BHARAT HEAVY ELECTRICALS LIMITED

(A Government of India Undertaking)
INDIA

Notice seeking

Expression of Interest

from

Prospective Vendors

for

Gas System Items

(Liquid Gas Separator, Demisters, Moisture Separator, H_2 Gas Cooler, De-OXO Unit, Catalytic Convertor, PSA/TSA Dryer, Hydrogen / Oxygen Compressor)

for the BOP of Electrolysers

CONTENTS

Section	DESCRIPTION
SECTION – 1	DISCLAIMER
SECTION – 2	TIMELINES OF EOI PROCESS & CONTACT DETAILS
SECTION – 3	BHEL
SECTION – 4	HYDROGEN BUSINESS
SECTION – 5	EOI
SECTION – 6	TECHNICAL DETAILS
SECTION – 7	CHECK LIST
SECTION – 8	ANNEXURES

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	09.11.2023
2	Last date of Submission of EOI response (BHEL will reserve the right of extension of the date)	05.12.2023

2.2 CONTACT DETAILS:

All the correspondence shall be marked to the following:

Mr. Iftekhar Hassan Manager Proposals & New Business, Project Engineering & Systems Division Unit Bharat Heavy Electricals Limited (BHEL), Hyderabad, India, PIN 502032 Tel:(+91)- 40-23184760, 7095953435 E-Mail: iftekhar@bhel.in	Mr. Amit Kumar Sinha Deputy General Manager Proposals & New Business Project Engineering & Systems Division Unit Bharat Heavy Electricals Limited (BHEL), Hyderabad, India, PIN 502032 Tel:(+91)- 40-23182195, 9912565252 E-Mail: aks@bhel.in

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*.

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) Liquid Gas Separator, Demisters, Moisture separator, Hydrogen Gas Cooler, De-OXO units, Catalytic Convertor, Pressure Swing Adsorption / Temperature swing Adsorption Dryers, with range of rating suitable for kW to MW scale Electrolyser Stack system.

(ii) H_2 / O_2 Compressors for pressure range of 350 to 700 bar.

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 ELIGIBLITY 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 Liquid Gas Separator:

Hydrogen generation through Alkaline based Electrolysis require a liquid gas separator at the outlet of the electrolyser stack to arrest the Electrolyte solution to be carried away along with Hydrogen / Oxygen gas at Cathode & Anode end respectively. These hydrogen & oxygen gases are separated in Liquid Gas separator with help of Gravity / baffles inside the vessel.

Typical Technical Data: -

Description	remark
Type	Horizontal type
Codes and standard	Applicable ASME/manufacturer proven standard
Separation efficiency	As per OEM
Retention time	As per applicable code

6.2 Hydrogen Cooler

The Hydrogen Gas coming out of the Gas Liquid separator is then pass through the Hydrogen cooler for cooling below its moisture dew point.

6.3 KOD with Demister Pad

Demister is also placed at the outlet of the Gas Liquid separator after Hydrogen cooler to further arrest the carry over mist in the gas through Demisters. Sometimes, it is also part of Gas Liquid separators mounted just above the outlet Nozzle of the gas after hydrogen cooler.

Description	Remarks
Type	Vertical type
Codes and standard	Applicable ASME/manufacturer proven standard
Separation efficiency	As per OEM
Other Technical parameters	Shall be suitable to feed Converters with above technical details

6.4 Moisture Separator

The Hydrogen gas after cooler is then flow through the Moisture separator to remove liquid water from gas arrest moisture at desired level.

6.5 De-Oxo Unit (Catalytic Convertors)

The Hydrogen gas after Moisture separator shall be then sent to De-OXO units, De oxidation unit further purify the hydrogen gas mixture by converting the traces of Oxygen gas present into H_20 (water) in presence of Catalyst.

6.6 Pressure Swing Absorption / Temperature Swing Adsorption Dryers

The hydrogen gas is then send to dryer towers which works on adsorption & regeneration. There will be 2 dryer tower, one will be in operation mode and other will be in regeneration mode.

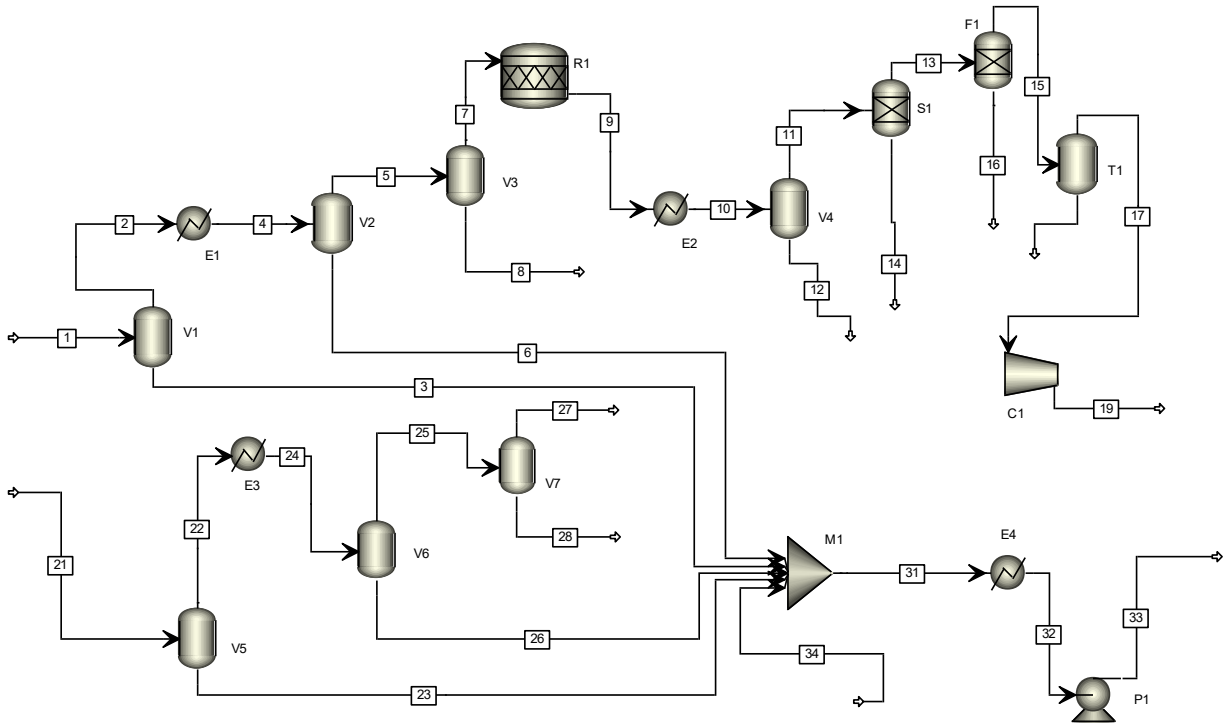
The desired output from the PSA/TSA unit is high purity hydrogen of around 99.999% level.

6.7 Hydrogen & Oxygen Compressors

The Hydrogen gas after PSA/TSA shall be stored in buffer tank (at 6 kg/cm2) for further Compressing to 350 bar or 700 bar as per requirement for further use.

All the Equipment mentioned above shall be suited to Hydrogen Electrolyser and Fuel cell application.

Typical PFD for Hydrogen Generation, Purification and Compression System.



EQUIPMENT NOMENCLATURE:

V1, V2,	Liquid-Gas separators
E1, E2	Heat Exchangers
S1	Separator (Temperature/ Pressure Swing Adsorption)
F1	Gas-Solid Separator (Filter)
P1	Pump
M1	Liquid Stream mixer
R1	Reactor
V3, V7	Demister vessel
T1	Tank (Buffer Tank)
C1	Compressor

SECTION-7

CHECK LIST FOR DOCUMENTS TO BE FORWARDED ALONG WITH EOI

Prospective Vendor should submit following documents along with their Proposal:

Sl. No.	Document Description	Format	Bidder's confirmation (Yes / No / Not Applicable)
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:	
Willing to get registered as a Supplier in BHEL's Supplier Directory	*Yes / No*
Attached are copies of original documents of o 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/ Item name	Brief description of the Equipment/ Item	Reference Project			Remark
		Name of the Project & Location	Capacity, Date of order and commissioning of the Equipment	Owner/Customer, Customer, contact address/ Tel./ Fax	

(Signature & Seal)