tender document can be downloaded from INDIAN RAILWAY’s e-procurement website.
- 3.4 BHEL would like to partner with party/parties who meet the PQR as per clause 6 of this EOI. Respondents are encouraged to go through RAILWAY BOARD’s referred tender document for qualification criteria in detail.
- The technical requirement of the propulsion equipment are governed by the RDSO specification No. RDSO/2006/EL/SPEC/0044, Rev’13’ issued by RDSO in June’13.
- 3.5 BHEL shall select suitable partner(s) who meet Pre-Qualification Criteria (PQR) as per Annexure -2 for the intended business tie-up and shall enter into exclusive Memorandum of Understanding (MoU), Pre-bid tie-up with selected partner(s) as per agreed business association. The chosen partner(s) shall also be required to enter into **mutually exclusive pre-bid tie up arrangement** with BHEL to provide due support for fulfilling the contractual obligations of BHEL to the customer i.e. Indian Railways. Also the selected bidder, after entering into a mutually exclusive agreement with BHEL, cannot quote directly or enter into any kind of joint arrangement with any other party for the above mentioned tender.
- 3.6 It is envisaged that BHEL along with the partner(s) shall jointly work towards preparation and submission of bid with respect to the scope of propulsion system equipment against this tender and shall jointly execute the works after award of contract.
- 3.7 BHEL shall enter into a MoU/BSA (Business Sharing Agreement) with the finalized partner(s) upon successful bidding in the subject tender.
- 3.8 The project cash flow sharing, terms of payment, schedule of payments and other financial obligations among BHEL and party/parties shall be in line with specific terms of the agreement of BSA at a later stage.
- 3.9 An individual Bidder cannot at the same time be Member of another Consortium/ Joint Venture bidding for the same Railway board RFP.

3.10 The scope of partnership for the EOI is as below:

S.N.	Item	Scope of Partnership
1.	Design of Propulsion Equipment comprising Traction Converter, Auxiliary Converter & VCU and Transfer of Technology limited to the manufacturing information for Traction Converter, Auxiliary Converter & VCU.	As per detailed scope division at section 4.0.

Note:

- 1) The complete software for Propulsion System equipment will also be in the scope of propulsion supplier. The successful bidder has to support for any Software upgrade as required during the course of operation of locomotives or as sought by the customer. Alternatively the supplier can pass on the information required for making changes in software at no extra cost for BHEL to maintain/ upgrade the software as required by the customer.
  - 2) The Auxiliary Converter shall include battery charger.
  - 3) The inter vehicular communication between the two B0-B0 units shall be part of VCU. The necessary hardware and software for this purpose shall also be part of the VCU design.
  - 4) For the purpose of arriving at the L1 bidder, **cost to BHEL** for 800 units as envisaged in the RFP No.2022/Elect (Dev)/440/5 shall be considered.
- 3.11 The selected partner will develop the Traction Converter, Auxiliary Converter and Vehicle control Unit as per RDSO specification No. RDSO/2006/EL/SPEC/0044, Rev'13' issued by RDSO in June'13 and manufacture one set each to prove the prototype. Information for manufacturing of remaining sets by BHEL will be passed on to BHEL under transfer of production rights. Proposal to manufacture more number of sets by the successful partner can also be considered and shall be deliberated separately during bid evaluation stage.

#### 4.0 SCOPE OF ACTIVITIES:

*Indicative scope split for items in EOI proposal*    R -> Responsible, S -> Support

S. N.	Scope	M/s BHEL	M/s Bidder	Bidder Acceptance/ Clarification
1.	System Engineering including performance calculation, equipment and component selection, sizing, rating calculations, weight balancing, cable rating finalization etc.	S	R	
2.	Layout of equipment for traction chain equipment.	S	R	
3.	Locomotive Schematics (HV/MV/LV Power, control & Communication), harness and wiring chart.	R	S	
4.	Preparation of documents such as design documents, test protocols and type test reports based on inputs from bidder.	R	S	
5.	RDSO/Railway approval of design documents.	R	S	
6.	Development of DDU (Driver Display Unit) software.	S	R	
7.	Hardware Design and software for Traction converter, Auxiliary Converter and VCU.	S	R	
8.	Design parameters & ratings / characteristics for BHEL to design and manufacture the Traction Motor & Traction Transformer.	S	R	
9.	TOT with Manufacturing information for Manufacture of Traction convertor, Auxiliary Converter & VCU.	S	R	
10	Hardware Design, software development and communication interface for Traction Converter, Auxiliary Converter & VCU.	S	R	



S. N.	Scope	M/s BHEL	M/s Bidder	Bidder Acceptance/ Clarification
11	VCU Interface/ integration with propulsion system and with other subsystems (Viz., Pneumatic & Brake System, Vigilance System, Fire Detection system, Event Recorder System and Remote Monitoring System, TCAS, etc.)	S	R	
12	Type Testing for propulsion equipment.	S	R	
13	Installation & Erection of equipment.	R	S	
14	Pre-commissioning of prototype unit at Banaras Locomotive Works, Varanasi.	R	S	
15	Commissioning of prototype unit at User Railway including system integration.	R	S	
16	Static and dynamic testing at user railway.	S	R	
17	Installation, Erection & commissioning of series Units.	R	S	
18	O&M manual and other customer docs.	S	R	
19	Training to end customer.	R	S	
20	Warranty support.	R	S	
21	After Sales support/ CAMC (Comprehensive Annual maintenance Contract).	R	S	
22	Technical support for designed life of equipment (Traction Converter, Auxiliary Converter and VCU).	S	R	
23	Design parameters / characteristics for BHEL to design and procure other electrical equipment like electrical panels, Pantograph, VCB, Earthing unit, Compressor unit, cooling blowers	S	R	





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S. N.	Scope	M/s BHEL	M/s Bidder	Bidder Acceptance/ Clarification
	and pumps, etc. Also the design detail of any other electrical equipment required for completing the design of Locomotive.			
24	Software updates required during the course of operation.	S	R	Alternatively supplier can equip/ train BHEL for this task at no extra cost.

Please note that the list is not exhaustive and additional activities may be added if deemed necessary to meet tender requirements as per mutual agreement.

Bidders can indicate suggested scope division in case of any difference from the one indicated above, however the same shall be subject to BHEL evaluation and acceptance.

Detailed scope to be finalized in partnership agreement.

### 5.0 INSTRUCTION TO RESPONDENTS:

- 5.1 Interested party may respond this EOI as per Annexure -1 (along with supporting documents for PQR) by e-mail enclosing their response in non-editable (PDF) format so as to reach us on or before 13:00Hrs on **17<sup>th</sup> Sep 2022** at the following address:

Addl. General Manager/TE,  
Bharat Heavy Electricals Limited  
Electronics Division  
V Floor NEB, Traction Engineering  
Mysore Road-Bangalore -560026,  
India.  
Email: [singhsp@bhel.in](mailto:singhsp@bhel.in); [barora@bhel.in](mailto:barora@bhel.in)  
Phone: +91 80 26998252/ 837;  
Mobile: +91- 9425604757 / +91- 9425604839

#### 5.1 Offer to be submitted in Three (I,II & III) parts:

**Part-I Bid:** The following documents are to be submitted as part of Part I bid.

1. General Information (As per Annexure-1)
2. Pre-Qualification Requirements (As per Annexure-2)

#### **Part-II:**

1. Technical Offer comprising of following:
  - i. Technical Offer



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- ii. Clause wise comments for RDSO specification No. RDSO/2006/EL/SPEC/0044, Rev'13' issued by RDSO in June'13.
  - iii. Clause wise compliance to this EOI.
2. Response to Questionnaire (As per Annexure-3)
  3. Commercial Offer for proposed partnership (Unpriced)

### Part-III: Password Protected Price Offer for Proposed partnership.

*Note: Password to be provided after requested by BHEL through written communication.*

BHEL shall verify & evaluate General information, Pre-qualification requirements submitted by all interested Bidders.

After evaluation, BHEL shall scrutinize Business proposal, technical offer & unpriced commercial offer of eligible Bidders.

BHEL shall request for password for Priced offer from the bidders who are successful after evaluation of technical and unpriced commercial offer. The bidders have to provide password immediately on BHEL request.

Evaluation criteria for Bidders is as mentioned in Annexure-4.

Commercial terms are as per Annexure-5.

- 5.2 The details submitted by the respondent(s) shall be complete in all respects and BHEL may seek clarifications/additional information as considered necessary. Such clarifications/additional information must be provided within 2 days of BHEL request.
- 5.3 Any request for further information or clarification on the EOI document may be submitted to above address within 07 days from date of issue of EOI.
- 5.4 Responses to EOI are to be submitted in English only. Supporting documents, as required, should also be in English language. In case of some documents being available in languages other than English, the Applicant shall necessarily provide duly authenticated translated version of the same in English.
- 5.5 Duly authorized representative of the respondent(s) shall sign on each page of the document. Response to EOI should be prepared in such a way so as to provide a straight forward, concise description of respondent's capabilities.
- 5.6 Notwithstanding anything contained in this EOI, BHEL reserves the right to accept or reject any response and to annul the EOI Process in whole or part, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons thereof.
- 5.7 BHEL reserves the right to verify all statements, information and documents submitted by the respondent(s) in response to the EOI. Any such verification or lack of such verification by BHEL shall not relieve the respondent of his obligations or liabilities hereunder nor will it affect any rights of BHEL.



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- 5.8 The EOI process shall be governed by, and construed in accordance with, the laws of India and the Courts at Bangalore shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the EOI process.
- 5.9 All costs incurred for participation in the EOI shall be borne by the respondent(s).



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### 6.0 Pre-Qualifying Criteria (PQR):

The prospective party/ respondent must meet the pre-qualification requirement as applicable and tabulated below, supported with relevant documents/ credentials/ certificates for further consideration:

6.1	The bidder shall have designed an IGBT based Propulsion System of railway locomotives/ High Speed Train Sets of 4,000 horsepower or more and manufactured the same as part of Eligible Projects as referred in RFP.
6.2	The Bidder (including each Member of Consortium) shall have executed at least one Eligible Project in any 1 (one) country.
6.3	Technical Capacity: For demonstrating technical capacity and experience, the Bidder shall, over the past 7 (seven) financial years preceding the Bid Due Date, have:
6.3.1	Designed and produced the Propulsion System, for supply comprising Eligible Projects; and/ or
6.3.2	Designed and produced Propulsion Systems for High Power of railway locomotives/ High Speed Train Sets of 4000HP and above, for supply comprising Eligible Projects such that the total horse power of the above supplies exceeds 1,800,000 (one million and eight hundred thousand) horse power (the "Threshold Technical Capacity"). Provided that at least one third of the Threshold Technical Capacity shall be from Eligible Projects which were supplied at least 4 (four) years prior to the Bid Due Date. Provided further that the Threshold Technical Capacity shall include at-least 10 (ten) railway locomotives from Eligible Projects in Category 1.  For the avoidance of doubt, in case of Eligible Projects where part supplies of railway locomotives/High Speed Train Sets were made prior to the aforesaid period of 7 (seven) financial years preceding the Bid Due Date and balance supplies were made in the aforesaid period, only those railway locomotives/High Speed Train Sets which were supplied in the aforesaid period of 7 (seven) financial years preceding the Bid Due Date shall be considered for computation of Eligible Projects hereunder.
6.4	Financial Capacity:
6.4.1	The Bidder shall have a minimum Net Worth (the "Financial Capacity") of Rs. 150 crore (Rs.One Hundred and Fifty crore) at the close of the preceding financial year.
6.4.2	Not barred by the Central/ State Government, or any entity controlled by it, from participating in any project.



**Annexure-1**

**General Information to be submitted by Applicant**

1. Name of the Company:
2. Legal status of the Company:
3. Brief description of the Company including details of its business groups/subsidiaries/affiliates:
4. Date of Incorporation:
5. Date of Commencement of Business:
6. Full address including Telephone nos. / Fax nos.:  
Registered Office:  
Head Office:  
Address for communication:  
Contact Details:  
Office Address in India, if any:
7. Documents to be enclosed:  
Filled up Annexure -2 along with all applicable documents considered relevant to meet PQR and support evaluation criteria indicated in respondent's response column of Annexure 2.

(Sign & Company Seal)  
Authorized signatory

**Pre- Qualification Requirement**

<b>Eligibility Criteria</b>		<b>Applicant's Response</b>	
		<b>Meeting the criteria</b>  Yes / No	<b>Documentary evidence:</b>  Enclosed / To be submitted later
<b>6.1</b>	The bidder shall have designed an IGBT based Propulsion System of railway locomotives/ High Speed Train Sets of 4,000 horsepower or more and manufactured the same as part of Eligible Projects as referred in RFP.		
<b>6.2</b>	The Bidder (including each Member of Consortium) shall have executed at least one Eligible Project in any 1 (one) country.		
<b>6.3</b>	Technical Capacity: For demonstrating technical capacity and experience, the Bidder shall, over the past 7 (seven) financial years preceding the Bid Due Date, have:		
<b>6.3.1</b>	Designed and produced the Propulsion System, for supply comprising Eligible Projects; and/ or		
<b>6.3.2</b>	Designed and produced Propulsion Systems for High Power of railway locomotives/ High Speed Train Sets of 4000HP and above, for supply comprising Eligible Projects such that the total horse power of the above supplies exceeds 1,800,000 (one million and eight hundred thousand) horse power (the "Threshold Technical Capacity"). Provided that at least one third of the Threshold Technical Capacity shall be from Eligible Projects which were supplied at least 4 (four) years prior to the Bid Due Date. Provided further that the Threshold Technical Capacity shall include at least 10 (ten) railway locomotives from Eligible Projects in Category 1.  For the avoidance of doubt, in case of Eligible Projects where part		



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	supplies of railway locomotives/High Speed Train Sets were made prior to the aforesaid period of 7 (seven) financial years preceding the Bid Due Date and balance supplies were made in the aforesaid period, only those railway locomotives/High Speed Train Sets which were supplied in the aforesaid period of 7 (seven) financial years preceding the Bid Due Date shall be considered for computation of Eligible Projects hereunder.		
<b>6.4</b>	Financial Capacity:		
<b>6.4.1</b>	The Bidder shall have a minimum Net Worth (the “Financial Capacity”) of Rs. 150 crore (Rs. One Hundred and Fifty crore) at the close of the preceding financial year.		
<b>6.4.2</b>	Not barred by the Central/ State Government, or any entity controlled by it, from participating in any project.		

(Sign & Company Seal)  
Authorized signatory

**NOTE:**

1. Any other documents considered relevant to meet PQR and to support evaluation criteria are to be submitted.
2. Bidders with deviations to the above mentioned PQR are also encouraged to submit their proposal. However, acceptance/suitability of such responses shall rest with BHEL and same decision shall be final and binding.
3. If no bidder is meeting the criteria of Clause 6.3.2, then bidder which is closest in meeting this requirement will only be considered provided the bidder is meeting technical requirements. If such bidder is technically not qualified then the next bidder closest to meeting the requirement of Clause 6.3.2 will be considered provided the bidder is meeting technical requirement.



Technology Transfer & Requirements of Business Association

Sl.no.	Query description	Yes/No	Bidders Acceptance/Clarification
<b>1)</b>	<b>Traction and Auxiliary convertor:</b>		
1.1	Bidder shall agree for Technology transfer. Bidder shall mention any pre requisite condition to be fulfilled by BHEL for Technology Transfer.		
1.2	All the design documents to be shared with BHEL including components and electronic cards. (Including Temperature simulations for various equipment, Harmonic estimation and control, Battery and Battery charger capacity calculations, Auxiliary Load calculation and any other studies required by the RDSO specification). Calculations regarding performance / equipment sizing and rating requirements for Traction and Auxiliary convertor to meet RDSO specification shall be carried out by Bidder. Complete methodology and software if any used for same shall be shared with BHEL. All the documents will be shared with BHEL for review and submission to customer.		
1.3	Manufacturing information of converter and the electronic cards should be shared with BHEL including design data viz., drawings/ data sheets of components, testing firmware, GERBER file etc., Type test and routine test information at component level and at the equipment level to be provided.		
1.4	Bidder should provide application software, diagnostic tools, Software information/ documentation and training for Traction and Auxiliary converter to maintain the locomotives by BHEL. Bidder shall provide update and support for Traction and Auxiliary converter Hardware, software and Firmware. Alternatively the bidder can equip/train BHEL personnel for updating /maintaining the software as required during the course of operation.		
1.5	Bidder shall provide manufacturing information of traction & auxiliary converter and its application/ testing software.		
1.6	Bidder shall support in manufacturing, Type testing, Erection/ installation, commissioning, Performance trails/ tests and field trials etc.		

1.7	<p>Reliability and component obsolescence: Bidder shall provide following :</p> <ul style="list-style-type: none"> <li>a) RAMS and MTBF Calculations as per specification</li> <li>b) Warranty obligation</li> <li>c) Fine tuning of the equipment to address the reliability issues</li> <li>d) Support for addressing component obsolescence</li> </ul> <p>Failure of equipment during warranty obligation shall be formulated during the detailed scope discussions. However, any warranty obligations arising out of inadequacy of design should be with the Bidder. Bidder should provide support for any fine tuning required to meet the reliability/ customer requirement</p>		
2)	<b>VCU hardware and Software:</b>		
2.1	Bidder shall agree for Technology transfer. Bidder shall mention any pre requisite condition to be fulfilled by BHEL for Technology Transfer.		
2.2	Bidder shall provide all necessary details to meet customer requirement as mentioned RDSO specification related to VCU e.g. software logic, software validation, software quality plan, safety analysis etc.		
2.3	Design and manufacturing information of VCU electronic cards should be shared with BHEL including design data viz., drawings/ data sheets of components, testing firmware, GERBER file etc. Type test and routine test information at component level and at the equipment level.		
2.4	Bidder should provide application software (including for DDU), diagnostic tools, S/W information/ documentation and training for VCU required to maintain the locomotives by BHEL. Bidder shall provide update and support for VCU Hardware, software and Firmware. Alternatively the bidder can equip/train BHEL personnel for updating /maintaining the software as required during the course of operation.		
2.5	Bidder shall provide complete details to BHEL to enable to establish VCU software simulation facility and carryout VCU software simulation testing in Lab environment for validation.		
2.6	Bidder scope shall include integration of VCU with other systems like traction system, brake system, Vigilance System, Pneumatic system,		



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	firefighting system, TCAS, etc. as mentioned in RDSO specification.		
2.7	Bidder shall support in manufacturing, type & routine testing of Traction converter, Auxiliary converter & VCU, Erection/ installation, commissioning, Locomotive level customer testing etc.		
2.8	Bidder shall support in full load combined system testing of the propulsion system along with traction motors and Traction transformer. Necessary software for conducting the combined system testing along with its source code shall also be supplied by bidder.		
2.9	<p>Reliability and component obsolescence:  Bidder shall provide following</p> <ul style="list-style-type: none"> <li>e) RAMS and MTBF Calculations as per specification</li> <li>f) Warranty obligation</li> <li>g) Fine tuning of the equipment to address the reliability issues</li> <li>h) Support for addressing component obsolescence</li> </ul> <p>Failure of equipment during warranty obligation shall be formulated during the detailed scope discussions. However, any warranty obligations arising out of inadequacy of design should be with the Bidder. Bidder should provide support for any fine tuning required to meet the reliability/ customer requirement.</p>		
3)	Bidder shall provide related information regarding Interface with Traction motor, Traction transformer or any other equipment with Traction, Auxiliary convertor & VCU as required.		
4)	List of details required to submit commercial offer for Traction, Auxiliary Convertor, and VCU to be provided along with questionnaire response in advance. Supplier to consider VCU components like VCU Controller, Field I/Os, Gateways, Repeaters, Connectors etc. based on his Network Architecture and RDSO specification requirements.		



Evaluation Criteria

**1. Price bid:**

Price bid will be invited only from shortlisted Bidders, meeting the pre-qualification criteria and conforming to all Railway tender technical requirements for equipment in Bidder's scope. BHEL's decision regarding shortlisting of Bidders shall be final and binding. Shortlisted bidders shall submit their price bids (Part III) within 3 working days from the date of communication from BHEL.

**2. Evaluated price:**

**Total cost to BHEL** for the equipment (required to meet complete INDIAN RAILWAY RFP No.2022/Elect (Dev)/440/5 for the scope of propulsion equipment) as per Cl. 3.4 of EOI shall be considered as basis of evaluation and finalization of EOI partner after applying loading factors in section 3.

**Per set cost is calculated as below :** ( For evaluation purpose only)

Total cost for the equipment (required to meet complete tender scope) divided by **800**, which is no of sets required as per Tender.

Bidder's quoted price shall Include supply of main equipment, spares, tools, service (engineering, documentation, testing, freight, installation/ commissioning, relevant software, AMC support of equipment), training and other costs applicable for finalized bidder's scope as per scope matrix. The pricing indicated by bidder shall be inclusive of cost for support for integration of Bidder's equipment with rest of equipment forming part of 12000HP Locomotive tender.

**3. Final selection of partner(s):**

Bidders shall be ranked based on evaluated **cost to BHEL** for 800 units. Bidders shall be ranked from Lowest (L1) to Highest (H1). The bidder ranked L1 will be selected for pre-bid tie up, for the agreed scope of partnership.

Loading criteria (Related to consortium bidding with BHEL)

- a) For bidders accepting consortium bidding along with BHEL to participate in the tender, **no loading will be applied.**
- b) For bidders not accepting consortium bidding along with BHEL to participate in the tender, loading will be applied @ 2% on the per set cost for bidder's scope equipment.

Loading criteria (Related to payment terms)

- a) For bidders accepting BHEL's proposed payment terms, no loading will be applied.
- b) For bidders taking deviation on BHEL's proposed payment terms, loading will be applied, which will be intimated before price bid opening.



Commercial Terms

Sl. No	Commercial Term	BHEL's Condition	Response
1	Delivery Period	As per Annexure 5	
2	Delivery Terms (in case of Bidder's supply)	(Door Delivery to BHEL for Indian vendors/Ex-Works for foreign vendors)	
3	Transit Insurance (in case of Bidder's supply)	In case of DDL, Bidder's scope.	
4	Bid security Bond (To be submitted by the successful bidders only)	1% of the bid value	
5	Performance (Warranty) Bank Guarantee (To be submitted by the successful bidders only)	10% of the bid value	
6	Warranty	Back to back with IR warranty terms	
7	Payment Terms	As per Annexure 5	
8	Price Variation Clause	As per Clause 8/ Annexure 5	
9	Inspection	By BHEL/IR nominated Agency.	
10	Validity of the offer	180 Calendar days from the date of opening of Indian Railways Tender	
11	Liquidated Damages for failure in warranty	As per IR RFP	
12	Liquidated Damages for delay in delivery	As per IR RFP	

### 1. Delivery Period:

Back to back as per railway RFP.

The schedule with selected EOI partner shall be finalized so as to meet Indian Railways schedule indicated below. Any change in delivery schedule as instructed by Indian railways shall be mutually complied. The RFP calls for “The Technological Partner shall no later than 730 days from the Appointed Date, supply a Prototype Locomotive to the Government for tests and trials to be conducted.”

Time is the essence of the Contract. The delivery schedule expressed as months stipulates hereafter a delivery date which is the date of delivery at Banaras Locomotive Works, Varanasi premises.

SN	ACTIVITY	TIME FOR ACTIVITIES (Months)	CUMULATIVE TIME
1	Date of signing of contract or 30 days from date of notification of award whichever is earlier	D	D
2	Submission of OGA (Overall General Arrangement) drawings and schematics	4	D+4
3	Approval of OGA drawings by RDSO	0.5	D+5.5
4	Submission of schematics, design documents of propulsion	1	D+6.5
5	Approval of schematics, design documents of propulsion equipment by RDSO	0.5	D+7
6	Witnessing of Type tests of propulsion equipment	12	D+19
7	Approval of Type tests of propulsion equipment	0.5	D+19.5
8	Witnessing of Routine tests by RDSO	0.5	D+20
9	Approval of Routine tests by RDSO	1	D+21
10	Supply of propulsion equipment including Traction Converter, Auxiliary Converter & VCU	1	D+22
11	Installation and commissioning of prototype Locomotive at Baranasi Locomotive Works, Varanasi	2	D+24
12	Static/dynamic trials and Oscillation trials in the user Railway- witness by RDSO	3	D +27
13	Introduction of prototype Locomotive into commercial service	3	D+30

**Note:**

- This item is procured for the 12000HP Banaras Locomotive project of Indian



## Expression of Interest (Eoi) for 12000HP Propulsion System Power Electronic Systems

Railways. Therefore, meeting the delivery schedule is of utmost importance.

- In case of failure to meet the delivery schedule, Purchaser reserves the right to levy damages on actuals/ Liquidated damages as the case may be. Number of prototype units shall be two. Both the prototype units shall be manufactured at Banaras Locomotive Works, Varanasi.
- Series supply of locomotives shall start after clearance which shall be provided by Railways subsequent to service trials of prototype locomotive. Supply programme of locos as per tender is as below:

Accounting Year	Number of Locomotives to be supplied
First Year of Supply	5*
Second Year of Supply	35
Third Year of Supply	60
Fourth Year of Supply	100
Fifth Year of Supply	100
Sixth Year of Supply	100
Seventh Year of Supply	100
Eighth Year of Supply	100
Ninth Year of Supply	100
Tenth Year of Supply	100
<b>Total</b>	<b>800</b>

Supply of propulsion equipment shall be matched with above supply programme of locomotives. To match the above supply program, the propulsion system equipment shall be supplied two months in advance.

2. **Delivery Terms (In case of Bidder's supply):** Door Delivery to BHEL Electronics Division/Ex-Works for all applicable equipment including prototype.
3. **Transit Insurance (In case of Bidder's supply):** Transit insurance shall be within the scope of vendor.
4. **Bid security Bond (To be submitted by the successful bidders only):** 1% of the value of MOU shall be provided by contractor to BHEL as bid bond in the form of bank guarantee /security deposit etc. in order to ensure the supplier's continued commitment during the validity period of the MOU.
5. **Performance (Warranty) Bank Guarantee (To be submitted by the successful bidders only):**  
Warranty Bank Guarantee equivalent to 10% value shall be provided on successful commissioning. The Warranty bank guarantee (B.G) will be released after satisfactory acceptance of all the equipment after expiry of warranty period. The bank guarantee can also be released on pro rata basis provided fresh bank guarantee is submitted by the firm for the balance equipment, to be supplied.
6. **Warranty & Maintenance:**  
Back to back as per railway RFP. The warranty terms as applicable for Indian Railways, INDIAN RAILWAY RFP No.2022/Elect (Dev)/440/5 shall also be applicable for selected EOI partner





## Expression of Interest (Eoi) for 12000HP Propulsion System Power Electronic Systems

limited to scope of Propulsion equipment comprising Traction Converter, Auxiliary Converter and VCU. The maintenance of Propulsion system supplied by the bidder shall be maintained for 35 years as per the provisions of the RFP. The cost for same shall be quoted separately and will be considered for bid evaluation.

### **7. Payment Terms:**

Back to back as per railway RFP. The payment terms as applicable for INDIAN RAILWAY RFP No.2022/Elect (Dev)/440/5 shall also be applicable for selected EOI partner limited to scope of Propulsion equipment comprising Traction Converter, Auxiliary Converter and VCU.

### **8. Price Variation Clause:**

Back to back as per railway RFP. The price variation as applicable for INDIAN RAILWAY RFP No.2022/Elect (Dev)/440/5 shall also be applicable for selected EOI partner limited to scope of Propulsion equipment comprising Traction Converter, Auxiliary Converter and VCU.

### **9. Inspection: By BHEL/IR nominated agency as applicable.**

### **10. Validity of the offer:**

Back to back as per railway RFP. The same shall be extended as per the bid validity requirement of Indian Railways

### **11. Liquidated damages (LD) for failure in warranty:**

The LD for failure in warranty as applicable for INDIAN RAILWAY RFP No.2022/Elect (Dev)/440/5 shall also be applicable for selected pre bid partner limited to scope of Propulsion equipment comprising Traction Converter, Auxiliary Converter and VCU.

### **12. Liquidated damages (LD) for delay in delivery:**

The LD for delay in delivery as applicable for INDIAN RAILWAY RFP No.2022/Elect (Dev)/440/5 shall also be applicable for selected pre bid partner limited to scope of Propulsion equipment comprising Traction Converter, Auxiliary Converter and VCU.