EXPRESSION OF INTEREST (EOI)

FOR

SETTING UP OF GREEN HYDROGEN PLANT IN MRPL

EOI NO.: MRPL/CS/2022-2023/01

(GLOBAL INVITATION FOR EXPRESSION OF INTEREST)

Mangalore Refinery and Petrochemicals Ltd

(A subsidiary of Oil and Natural Gas Corporation Limited)

Invites

Expression of Interest (EoI)

From

Any Indian/Global Company/their Affiliates/Representatives

For

Detail Engineering, Supply, Installation and Commissioning of Electrolyser module/s along with all auxiliaries for production of Green Hydrogen, of capacity 500 TPA (62.5 Kg/hr), for mixing with refinery H2 network at the Refinery located in Mangalore, Karnataka, India

I. Letter for invitation of EOI

Invitation Letter

Date: 27.05.2022

Sub: Expression of Interest for Detail Engineering, Supply, Installation and Commissioning of Electrolyser module/s along with all auxiliaries, for production of Green Hydrogen, of capacity 500 TPA (8000 hours per year basis), for mixing with refinery H2 network, at Refinery in Mangalore, Karnataka, India.

Mangalore Refinery and Petrochemicals Limited(MRPL) is a 15 MMTPA (300,000 barrel per day) Refinery located in the coastal city of Mangalore in the state of Karnataka in India. Considering Green Hydrogen mandate by Govt of India that is expected shortly Mangalore Refinery and Petrochemicals Limited(MRPL) intends to set up a Green Hydrogen Plant in its Refinery premises. In this regard, MRPL invites Expression of Interest (EoI) from any Indian/Global Company/ their Affiliates/ representatives (herein after called APPLICANT) for setting up a green H2 plant within the existing refinery.

SN	Critical Dates	Date & Time
1	Publishing Date	10.06.2022
2	Last Date for queries/seeking clarifications	30.06.2022
3	Pre-EOI submission meeting with applicants for providing clarifications	07.07.2022
4	EOI Submission End Date	15.07.2022

MRPL reserves the right to select the technology and its implementation in future, through a Request for Proposal (RfP) process amongst the shortlisted parties identified through this EoI Process or through a separate tender.

EOI can be considered as initial step for selection of technology/bidder for implementation of the project of green hydrogen plant at Mangalore in Karnataka.

MRPL reserves the right to reject or accept any or all applications, cancel/withdraw the EoI process without assigning any reason whatsoever and in such case, APPLICANT shall not have any claim arising out of such action. MRPL bears no responsibility or liability of any kind in reference to the EoI.

II. Introduction

1. Introduction

Mangalore Refinery and Petrochemicals Limited is a Schedule-A Miniratna CPSE and a subsidiary of Oil and Natural Gas Corporation Limited. It operates a 15 MMTPA Refinery in Mangalore, Karnataka. The complex comprises of process units like CDU/VDU, HCU, CCR, PFCC, DCU, DHDT etc in addition to captive power plant and utilities. It is a coastal refinery with Jetty/SPM facilities for import of crude and product sales. It is also connected to a product pipeline for domestic sales to hinterland.

2. Hydrogen Energy Mission of India:

Hon'ble Prime Minister launched the National Hydrogen Mission on 15th Aug 2021. The mission aims to aid government in meeting its climate targets and making India a green hydrogen hub. In line with this, the Green Hydrogen Policy was released in Feb 2022 wherein Green Hydrogen has been defined as Hydrogen produced by way of electrolysis of water using Renewable Energy and the Hydrogen produced from biomass.

3. MRPL's Plan for production of Green Hydrogen:

3.1. In MRPL, the present Hydrogen requirement for Hydro-processing units of the complex is met by Hydrogen produced from Steam Methane Reforming (SMR) units. Considering the Green Hydrogen Policy and the mandate that is expected shortly MRPL intends to set up a Green Hydrogen production facility within the Refinery wherein the Green Hydrogen produced would be blended with Hydrogen produced presently in the Refinery for captive use.

3.2. Among other aspects, the capacity of the Green Hydrogen facility would depend on land availability and power infrastructure available for Green power drawl. Basis this, MRPL intends to set up a Green Hydrogen plant of 500 TPA (62.5 kgs/hr) by Q4 of FY 2024-25 initially.

3.3. MRPL intends to produce Green Hydrogen on continuous basis (24 hours x 7 days) with Renewable Energy Power using water electrolysis method.

4. Power supply for Green Hydrogen Production:

4.1 MRPL in near future shall tie-up for Green Power. The renewable energy power for the 500 TPA plant is intended to be sourced on an open access solution basis blending solar and wind.

4.2 Power will be made available for the Green H2 plant at 6.6 KV/440V level.

III. Intent of the EOI

5. Intent of EoI:

The purpose of the EoI is:

5.1. To identify a reputed company capable of manufacturing, installating and commissioning of electrolyser and related items, for production of Hydrogen.

5.2. Evaluation and selection of feasible and cost effective technology of electrolyser for production of green hydrogen within the refinery premises.

5.3. The green hydrogen produced shall be mixed with the refinery's grey Hydrogen network produced from SMR process.

5.4. The technology of the electrolyser selected after the evaluation, may be used for increasing the green H2 generation capacity in future.

6. Technical Eligibility Criteria:

Following applicant can participate in the EoI, meeting any of the criteria in 6.1 and 6.2:

6.1. Bidder shall be a manufacturer or a channel partner of the manufacturer of Proton Exchange Membrane (PEM)

AND

The Manufacturer or the Channel partner should have supplied and installed at least one unit of electrolyser having minimum 5 **kg/hr Hydrogen production capacity** based on above technology (PEM) in last 5 years, and should have been in successful commercial operation for at least 6 (six) months prior to the last date of month previous to the one in which bids are invited. This should be corresponding to the electrolyzer type being offered to MRPL.

6.2. Bidder shall be an EPC (Engineering, Procurement, and Construction) Contractor/ EPCM (Engineering, Procurement, and Construction Management) Consultant having past experience of successfully completed industrial project(s) as EPC/EPCM in the field of Hydrogen Generation Plant / Power / Oil & Gas / Chemical / Petrochemical / Hydrocarbon / Fertilizer during last 7 years ending last date of month previous to the one in which bids are invited.

AND

The bidder (EPC/EPCM) should have a Deed of Joint Undertaking (DJU) with Manufacturer who meets the Technical Criteria as mentioned in Clause (6.1) above for supply of Electrolyser. The Deed of Joint Undertaking (DJU) between EPC/EPCM and Manufacturer shall be strictly as per the format enclosed with the Tender Document; which shall be valid for minimum 05 (five) years from the last date of month previous to the one in which bids are invited.

Applicant shall submit all the required documents as per the Annexure list in support of their technical and financial credentials for evaluation of EoI.

6.3 Notes for Technical Eligibility Criteria

6.3.1 Channel Partner: A Channel Partner is defined for this project as an entity that has a valid authorization/agreement for 5 yrs, with a Water Electrolyser Manufacturer to market/ supply/ assemble/ sell the manufacturer's products.

6.3.2 A Manufacturer may tie up with multiple EPCs through a separate Deed of Joint Undertaking.

6.3.3 A Manufacturer can submit bid individually or may tie up with bidding company (i.e. Indian Subsidiary /Channel Partner/ multiple EPCs) but both options cannot be availed by a single manufacturer.

6.3.4 A job executed by a Bidder for own plant/projects cannot be considered as experience for the purpose of meeting the requirement of eligibility criteria. However, jobs executed for Subsidiary/Fellow subsidiary/Holding company will be considered as experience on production of requisite documentation.

6.3.5 Bidder shall have single point responsibility for project management and execution of complete scope covered in the tender including.
Bidder's scope of work/ supply shall include but not limited to the following:

- Design & Engg.
- Fabrication at shop
- Supply of Electrolyser stack/s as per technical specifications preferably as a complete skid/containerized unit.
- Supply of Balance of Plant Works
- Fabrication & Installation including all Civil, Electrical, Inst. Mech. works at site.
- Commissioning and Performance Guarantee Test Run (PGTR)
- Warranty/Service Life Guarantee

7. Technical Specification

7.1 The green Hydrogen produced from the electrolyser shall be mixed with the Refinery H2 which is produced from existing SMR plants for use in hydro-processing units. The Green Hydrogen shall meet the following product specifications:

Unit	Value
H2 vol%	99.99% min.
CO+CO2	20 ppm vol max
N2	Bidder to specify if any/Indicate NIL
O2	1 ppm vol max
H2O	5 ppm vol max
Cl	Bidder to specify if any/Indicate NIL

Chlorine plus Chlorides	Bidder to specify if any/Indicate NIL
Metals, ppm max	Bidder to specify if any/Indicate NIL

7.2 The green H2 with 99.99% purity shall be produced at 25 Kg/cm2 min. pressure and temperature of 40degC at the battery limit of Green H2 plant. Bidder shall guarantee the product H2 quality. Bidder shall design the gas purification system accordingly.

7.3 The battery limit (tie-in point) of the bidder will be defined subsequently as part of RFP/RFQ process

7.4 The unit shall be designed to run min. 8000 hrs per year at 100% capacity.

7.5 The guaranteed service life of electrolyzer stack shall not be less than 80000 hrs (Service Life Guarantee). Any replacement cost during the guarantee period i.e. before 80000 hrs shall be borne by bidder and this requirement shall survive the termination of DJU that the bidder may have entered into with manufacturer and/or shall survive the termination of the agreement that the bidder many have entered into as a channel partner with the manufacturer.

7.6 No Hydrogen storage shall be allowed inside the battery limit of the Hydrogen Unit. Vendor to supply continuous Hydrogen at specified pressure without any pressure fluctuation.

7.7 Turndown capacity of the unit (i.e. the minimum operable capacity of the Water Electrolyser system at which the system can produce hydrogen as per specification and at required pressure and temperature), shall be **25% max.** The unit shall be capable of operating anywhere between the Turndown Capacity i.e. lower than 25% (as offered by the bidder and 100%). Bidder shall guarantee turndown capacity.

7.8 Plant should be designed and built to meet all safety/environment/regulatory requirement required by Factory Act, PESO, Electricity Act, CPCB/ KSPCB, and/or all other applicable and relevant guidelines by authorities.

7.9 The entire plant along with all auxiliaries shall be installed with-in the available plot area i.e 500 **m2** , excluding substation. MRPL intends to supply power at the battery limit of the bidder/applicant from an existing substation located within the Refinery. The electrolyzer stack and the BOP like feed preparation section, Gas purification system, oxygen-water separator, pumps, compressors, heat exchangers, all associated auxiliaries etc. shall be installed within this available plot area preferably as a skid or containerized unit.

7.10 The electrolyser stack shall be designed such that one or more modules can be removed online for maintenance, without affecting the plant operation.

7.11 Bidder to provide a warranty period of 1 year from commissioning. Bidder shall provide all inclusive AMC as an option for the first three years after completion of the warranty period.

7.12 The electrolyzer design must comply with the classification of Hazardous areas done in the case of a Refinery such as Zone 0, Zone 1 etc. Accordingly, the type of electrical equipment/instrument to be selected would be governed by various codes and standards such as IS 5571, IS 5572, IS 9570, OISD STD-113, OISD STD-118, PESO, CCOE etc.

7.13 The Hydrogen Generation System/ process should comply with all relevant National and International standards for safe and reliable operation of Hydrogen Generation system .

8. Applicant's Responsibility:

The key roles and responsibilities shall include but not limited to following:

8.1. Engineering and supply of the electrolyser system along with all the related auxiliaries as a single point responsibility.

8.2. Supply of the complete system along with spares for 2 yrs. operation.

8.3. Erection & commissioning of entire system along with all auxiliaries.

8.4. To meet the performance guarantee of the system, like specific power (Kwhr/kg of H2), water consumption (i.e. Kg water/Kg of H2), Hydrogen production and Hydrogen pressure.

8.5. To improve the quality of the water supplied by MRPL as required, before feeding to electrolyser.

8.6. To meet the quality of Green Hydrogen as mentioned under Technical Specification with purity 99.99%.

8.7. Operation of the system for one year, after successful commissioning (optional).

8.8. To assist MRPL for getting statutory clearance from statutory bodies.

8.9 Bidder will provide on-site training on operation, maintenance and troubleshooting of critical equipment like electrolyser etc. and control system to MRRL personnel

9. MRPL's Responsibility:

9.1. To provide land for installation and commissioning of system within MRPL's premises.

9.2. To supply Renewable power (AC) on an open access solution basis blending solar and wind. The Power would be available at 6.6 KV/440V at battery limit of bidder.

9.3. To supply required qty. of DM water/Desalinated Water/Treated Raw Water as feed for electrolyser at ambient temperature. The DM water/Desalinated Water/Treated Raw Water shall be supplied from the existing plant of the refinery .

MRPL shall make available DM water or Desalinated Water or treated raw water at Battery limit of Green Hydrogen unit as per the specifications indicated below. However, MRPL will take final call to supply DM water/Desalinated water or treated Raw Water. Quality of water shall be improved further by bidder as required for the feed to electrolyser.

The typical DM water/Desalinated quality shall be as mentioned below:

DM Water

Test	**Unit**	**Result**
pH		6.5-7.0
Conductivity @ 25^{0}C	Micro mho/l	< 1
Turbidity	NTU	Nil
Chlorides as Cl	mg/l	Nil
Total Hardness as CaCO3	mg/l	Nil
Total Reactive Silica as SiO2	mg/l	<0.02
Oil	mg/l	Nil
Total iron as Fe	mg/l	<0.03(max)
Total Copper	mg/l	<0.003
KMnO4 value at 100°C	mg/l	<5

Desalinated Water

Test	**Unit**	**Result**
TDS @ 32degC	ppm	< 100

Treated Raw Water

Parameters	Units	Filtered Raw Water
pH	--	6.0-7.8
Conductivity @ 25° C	Micro mho/l	60-120
Turbidity	NTU	1-10
M. Alkalinity	mg/l	20-20
Total Suspended Solids	mg/l	1-5
Chlorides as Cl	mg/l	10-24
CaH as $CaCO_3$	mg/l	12-24
MgH as $CaCO_3$	mg/l	16-22
Total hardness as $CoCO_3$	mg/l	28-46
Total Reactive Silica as SiO_2	mg/l	6-20
Colloidal Silica as SiO_2	mg/l	<0.1
PP Alkalinity	mg/l	NIL
Total iron as Fe	mg/l	0.1-04

Sulfates as SO_4	mg/l	4-10
Total Copper	mg/l	NIL
Organic matter as $KMnO_4$	mg/l	<5

9.4. To provide all utilities like CW, Instrument air, N2 as required. Applicant shall specify the required quality and qty. of all utilities as required for the project.

9.5 Provide necessary support during Operation & Maintenance (O&M).

9.6 Facilitate installation and commissioning of system.

10. Meteorological Design Data:

Sl #	Parameter	Minimum	Normal / Average	Maximum / Design
(A) METEOROLOGICAL DATA				
1	Elevation above mean sea level, m	5.5	8.0	8.0 to 78
2	Barometric pressure, mbar		1007	
3	Ambient temperature, °C	t_{min} =16.0	t_{nor} = 32.0	t_{max} = 38
4	Relative humidity, %	61@ t_{min}	75 @ t_{nor}	91 @ t_{max}
5	Rainfall data: mm (a) for 1-hour period	10	30	115
	(b) for 24-hour period	10	100	360.9 max
	(c) Annual	2270 min	3467 avg.	4703 max
6	Wind data (a) wind velocity, Kmph (b) wind direction	20 – 61 (Max. 28 days / year) Morning East to West, Evening North West to South East		

(B) DATA FOR EQUIPMENT DESIGN		
1	Design dry bulb temperature, °C	35
2	Design wet bulb temperature, °C	29
3	Low ambient temperature for MDMT, °C	16
4	Design air temperature for air cooled exchangers where followed by water cooling,	35
5	Design air temperature for air cooled exchangers where not followed by water cooling,	38
6	Coincident temperature and relative humidity for Air Blower / Air Compressor design.	@ 35 oC, 88%

11. EoI Evaluation Methodology:

After initial screening of all the applications on the basis of the criteria as mentioned in clause no 6. above, the offers and the supporting documents (technical and financial) submitted by the qualified applicants will be further evaluated by MRPL considering the following parameters:

11.1 Specific power consumption i.e Kwhr/Kg of Green Hydrogen produced.

11.2 Overall cost of H2 produced i.e. Rs/Kg

11.3 Area Footprint in sq. meter required.

11.4 Nos. of units operating satisfactorily, if any.

11.5 Operating and maintenance cost.

11.6 Project completion timeline.

11.7 Reliability and scalability of the technology.

11.8 Life cycle cost of the plant.

MRPL reserves the right to select the electrolyser technology, capacity of green hydrogen plant and its implementation in future, through a Request for Proposal (RFP) process amongst the shortlisted parties identified through this EoI Process or through a separate tender.

EOI may be considered as initial step for selection of technology/bidder for implementation.

1. List Of Enclosures

1.1	Instruction to Applicants	: Annexure-I
1.2	Covering letter cum undertaking	: Annexure II
1.3	Applicant's General Information	: Annexure III
1.4	Technical credential of applicant	: Annexure IV
1.5	Financial information of applicant	: Annexure V
1.6	Deed of Joint Undertaking	: Annexure VI

Annexure: I

INSTRUCTIONS TO THE APPLICANTS

1. The Applicants should note that:

1.1 Language of the responses to EoI or any query/ clarifications/ correspondences shall be in English only.

1.2 For expression of interest, Application Form/Annexures shall be duly filled and sent to MRPL by the APPLICANT

1.3 Applicants shall mention the name and contact details of relevant person(s), with complete address, phone number and email id.

1.4 MRPL may, at its sole discretion, ask for additional information/ documents and/ or seek clarifications from the Applicant(s) after the Deadline for submission of response, inter alia, for the purpose of removal of inconsistencies or infirmities in their responses.

1.5 The Applicants shall be responsible for all the costs associated with the preparation of the response and participation in discussions, finalization & execution of the documents related with this EoI. MRPL shall not be responsible in any way for such costs, regardless of the conduct or outcome of this short-listing/ selection process.

1.6 The financial data must be submitted in Indian Rupees Only.

1.7 All the pages of the Application for Enlistment and attachments should be signed and corrections and over writings should be countersigned by the authorized signatory.

1.8 If it is established that the Applicant has submitted fraudulent documents or has indulged in to corrupt and fraudulent practice at any point of time, the Applicant would be debarred/ disqualified from the Enlistment / tendering / taking up of work in MRPL.

1.9 MRPL reserves the right to cross check and confirm the information / details furnished by the Applicant at any time during the period of enlistment.

2. Corrigendum :

At any time before the last date of submission of EoIs, MRPL may, for any reason, whether at its own initiative or in response to a clarification requested by an Applicant, modify the EoI document. The amendment will be will be binding on the Applicants and the Applicant will give due consideration to the same, while they submit their EoIs, and would invariably enclose documents/ information, as required, on account of the amendment, as a part of the EoI. MRPL may, at its discretion, extend the deadline for the submission of EoIs.

3. Validity of the responses:

The Applicant shall submit the responses which shall remain valid up to twelve (12) months after the last date of submission. MRPL may solicit the Applicant's consent for an extension of the period of validity of the response.

4. Submission of the response to EoI :

The responses to the EoI are to be submitted in soft copy vide e-mail to:

Mr. P V Ganesh
General Manager (Corporate Strategy)
Mangalore Refinery and Petrochemicals Limited,
Mudapadav, Post Kuthethoor, Via Katipalla
Mangaluru-575030, Karnataka
Mobile: 9448495772
Email : ganesh@mrpl.co.in

Any technical/commercial queries, before submission of EOI shall also be sent by email to above addressee.

****

Annexure-II

FORMAT FOR COVERING LETTER CUM UNDERTAKING

(The covering letter should be on the Letter Head of the Applicant)

Applicant's Ref. No. : _____
Date: _____
Place: _____

To,
.....
.

Sub.:

MRPL Ref.: EoI No. MRPL/Green Hydrogen/EoI/2022, dated xx/xx/2022

Dear Sir,

We, the undersigned ..... [insert name of the "Applicant"] ..... having read, examined and understood in detail the INVITATION FOR EXPRESSION OF INTEREST, we confirm that neither we nor any of our Parent Company/ Affiliate/ Ultimate Parent Company has submitted response other than this response directly or indirectly in response to the aforesaid EoI.

1. We give our unconditional acceptance to the EoI, issued by MRPL, including its amendments and/or clarification, if any, the receipt of which is hereby acknowledged. In token of our acceptance to the EoI, the same have been signed & stamped by us and enclosed to the response. We hereby confirm that the provisions of the EoI shall be binding on us.

2. We have submitted our response strictly as per provisions and formats of the EoI, with-out any deviations, conditions and without mentioning any assumptions or notes.

3. We hereby unconditionally and irrevocably agree and accept that the decision made by MRPL in respect of any matter regarding or arising out of the EoI shall be binding on us. We hereby expressly waive any and all claims in respect of EoI process. We confirm that there are no litigations or disputes against us, which materially affect our ability to participate or function under the obligations with regard to EoI.

4. Details of the contact person of applicant are furnished as below: Name:
   Designation:
   Address
   Contact numbers
   Email id

5. It is confirmed that our response is consistent with all the requirements of submission as stated in the EoI and subsequent communications from MRPL, if any.

6. The information submitted in our response is complete, strictly as per the requirements stipulated in the EoI and is correct to the best of our knowledge and understanding. We would be solely responsible for any errors or omissions in our response.

7. We confirm that all the terms and conditions of our response are valid for acceptance for a period of twelve (12) months from the response Deadline.

8. We understand that MRPL is not bound to accept any response it receives.

We remain,
Yours sincerely

Signature Name Designation

(Authorized Person in whose name Power of Attorney is issued)

Annexure: III

APPLICANT'S GENERAL INFORMATION

Applicant shall submit following general information along with supporting documents:

1. Name of the Company/Affiliates/Representatives/: (Strike off whichever is not applicable)
2. Legal status of the Company/Affiliates/Representatives
3. Brief description of the Company/Affiliates/Representatives including details of its business groups/subsidiaries:
4. Date of Incorporation:
5. Date of Commencement of Business:
6. Full address including Telephone nos.: a. Registered Office: b. Head Office: c. Address for communication: d. Contact Details: e. Office Address in India, if any:
7. Any other documents considered relevant

(Sign & Company Seal) Authorized signatory

AnnexureIV

TECHNICAL CREDENTIAL OF APPLICANT

Following documents/information shall be submitted by applicant in support of their technical credential:

1. Brief of the Applicant's Electrolyser technology for H2 production including basic principle, major operating conditions/parameters, quality of H2 produced etc.

2. Advantages/merits of Applicant technology compared to other electrolyzer in market.

3. Confirm electrolyzer design ensures compliance to all applicable standards/codes for installation and operation within Refinery.

4 . Confirm whether design standards are equivalent to ISO 22734

5 . Mention Quality of Green Hydrogen produced, along with impurity level. Bidder to refer product specification mentioned under clause 7.1 of Technical specification

6. Pressure and temperature at which Green Hydrogen shall be produced (Min pressure reqd- 25 kg/cm2g at max temp of 40degC)

7. Power per unit of H2 production.
   Provide Estimated power requirement on kwhr basis per kg of Hydrogen produced at 100% capacity (This shall be total power consumption including electrolyzer and balance of plant). Balance of Plant (BoP) includes all other equipment excluding Electrolyser stack/modules assembly . It shall include feed preparation unit, gas purification section, pumps & compressor (if applicable), Exchanges, control system, all associated auxiliaries etc)

8. Land Area/Footprint per module/stack basis. Equivalent H2 generation capacity per module/stack to be indicated. Also indicate total area for the 500TPA plant (excluding substation)(Area shall not exceed 500 m2)

9. Confirm entire plant (Electrolyzer, BOP) including, but not limited to, instrumentation controls/PLC etc is considered for installation within 500 m2 (max) and no additional space is required whatsoever.

10. Typical unit plot plan to be provided (Max area available is 500 m2)

11. Based on the meteorological design data provided elsewhere in this tender document, and statutory/safety requirements, applicant to confirm plant is designed for outside/outdoor installation. Bidder to confirm if it is a skid mounted/containerized unit.

12. Utilities required for normal operating of the plant (eg. Nitrogen/Service Water/Plant Air/Instrument Air/Cooling Water/Others(specify)). Please specify on per min/per hour basis for the 500 TPA plant

Sl No.	Parameter	Unit of Measurement	Quantity	Frequency
1	Nitrogen			
2	Service Water/DM Water or both(Specify)			
3	Plant Air			
4	Instrument Air			
5	Cooling Water			
6	Any other chemical			
7	Others			

13. Estimated utility requirement in standard litres per minute if DM water is provided by MRPL versus utility requirement in standard litres per minute if treated raw water is provided.

14. Estimated Capital Investment for the Project

Sl No.	**Item Description**	**UOM**	**Qty**	**Rs. Cr**
1	Supply & Installation of Electrolyser Stack:	Lump-sum	1	
2	Supply & Erection of Balance of Plant (BOP) and Commissioning (SAT) of entire Green H2 Plant, PGTR etc	Lump-sum	1	
3	AMC Charges for 1st year after the expiry of warranty period.	Year	1	
4	AMC Charges for 2nd year after the expiry of 1st year AMC	Year	1	
5	AMC Charges for 3rd year after the expiry of 2nd year AMC.	Year	1	
6	Bidder to indicate any other periodic replacement/replenishment required as per design(including but not restricted to electrodes)	To be specified by bidder	To be specified by bidder	

15. Requirement of flare to be confirmed

16. Effluent generation if any (Solid, Liquid, Gaseous) to be confirmed if approximate figures.

17. Previous experience of the applicant in implementing electrolyser based green hydrogen production projects. Experience /reference list of green H2 plant executed in past

18. Catalogue/ detailed technical details of the relevant system/ product of the applicant

19. Details about electrolyzers in successful commercial production for a min. period of 6 (six) months prior to the last date of month previous to the one in which bids are invited.

20. Turndown capacity of electrolyzer being offered (Min. shall be 25%)

21. Guaranteed Service Life of Electrolyzer Stack (Min. shall be 80000 hrs)

22. Electrolyzer cold start-up time and stand-by start up time

23. Cell Temperature and efficiency. Operating pressure

24. Ramp up capability and ramp up time from turndown capacity to 100% capacity

25. Maintenance Requirement, frequency and no. of shutdown days. Bidder to clearly specify.

26. Ability of technology to handle intermittent renewable power (i.e. transient range) vs requirement of continuous rated renewable power?

27. Power will be supplied at 6.6 KV at HT level and 440V at LT level. Applicant to indicate power requirement at LT level and HT level.

28. Copy certificate from customer about satisfactory performance of the unit already commissioned

29. Engineering strength of applicant, for execution of the project, if job is awarded in future.

30. Detail about the collaboration/tie up details with any manufacturer (if applicable).

31. Execution period required (project schedule) from the date of award of job to commissioning of the facility. Applicant to specify (Shall not exceed 15 months)

32. Name and Production Capacity of Electrolyzer manufacturer in KW/MW per year. Concurrent commitments.

33. The electrolyser stack shall be designed such that one or more modules can be removed online for maintenance, without affecting the plant operation. Further, the module design shall ensure compatibility for replacement and/or integration with next generation electrolyzer modules that may be manufactured by the electrolyzer manufacturer. Bidder to confirm

34. Bidder to indicate the min. stack size and standard stack size that can be delivered/manufactured for operation. Bidder to indicate on KW basis.

35. Any other technical detail which applicant would like to highlight, about its technology for consideration of EoI in future.

(Sign & Company Seal) Authorized signatory

AnnexureV

FINANCIAL CREDENTIAL OF APPLICANT

Following documents to be enclosed related to financial credential of the applicant:

1. Copies of Audited Financial statements (Annual Reports) for last 3 years.
2. Credit Rating, Market share (Domestic/International)
3. Segmental Revenue in the applied category.
4. Following financial data as certified by a Chartered/ Cost Accountant (with membership number and firm registration number) to be provided as per below format

In INR Cr.

Sl No.	Description	FY-2019-20	FY-2020-21	FY 2021-22
d	Annual Turnover			
e	Paid up share capital			
g	Net worth			
h	Profit before taxes			

(Sign & Company Seal) Authorized signatory

Annexure-VI

DEED OF JOINT UNDERTAKING

DEED OF JOINT UNDERTAKING TO BE EXECUTED BY THE BIDDER / CONTRACTOR AND THE MANUFACTURER

The DEED OF UNDERTAKING executed this .....day of .....Two thousand .....by M/s.....a Company incorporated under .....having its Registered Office at..... (hereinafter called the "Bidder/Contractor", which expression shall include its successors, administrators, executors and permitted assigns) and M/s .....a Company registered under the .....having its Registered Office at .....(hereinafter called the "Manufacturer", which expression shall include its successors, administrators, executors and permitted assigns) in favour of

Mangalore Refinery and Petrochemicals Limited, a subsidiary of Oil and Natural Gas Corporation Limited, incorporated under the Companies Act, 1956, having its Registered Office at Kuthethoor, via Katipalla, Mangaluru- 575030, Karnataka, India (hereinafter called "MRPL " which expression shall include its successors, administrators, executors and assigns).

WHEREAS, MRPL invited for Expression of Interested for Design, Engineering, Supply, Installation and Commissioning of Water Electrolyser System, for 62.5 KG/HR (500 TPA), of Green Hydrogen Production at MRRL Mangalore AND WHEREAS vide Technical Eligibility Criteria it has been specified that bidder who meets the required experience shall also have an Agreement with Manufacturer who meets the criteria. WHEREAS M/s ..... (Bidder) is submitting its proposal in response to the Invitation for Expression of Interest(EOI) by MRPL bearing Tender No. ..... dated ..... for 'Design, Engineering, Supply, Installation and Commissioning of Water Electrolyser System, for 62.5 KG/HR (500 TPA), of Green Hydrogen Production at MRPL Mangalore'. The Bidder and the Manufacturer are required to jointly execute and furnish an irrevocable Deed of Joint Undertaking and be jointly responsible and bound unto MRPL for successful performance of the Contract.

NOW THEREFORE, THIS DEED WITNESSETH AS UNDER:

That in consideration of the Award of the Contract by MRPL to the Contractor, we the Manufacturer of Proton exchange membrane (PEM) based Hydrogen Generation System and the Contractor, do hereby declare and undertake the following:

1. That we shall be jointly responsible to MRPL for the execution and successful performance of the complete Package and for performance of all the contractual obligations, as specified under the said contract(s).

2. Without prejudice to the generality of the Undertaking in paragraph 1 above, the manner of achieving the objective set forth in paragraph 1 above shall be as follows:

a. We the Manufacturer shall be fully responsible for the complete Package. Further, the Manufacturer shall depute their technical experts from time to time to the Contractor's works / MRPL's project site as required by MRPL and agreed to by Contractor / Manufacturer to facilitate the successful performance of the Contract as stipulated in the aforesaid Contract and if necessary, the Manufacturer shall advise the Contractor for suitable modifications of design and implement necessary corrective measures to discharge the obligations under the contract.

b. In the event the Manufacturer and Contractor fail to demonstrate guaranteed parameters as specified in the contract, the Manufacturer and the Contractor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to MRPL.

c. Implementation of the corrected design and all other necessary repairs, replacements, rectification or modifications to the Package work and payment of financial liabilities and penalties and fulfilment of all other contractual obligations as provided under the Contract shall be the responsibility of the Contractor.

d. In the event the Contractor fails to complete the project, MRRL shall have the right to carry-out unfinished work through technology provider or any other agency at the bidder's risk and cost.

3. This Deed of Joint Undertaking shall be valid till _____ years **(Min 5 years)** from the final bid submission close date. We, the Contractor and the Manufacturer do hereby undertake and confirm that the undertaking herein contained shall be irrevocable and shall not be revoked till expiry of validity period of Deed of Joint Undertaking mentioned above. In case of delay in completion of contract, the validity of this Deed of Joint Undertaking shall be extended by such period of delay beyond the validity period mentioned above. We further agree that this Undertaking shall be without any prejudice to the various liabilities of the Contractor including Contract Performance Security as well as other obligations of the Contractor in terms of the Contract.

4. Any dispute that may arise in connection with this Deed of Joint Undertaking shall be settled as per arbitration procedure/rules mentioned in the Instruction to Bidders (ITB) of the tender document. This Deed of Joint Undertaking shall be construed and interpreted in accordance with the Laws of India and District Court of Mangalore shall have exclusive jurisdiction.

5. We, the Manufacturer and the Contractor agree that this Undertaking shall form an integral part of the Contract. We further agree that this Undertaking shall continue to be enforceable till its validity.

6. That this Deed of Joint Undertaking shall be operative from the effective date of the Contract.

IN WITNESS WHEREOF, the Manufacturer and the Contractor through their authorized representatives have executed these presents and affixed common seal of their respective companies, on the day, month and year first mentioned above.

For (Contractor) M/s ..... Witness:

....

(Signature of the Authorized Representative) (Signature of the Witness)

Name: Name:

Designation: Address:

Common Seal of the Company

For (Manufacturer) M/s ..... Witness:

....

(Signature of the Authorized Representative) (Signature of the Witness)

Name: Name:

Designation: Address:

Common Seal of the Company

Note: Power of Attorney of the person signing on behalf of Manufacturer and Bidder is to be furnished by Bidder.

Mangalore Refinery and Petrochemicals Limited (MRPL) is a subsidiary of M/s. Oil and Natural Gas Corporation Limited (ONGC). MRPL proposes to invite Expression of Interest.

EOI Details as follows:

EOI No.	MRPL/EOI/CS/2022-2023/01
EOI on Website	From 10.06.2022 to 15.07.2022
Last Date foe queries/Seeking Clarifications	30.06.2022
Pre-EOI submission meeting with applicants for providing clarifications	07.07.2022
Closing date for submission of EOI	Upto 17:00 hrs (IST) on 15.07.2022
EOI documents available at	www.mrpl.co.in/eoi

Please contact below mentioned personnel for further details:

Designation	Contact No.	Email id
GM (Corporate Strategy)	+91-824-2883244	**ganesh@mrpl.co.in**

All Credentials / Documents shall be addressed to

General Manager
Materials Department
Mangalore Refinery & Petrochemicals Ltd
Kuthethoor PO, Via Katipalla, Mangalore – 575 030
Karnataka- India

The envelope containing the documents shall be superscribed **"Documents for Setting up of Green Hydrogen plant at MRPL"**