BID EVALUATION CRITERIA

Selection of Successful Bidder (Evaluation Methodology):

Techno-Economic evaluation of the technically acceptable bids will be carried out for the final selection of Bidder as described below:

Selection of the bidder shall be based on the calculated Levelized Cost of Hydrogen (LCOH) produced considering only Bidder scope.

1) The LCOH shall be calculated as per the formula mentioned below:
   LCOH (Rs. /Kg) = PV of total cost of bidder scope / H (Total H_2 production in 10 yrs.)
   Where: -
   Total Cost of bidder scope = Total CapEx (C) + Total OpEx (O) in 10 yrs,
   - CapEx (C) = Total cost as quoted by bidder including taxes as applicable
   - OpEx (O) = O1+O2 (As mentioned below)
   - H = Total Qty. of H_2 produced & supplied in 8,000 hrs per year x 10 Yrs. i.e. 80,000 hours
   - O1 = Cost of total electricity consumed in 10 yrs. @ Rs 5.0 per KWh
   - O2A = Total cost of comprehensive O&M in 10 yrs. as mentioned by bidder for each year in his technical bid
   - O2B = Total cost of replacement of stacks in the year as recommended by bidder in his technical bid during 10 years of operation
2) The total period for PV calculation shall be total 11 years with first year capex and opex in subsequent 10 years.
3) The Discount rate for NPV calculation shall be considered @ 10%.
4) The cash flow for the 1st year shall be the total CapEx (C) only, as quoted by bidder. The OpEx (O) shall be considered for the next 10 yrs, starting from 2nd year.
5) The total O&M costs (O2) shall be considered for 10 yrs, which shall start after the successful SAT.
6) The bidder with least LCOH value (Rs/kg) shall be selected as successful bidder.
7) The unit shall be considered operating 8,000 hrs each year at 100 % throughput.
8) For LCOH calculation, the Hydrogen supply rate shall be considered @ quoted guaranteed rate for all the 10 yrs. Total 8000 operating hrs. shall be considered for each yr. for all the 10 yrs. The quoted guaranteed Hydrogen supply rate shall be within 17 kg/hr (Minimum) to 19 Kg/hr (Maximum).
9) Bidder shall submit following, as per the table given below in the price bid only:

Table-1

Sl. No	Stream	UOM	Estimated Value
i	Electricity Power consumption by the electrolyser system/s, at guaranteed rate of hydrogen production	KWh	To quote in Price Bid
ii	Electricity Power consumption excluding electrolyser system (BOP), at guaranteed rate of hydrogen production	KWh	To quote in Price Bid

BEC/NBDG/ES/01/R01 18.01.2024

Table-2 (to be put in annexure to Price Bid in Table 2) for reference only

Sl. No	Stream	UOM	Estimated Value
iii	DM water consumption as feed to unit at guaranteed rate of hydrogen production	Kl/hr	To quote
iv	Cooling water flow requirement for BoP	KL/hr	To quote
v	Instrument air consumption at B/L	Nm3/hr	To quote
vi	KOH/NaOH or other chemical/s as required	Kg/yr	To quote
vii	Cost of other utilities, if applicable N2	LS per year	To quote

10) CapEx (C) shall be considered as quoted by the Bidder in its price bid.
11) The guaranteed life cycle of electrolyser system shall not be less than 40,000 hours. The bidder shall furnish the cost of replacement of electrolyser system/stacks and specify the time period (Year) in which replacement is recommended. The quoted cost of stack replacement shall not be less than 25% of the quoted CAPEX.

Corrigendum on PQR (PQR/NBDG/ES/01/R00) dated 18th January 2024

Subject: PRE-BID TIE UP OF ELECTROLYSER SYSTEM

The following modifications have been incorporated in the tender document for the subject tender:

SL No.	Clause No.	Existing PQR Criteria	To be modified as
1	A) Technical Prequalification Requirements (PQRs)	Bidder shall be a manufacturer or a channel partner of the manufacturer of either Alkaline Water Electrolyser (AEL) or Anion Exchange Membrane (AEM) or Proton Exchange Membrane (PEM) or Alkaline Membrane Solid Electrolyser (AMSE) or Solid Oxide Electrolyser (SOE) technology (Suitable/relevant documentary evidence to substantiate the fulfilment of this PQR is to be submitted along with the bid). AND Bidder should have done system integration & supplied at least one (1) Electrolyser system (AEL/PEM/AMSE/SOE) of capacity at least 250 kW as a single unit in India in the last 10 years and the system should have been in successful operation for at least 03 (three) months prior to the original bid closing date. (Requisite performance certificate from the end client/customer as documentary evidence to substantiate the fulfilment of this PQR is to be submitted along with the bid). AND The bidder who meets the Technical Criteria as mentioned above for supply of Electrolyser system shall be required to enter a Deed of Joint Undertaking (DJU) with BHEL. In such case, Deed of Joint Undertaking (DJU) executed by the Bidder and BHEL shall be as per the format enclosed in the Tender Document, in which the Bidder and BHEL to sign an undertaking for successful completion of the Contract. The DJU format with acceptance should be submitted along with the Techno-Commercial bid, failing which the bidder shall be disqualified and its bid shall be rejected. The DJU shall be valid for at-least five years from the original bid closing date.	Bidder shall be a manufacturer or a channel partner of the manufacturer of either Alkaline Water Electrolyser (AEL) or Anion Exchange Membrane (AEM) or Proton Exchange Membrane (PEM) or Alkaline Membrane Solid Electrolyser (AMSE) or Solid Oxide Electrolyser (SOE) technology (Suitable/relevant documentary evidence to substantiate the fulfilment of this PQR is to be submitted along with the bid). AND Bidder should have done system integration & supplied at least one (1) Electrolyser system (AEL/PEM/AMSE/SOE) of capacity at least 250 kW as a single unit ~~in India~~ in the last 10 years and the system should have been in successful operation for at least 03 (three) months prior to the original bid closing date. (Requisite performance certificate from the end client/customer as documentary evidence to substantiate the fulfilment of this PQR is to be submitted along with the bid). AND The bidder who meets the Technical Criteria as mentioned above for supply of Electrolyser system shall be required to enter a Deed of Joint Undertaking (DJU) with BHEL. In such case, Deed of Joint Undertaking (DJU) executed by the Bidder and BHEL shall be as per the format enclosed in the Tender Document, in which the Bidder and BHEL to sign an undertaking for successful completion of the Contract. The DJU format with acceptance should be submitted along with the Techno-Commercial bid, failing which the bidder shall be disqualified and its bid shall be rejected. The DJU shall be valid for at-least five years from the original bid closing date.

Corrigendum No.1 on Technical Specification dated 18th January 2024

7.	New Clause		Metering Point For all accounting purpose, the electrical energy consumption shall be recorded in supply energy meter installed at the incoming of the 33kV feeder at plant boundary.
8.	6.0 a) iii)	33 KVA power supply	Owner's responsibility: 33 KV power supply Green Power will be supplied at 33 KV feeder available at Plant boundary free of cost up to the guaranteed consumption corresponding to the supply of Hydrogen
9.	6.0 b)		**Bidder's Responsibility:** **Addition: -** xi) Supply of all the consumables and utility except power required for operation of the plant is in the scope of bidder.
10.	8.0 b)	The capacity of electrolyser module/s to be supplied shall be minimum 17 Kg/hr.	The capacity of electrolyser module/s to be supplied shall be minimum 17 Kg/hr and Maximum 19 Kg/hr.
11.	8.0 g)	The H2 generation capacity offered by the bidder shall be 17 Kg/hr (min). Bidder shall select its model/s of its electrolyser or designed it accordingly to meet the minimum capacity of Green Hydrogen plant.	The H2 generation capacity offered by the bidder shall be ranging from 17 Kg/hr (min) to 19 kg/hr maximum. Bidder shall select its model/s of its electrolyser or designed it accordingly to meet the guaranteed capacity of Green Hydrogen plant.
12.	8.0 i)	The guaranteed Service life of electrolyser system shall not be less than 80,000 hours.	The guaranteed Service life of electrolyser system shall not be less than 40000 hours.
13.	New Clause	-	Bidder will provide on line process analyser to monitor and control variables such as Hydrogen purity, Gas composition, Pressure, Temperature, Moisture content and Impurities for optimization, safety and quality assurance.
14.	New Clause	-	Bidder will provide flame and gas leakage detection system with proper alarm and interlocks which shall be incorporated in ESD PLC.

Corrigendum No.1 on Technical Specification dated 18th January 2024

Subject: PRE-BID TIE UP OF ELECTROLYSER SYSTEM

The following modifications have been incorporated in the tender document for the subject tender:

Sl. No.	Specification Clause No.	Existing Tender Specification	To be Modified as
1.	New Clause	-	Oxygen gas shall be vented out into atmosphere.
2.	New Clause	-	The project is a Green Field project and located at: Dabhota-II (Khasra No. 1798). The site is adjacent to Nalagarh-Bharatgarh Road. Site Coordinates - 31°5'40"N, 76°39'24"E
3.	New Clause	-	Safety audit to be done by Bidder periodically as and when required.
4.	New Clause	-	Upto 8.5 % downtime shall be considered during operation of Green Hydrogen plant
5.	New Clause	-	The power consumption of the Electrolyser system shall not be more than 60 kWh/ Kg of Hydrogen produced
6.	12	a) Bidder shall ensure the guaranteed life of the Electrolyser system is minimum 80,000 hrs from the date of commissioning. b) Bidder shall declare a list of components of the Electrolyser system and its nos., price, which need to be replaced before 80,000 hrs cycle life. The cost of replacement shall be loaded in the OpEx while calculating the LCOH.	a) Bidder shall ensure the guaranteed life cycle of electrolyzer system shall not be less than 40,000 hours from the date of commissioning. b) The bidder shall furnish the cost of replacement of electrolyser system/stacks and specify the time period (Year) in which replacement is recommended. The quoted cost of stack replacement shall not be less than 25% of the quoted CAPEX c) Bidder shall declare a list of components of the electrolyser system including stacks and its nos., price, which need to be replaced during 10 years of operation. The cost of replacement shall be loaded in the OpEx while calculating the LCOH.

Corrigendum No.1 on Technical Specification dated 18th January 2024

15.	11 a)	a) Performance Guarantee Test Run (PGTR) shall be carried out within 3 months of commissioning (SAT) of the plant to ascertain the meeting of the guaranteed parameters as mentioned below: •Hydrogen production: 17 Kg/hr minimum. •Total Power consumption: kW/Kg of H2 (as guaranteed) •Hydrogen pressure: 26 kg/cm2 min. •Hydrogen purity: 99.999 vol. % min.	Performance Guarantee Test Run (PGTR) shall be carried out within 2 months of commissioning (SAT) of the plant to ascertain the meeting of the guaranteed parameters as mentioned below: • Hydrogen production: 17 Kg/hr minimum Or As guaranteed by the bidder within the permitted range •Total Power consumption: ____ Kwh/Kg of H2 (as guaranteed by bidder) •Hydrogen pressure: 26 kg/cm2 min. •Hydrogen purity: 99.999 vol% min.
16.	8.0 j)		**Addition: -** xi) System configuration of Electrolyser system details including redundancy (e.g. 3X50%, 4X33% etc.) and reliability details (*as per Cl. 7.0, 6.11 (h)*) to be provided along with technical bid
17.	Annexure-II	1.1 The offered PLC systems shall be hooked up with existing plant DCS through Modbus.	Deleted
18.	Annexure II (Instrumentation & Control system Requirements)		**Annexure II (Instrumentation & Control system Requirements)** The Instrumentation and Control system requirement as specified is only for indicative purpose. The bidder shall design and install and commission the Instrumentation and Control system as per the specific requirements of offered technology as per the standard engineering practice and subsequent to approval from the Engineer in charge. The instrumentation design shall comply with relevant engineering instrumentation codes established by industry standards. Some applicable codes include, but are not limited to: 1. ISA (Instrumentation, Systems, and Automation Society) standards 2. IEC (International Electrotechnical Commission) standards 3. ANSI/ISA standards 4. IEEE (Institute of Electrical and Electronics Engineers) standards

Corrigendum on Techno-Commercial Specification dated 19th January 2024

Subject: PRE-BID TIE UP OF ELECTROLYSER SYSTEM

The following modifications have been incorporated in the tender document for the subject tender:

SL No.	Specification Clause No.	Existing Tender Specification	Amended clause
1.		Addition	Price Discount due to non-compliance of Guaranteed Performance Parameters during O & M. **Lower Supply of Hydrogen:** The overall supply of Green Hydrogen will be accounted on quarterly basis vis-à-vis Green Hydrogen Production guaranteed in the offer to calculate the short fall in supply of green hydrogen Price discount @ Rs.350.00/kg will be payable to the owner for the shortfall quantity of Green Hydrogen **Excess energy consumption:** The price discount due to excess energy (KWh) consumption over the guaranteed values will be 125% of the applicable energy cost of that quarter (Average cost of electricity of 3-month electricity bill of the applicable period). The amount of the both above price discount will be calculated and deducted from the Operation & Maintenance bill payable to contractor on quarterly basis. In case the discount amount is more than quarterly O&M bill then the difference amount shall be reimbursed by the contractor within 15 days of informing about the shortfall.
2.		Addition	**Performance Bank Guarantee during O&M Period** The Bidder shall submit a Bank Guarantee one month prior to commencement of O & M period for an amount equivalent to 10% (ten percent) annual O&M charges for the year. Every year a fresh bank guarantee shall be submitted by the Bidder, having validity of 13 months, one month prior to expiry of the previous Bank Guarantee or the existing bank guarantee can be extended suitably every year till O&M contract remains with the Bidder. All charges for above PBG shall be to bidder's account.

Corrigendum on Techno-Commercial Specification dated 19th January 2024

3.	Annexure-E point no. (v).	Comprehensive O&M Contract must be provided for the ten (10) years @ 5 % escalation every year which shall start after the commissioning of the plant.	Comprehensive O&M Contract must be provided for the ten (10) years @ 5% maximum escalation every year which shall start after successful completion of Site Acceptance Test (SAT) of the entire green hydrogen plant. UOM will be Lump-sum on annual basis for 10 years.
4.		Addition	**Financial Criteria.** Annual Turnover Criteria: The Annual Turnover of the bidder during any of the last 03 financial years, viz., FY 2020-2021, FY 2021-22 & FY 2022-23, should be at least Rs. 2.0 Crores as per the audited financial results.
5.		Addition	Owner to provide the list of mandatory spares as applicable for the whole Green hydrogen Plant
6.		Addition	What will be the arrangement at site in terms of availability hosting/ housing workers / labour during construction Engineers during installation and commissioning O&M staff during O&M period
7.		Addition	Understand that bidder should consider the cost for below items for 10 yrs O&M: 1. Spare stack to replace (at no cost) during operation if there is any stack failure before 80000 hours. 2. Other O&M spares for 10 years 3. Power supply for entire 10 years as per DISCOM rate or 5 Rs/unit. Please clarify. 4. Manpower 5. Tools 6. All consumables including Catalyst, chemicals, water, etc.,

Corrigendum on Techno-Commercial Specification dated 19th January 2024

Addendum as new clauses – The below clauses are in addition to the existing tender.

- **Compensation on account of incoming grid supply failure**:

  Grid outage hours shall be subtracted from the total number of guaranteed hours in a quarter and corresponding target of green hydrogen guaranteed quantity shall also get reduced. On this account, the contractor will not be responsible for shortfall in hydrogen guaranteed quantity corresponding to grid outage hours. The Contractor shall submit grid outage certification from competent authority of STU/DISCOM.

- **Compensation on account of non-offtake of Hydrogen supply:**

  In case the owner fails to take delivery / offtake of green hydrogen for x hours during the quarter then energy consumption of the plant during the period (x hours) will not be accounted in calculating guaranteed energy consumption of the applicable quarter.

- **Price Discount for not successfully completing PGTR:**

  In case the contractor fails to successfully complete the PGTR within 2 months of site acceptance test, the contractor will be required to modify or add additional equipment required for successful PGTR and offer for second PGTR within 2 months. If the contractor fails again then for every 0.1 shortfall in hydrogen guaranteed supply rate (Kg/hr) below the committed value, a penalty of 1% of the total Contract Value (i.e., total sum of all the Supply and installation) shall be levied. In case the Contract Performance Security has already been encashed on account of any default/delays, the penalty amount will be recovered from any due payments to the contractor. In case the hydrogen production Shortfall is more than 0.5 kg/hr than the guaranteed value but above 17kg/hr, then the total plant will be accepted on as-is basis & the total Contract Performance. Security submitted by the contractor will be forfeited & payments linked to PGTR will not be made. However, in case the Hydrogen production is below 16.5 Kg/hr in case of guaranteed 17 Kg/hr than the plant will be taken over as on as is basis after a price discount of 2% for every shortfall of 0.1% from 17 Kg/hr reference values

A sample calculation given below:

Sample sheet showing calculations of Bid Evaluation

Bidder						
	PGTR Test results			Price Discount in CAPEX		
Guaranteed Supply of Hydrogen Kg/hr	17	18	19			
As per PGTR Test Kg/hr	16.9	17.9	18.9	1%	1%	1%
	16.7	17.7	18.7	3%	3%	3%
	16.5	17.5	18.5	5%	5%	5%
	16.4	17.4	18.4	12%	12%	12%
	16	17	18	20%	20%	20%
	<16	<17	<18	Not Acceptable		

Note: Plant with hydrogen production capacity 1.0 kg/hr below the guaranteed value will not be accepted and simply rejected

O&M Contract Price Discount for non-performance during O & M period:

If the plant fails to produce hydrogen as per the rate achieved and accepted during PGTR, the O&M contractor is liable to pay the owner the cost of shortfall in hydrogen supply (shortfall quantity in Kg X Rs 350/-) during the quarter. The amount will be recovered from the quarterly bill payable to contractor. If the amount is more than the quarterly bill amount then the same has to be reimbursed by the contractor within 15 days of invoicing failing which the PBG will be encashed.

In case of any dispute, more stringent terms & conditions shall prevail. (please refer NIT document of M/s OIL, IFB No. CQI4810P24 and amendment CORRIGENDUM NO.1 TO OIL e-tender NO.: CQI4810P24 dated 09.01.2024 for complete information)