



## Expression of Interest from Prospective Vendors for Electrical & Instrumentation Items (Rectifier, Rectifier Transformer, Oxygen/ Hydrogen Analyser, Leak Detector, Dew Point meter) for the BOP of Electrolysers

### Extension of due date for EoI

**Subject: Expression of Interest from Prospective Vendors for Electrical & Instrumentation Items (Rectifier, Rectifier Transformer, Oxygen/ Hydrogen Analyser, Leak Detector, Dew Point meter) for the BOP of Electrolysers.**

This has reference to the Expression of Interest (EoI) published on BHEL's website i.e. [www.bhel.com](http://www.bhel.com) **EoI Ref No.: BHEL/PESD/EoI/EBOP/001, Rev 00 Dated 08.11.2023**, seeking interest from prospective Vendors who can supply one or more of the below equipment for Electrolyser package.

- i). Rectifiers, Rectifier Transformers with range of rating suitable for kW to MW scale Electrolyser Stack system.
- ii). Oxygen Analysers, Hydrogen Analysers, Hydrogen Leak Detectors, Dew Point Meters.

Based on the requests received from prospective Vendors, the due date for receiving the proposals against the EoI has now been extended up to **31<sup>st</sup> Jan 2024**.

The interested Prospective Vendors shall ensure that their response, along with the details requested as per Annexures of the EoI, is received by BHEL on or before **31<sup>st</sup> Jan 2024**.

#### Contact details for submission of response is as below:

|  |  |
|--|--|
| Mr. Abu Malick<br>Sr. Manager<br>Proposals & New Business,<br>Project Engineering & Systems Division Unit<br>Bharat Heavy Electricals Limited (BHEL),<br>Hyderabad, India, PIN 502032<br><br>Tel:(+91)- 40-23184621, 8500862582<br>E-Mail: abumalick@bhel.in | Mr. Amit Kumar Sinha<br>Deputy General Manager<br>Proposals & New Business<br>Project Engineering & Systems Division Unit<br>Bharat Heavy Electricals Limited (BHEL),<br>Hyderabad, India, PIN 502032<br><br>Tel:(+91)- 40-23182195, 9912565252<br>E-Mail: aks@bhel.in |
|--|--|

Date of Issue: 1<sup>st</sup> January 2024



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Date of Issue: 1<sup>st</sup> December 2023

**BHARAT HEAVY ELECTRICALS LIMITED**  
(A Government of India Undertaking)  
INDIA

Notice seeking

**Expression of Interest**

from

Prospective Vendors

for

**Electrical & Instrumentation Items**

**(Rectifier, Rectifier Transformer,**

**Oxygen/ Hydrogen Analyser, Leak Detector, Dew Point meter)**

for the BOP of Electrolysers

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**SECTION-1**

**DISCLAIMER**

- 1.1 The information contained in this Expression of Interest (EOI) document is provided to the Prospective Vendor, by or on behalf of Bharat Heavy Electricals Limited (BHEL) or any of its employees or advisors on the terms and conditions set out in this EOI document and all other terms and conditions subject to which such information is provided.
- 1.2 This invitation to EOI document does not purport to contain all the information that each Prospective Vendor may require.
- This invitation to EOI 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 Vendor who reads or uses this invitation to EOI document.
- Prospective Vendor should conduct his own investigations and analysis and should check the accuracy, reliability and completeness of the information in this invitation to EOI document and where necessary obtain independent advice from appropriate sources.
- 1.3 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 invitation to EOI document.
- 1.4 BHEL may at any time, in its absolute discretion, but without being under any obligation to do so, modify, amend or supplement the information in this invitation to EOI document.
- 1.5 The issue of this EOI does not imply that BHEL is bound to select and shortlist any or all the Prospective Vendor.
- Even after selection of suitable Prospective Vendor, BHEL is not bound to proceed ahead with the participation in any or all business opportunities and in no case be responsible or liable for any commercial and consequential liabilities in any manner whatsoever.
- 1.6 The Prospective Vendor shall bear all costs associated with the preparation, technical discussion/presentation and submission of EOI.
- BHEL shall in no case be responsible or liable for the costs regardless of the conduct or outcome of the EOI process.
- 1.7 Canvassing in any form by the Prospective Vendor or by any other agency on their behalf shall lead to disqualification of their proposals against this invitation to EOI.

**SECTION-2**

**TIMELINES OF EOI PROCESS & CONTACT DETAILS**

**2.1 TIMELINE OF EOI PROCESS**

The schedule of activities of the EOI Process shall be as follows -

| Sl. No. | Description   | Date       |
|---------|---|------------|
| 1       | Publishing of Notice for EOI document   | 08.11.2023 |
| 2       | Last date of Submission of EOI response<br>(BHEL will reserve the right of extension of the date) | 30.11.2023 |

**2.2 CONTACT DETAILS:**

All the correspondence shall be marked to the following:

|   |   |
|---|---|
| Mr. Abu Malick<br>Sr. Manager<br>Proposals & New Business,<br>Project Engineering & Systems Division Unit<br>Bharat Heavy Electricals Limited (BHEL),<br>Hyderabad, India, PIN 502032<br><br>Tel:(+91)- 40-23184621, 8500862582<br>E-Mail: <a href="mailto:abumalick@bhel.in">abumalick@bhel.in</a> | Mr. Amit Kumar Sinha<br>Deputy General Manager<br>Proposals & New Business<br>Project Engineering & Systems Division Unit<br>Bharat Heavy Electricals Limited (BHEL),<br>Hyderabad, India, PIN 502032<br><br>Tel:(+91)- 40-23182195, 9912565252<br>E-Mail: <a href="mailto:aks@bhel.in">aks@bhel.in</a> |
|---|---|

**2.3 GUIDELINES FOR EOI SUBMISSION**

The Prospective Vendor shall forward their documents as part of EOI, to the e-mail of the contact persons indicated above.

The size of the e-mail (with attachments) may be restricted to **15 MB** due to constraint at receipt. The attachments may be split and sent in no. of e-mails clearly mentioning in subject of mail 'Mail 1 of N', Mail 2 of N ....etc.

**SECTION – 3**

**BHEL**

**3.1 BHEL**

*Bharat Heavy Electricals Limited (BHEL)* is a Central Public Sector Enterprise under ministry of Heavy Industry and Public Enterprises, Government of India.

It is an integrated power plant equipment manufacturer and one of the largest engineering and manufacturing companies of its kind in India having a turnover of around US \$ 2.6 billion and is a company listed in stock exchanges of India.

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, Water Management, Oil & Gas and Defence with over 180 product offerings to meet the needs of these sectors.

BHEL has been in the business for more than 50 years and BHEL supplied power equipment account for about 58% of the total thermal generating capacity in India.

The company has highly skilled and committed manpower of approximately 30,000 employees spread across 16 manufacturing units, 4 project execution units, 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 82 countries with cumulative overseas installed capacity of BHEL manufactured power plants nearing 10,000 MW.

BHEL invests more than 2.5% of turnover on R&D and innovation.

More details about the entire range of BHEL's products and operations can be seen at [www.bhel.com](http://www.bhel.com).

**3.2 PE&SD (Unit of BHEL)**

*Project Engineering & System Division (PE&SD)* is a Unit of BHEL working on EPC basis and is located in Hyderabad, Telangana State in Southern India. It has capabilities to execute the projects on EPC basis and has rich experience of engineering the Captive Power Plants and has experience of executing wide variety of projects like Solar Power Plants, Railway Line Electrification and Sulphur Recovery Unit in Refinery.

**SECTION – 4**

**HYDROGEN BUSINESS**

**4.1 National Green Hydrogen Mission**

India has declared a goal to become energy independent by 2047 and achieve Net Zero by 2070.

Green Hydrogen, produced using renewable energy, has the potential to play a key role in such low-carbon and self-reliant economic pathways.

The National Green Hydrogen Mission aims to provide a comprehensive action plan for establishing a Green Hydrogen ecosystem and catalysing a systemic response to the opportunities and challenges of this sunrise sector.

**4.2 BHEL's plan in Hydrogen Business Value Chain**

BHEL is taking steps to manufacture of Electrolysers and address EPC business in Hydrogen Value Chain.

BHEL is setting up a new manufacturing facility, for integrating the equipment of Electrolyser Package at Karkhiyaon, Varanasi.

The design and supply of BOP equipment of Electrolyser will be arranged by PE&SD – Unit of BHEL located at Hyderabad.

Dedicated teams are working in mission mode for development of in-house Alkaline Electrolyser stack.

BHEL is also exploring collaborations with leading Electrolyser OEMs to address immediate EPC Business opportunities in Hydrogen market.

**SECTION – 5**

**EOI**

**5.1 OBJECTIVE OF THIS NOTICE:**

The objective of this Notice is to seek EOI from prospective Vendors who can supply one or more of the below equipment for Electrolyser package.

- (i) Rectifiers, Rectifier Transformers with range of rating suitable for kW to MW scale Electrolyser Stack system.
- (ii) Oxygen Analysers, Hydrogen Analysers, Hydrogen Leak Detectors, Dew Point Meters.

**5.2 EXPECTATIONS FROM RESPONDENTS TO THIS NOTICE (AS PART OF EOI):**

Vendors are expected to furnish their

- Details of their Product range in Hydrogen (Electrolysers, Fuel Cells etc.)
- Product Catalogues, Datasheets, Presentations etc.
- Past Track record (PTR) for supply of above equipment

**5.3 ELIGIBILITY CONDITIONS FOR PROSPECTIVE VENDOR**

The Prospective Vendor can be Private, Public or Government owned legal entity.

**5.4 RESULT OF EOI:**

Based on the data furnished, BHEL will register the vendors in their Supplier Directory as a regular supplier.

**5.5 INSTRUCTIONS**

- a) A prospective vendor requiring any clarification to the EOI documents may notify the same through e-mail or by post at the address indicated in Section 2 of this EOI.

BHEL will respond to any request for clarification or modification of the EOI

Prospective Vendors are advised to regularly visit BHEL's website for clarifications, modifications if any.

- b) BHEL at their sole discretion may inspect the Vendor works / office / reference project sites etc. for the purpose of evaluation, if required.

**5.6 MISCELLANEOUS:**

**Right to accept or reject any or all Applications:**

- i). Notwithstanding anything contained in this invitation to EOI, BHEL reserves the right to accept or reject any EOI and to annul the EOI Process and reject all EOIs at any time without any liability or any obligation for such acceptance, rejection or annulment and without assigning any reasons, thereof.
- ii). BHEL reserves the right to disqualify any Prospective Vendor during or after completion of EOI process, if it is found there was a material misrepresentation by any such Prospective Vendor or the Prospective Vendor fails to provide within the specified time, supplemental

information sought by BHEL.

- iii). BHEL reserves the right to verify all statements, information and documents submitted by the Prospective Vendor in the EOI. Any such verification or lack of such verification by BHEL shall not relieve the Prospective Vendor of his obligations or liabilities hereunder nor will it affect any rights of BHEL.

**5.7 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 this EOI process

SECTION-6

TECHNICAL DETAILS

**6.1 Rectifiers:**

Hydrogen generation through Electrolysis require a high amount of DC power supply. As a result, the use of AC-DC converters from an AC power supply is mandatory. SCR / Thyristorised and Insulated-gate Bipolar Transistor (IGBT) topologies are in use across Industry globally for reliable and efficient DC power supply for Electrolysers. High efficiency, low DC ripple, easy control of the load current and high power factor etc. are some of the qualities preferred by Electrolyser OEMs for optimum Hydrogen output. However, actual requirement may vary depending on the end use.

**Converter typical technical data**

| Specification        | Thyristor Rectifier   | IGBT Rectifier  |
|----------------------|---|---|
| Applicable Standards | IEC 60146-1-1, IEC61800-3, IEC61800-5-1, IEC 61000-6-2, IEC61000-6-4, IEE 519, applicable IS etc. | IEC 60146-1-1, IEC61800-3, IEC61800-5-1, IEC 61000-6-2, IEC61000-6-4, IEE 519, applicable IS etc. |
| Cooling Req.         | Air cooled / Water Cooled   | Air cooled / Water Cooled   |
| Input Voltage Range  | 0.4 – 33kV  | 0.4 – 33kV  |
| Max Output V / I     | <b>1500V / 10,000 A</b>   | <b>1000V / 15,000 A</b>   |
| Power                | <b>500 kW to 10 MW</b>  | <b>500 kW to 10 MW</b>  |
| Power Factor         | >0.8 (0.9 with passive filter)  | >0.99   |
| ThDi                 | <10%(<5% with passive filter)   | <3% @ rated output and nominal input  |
| Output ripple        | <5%   | <2%   |
| Efficiency           | >97% @ rated output with nominal voltage  | >97% @ rated output with nominal voltage  |

**6.2 Rectifier Transformer typical technical data**

|                            |   |
|----------------------------|---|
| Type                       | Oil Type, 6/12/24/48 pulse  |
| Standards                  | IEC 60076-1, IEC61378, IS 2026, IS 6600, CBIP etc.                |
| Input Voltage, frequency   | 33kV/11kV/6.6/0.415kV, 50Hz                                       |
| Other Technical parameters | Shall be suitable to feed Converters with above technical details |

**6.3 Oxygen Analyser, Hydrogen Analysers, Hydrogen Leak Detectors, Dew Point Meters**

Purity of hydrogen gas and dew point is measured by an online purity analyzer and dew point meter. Online Dew Point Analyzer and PPM Analyzer monitors the moisture content of the Produced Hydrogen. Oxygen analyzer shall measure the traces of the oxygen present in H<sub>2</sub> gas.

Hydrogen leak detectors are provided to trip the plant and vent the gases to atmosphere in case hydrogen quantity inside building atmosphere is more than allowed limit.

All the instruments and analyzers shall be suited to Hydrogen electrolyser and fuel cell.

**SECTION-7**

**CHECK LIST FOR DOCUMENTS TO BE FORWARDED ALONG WITH EOI**

Prospective Vendor should submit following documents along with their Proposal:

| <b>Sl. No.</b> | <b>Document Description</b>  | <b>Format</b> | <b>Bidder's confirmation<br/>(Yes / No / Not Applicable)</b> |
|----------------|--|---------------|--|
| 1.             | General information  | Annexure - 1  |  |
| 2.             | List of Executed/ Ongoing Projects   | Annexure - 2  |  |
| 3.             | Product catalogue indicating product range in Hydrogen (Electrolyser, Fuel Cells etc.) | -             |  |
| 4.             | Product(s) technical datasheet   | -             |  |

SECTION-8

Annexure – 1

General Information

Date:

|   |                 |
|---|-----------------|
| Legal name of company   |                 |
| Country of constitution:  |                 |
| Year of constitution:   |                 |
| legal address in country of constitution:   |                 |
| Mobile Number of the Concerned Person:  |                 |
| Email id of the Concerned Person:   |                 |
| <i>Willing to get registered as a Supplier in BHEL's Supplier Directory</i>   | <i>Yes / No</i> |
| Attached are copies of original documents of  |                 |
| <input type="checkbox"/> Articles of Incorporation or Documents of Constitution, and documents of registration of the legal entity named above. |                 |

(Signature of Authorized Signatory)

Name:

Designation:

Address:

Date:

**Annexure – 2**

**List of Commissioned / completed / Under Execution Projects in last 7 years**

Date:

Prospective Vendor 's Legal Name:

Prospective Vendor should provide information of their executed projects

| Equipment/<br>Item name | Brief<br>description of<br>the Equipment/<br>Item | Reference Project                    |   |   | Remark |
|-------------------------|---|--------------------------------------|---|---|--------|
|                         |   | Name of<br>the Project<br>& Location | Capacity, Date of<br>order and<br>commissioning of the<br>Equipment | Owner/Customer,<br>Customer,<br>contact address/<br>Tel./ Fax |        |
|                         |   |                                      |   |   |        |
|                         |   |                                      |   |   |        |
|                         |   |                                      |   |   |        |
|                         |   |                                      |   |   |        |

(Signature & Seal)