

Subject: Pre-Bid Tie- up/MOU with OEM Of Electrolyser/ Its Channel Partner for Supply and AMC of Electrolyser system for Microgrid system Pilot Project at 400/220 kV Neemrana Sub-station, Rajasthan of M/s Power Grid Corporation of India Limited (PGCIL)

Clause No.	Existing Clause	Amended as
4.0	A legally enforceable undertaking (jointly with the Electrolyser Manufacturer/its channel partner) (as per enclosed format in Section-VI, Volume-I of bidding document) to guarantee quality, timely supply, performance and warranty obligations as specified for the equipment(s) is to be submitted along with the bid stating that Electrolyser Manufacturer shall furnish performance guarantee for an amount of ten (10) % of ex-works price of Electrolyser. This performance guarantee shall be in addition to the Contract Performance security to be submitted by the Bidder	A legally enforceable undertaking (jointly with the electrolyser Manufacturer/its channel partner) (as per enclosed format in Section-VI, Volume-I of bidding document) to guarantee quality, timely supply, performance and warranty obligations as specified for the equipment(s) is to be submitted along with the bid stating that electrolyser Manufacturer/its channel partner shall furnish performance guarantee for an amount of ten (10) % of ex-works price of electrolyser
5.7 ii) 3.	Specific Energy Consumption of electrolyser and balance of plant (BoP)(Compressor, DM Water treatment Plant, Raw Water extraction, chiller, auxiliary load of hydrogen plant control room etc) at BOL i.e. beginning of life of the system ($\leq 58\text{kWh}$ per kg of hydrogen generated)	Specific Energy Consumption of electrolyser and balance of plant (BoP)(Compression System, DM Water treatment Plant, Raw Water extraction, chiller) at BOL i.e. beginning of life of the system ($\leq 58\text{kWh}$ per kg of hydrogen generated) $\leq 64.5\text{kWh/kg}$ of hydrogen generated at the end of 10 years after successful PG Test
5.7 xix	New Clause	The system have to be interface with owner's Energy management system (EMS) & SCADA system. Base on the inputs received from EMS & SCADA system Electrolysers (along with its BoP) have to be loaded & Unloaded to match the power availability from solar grid. All the system parameters have to be displayed in remote control system. Connectivity shall be Hardwired/Soft and same shall be finalized during detail engineering.
5.8 vi	New Clause	1. Power factor at rectifier transfotmer input shall be morethan 0.9. 2. Rectifier transformer type : Oil/Dry
5.8 vii	New Clause	Complete power, control, Signal cables and termination accessories with in Electrolyser package is in bidder scope.

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Clause No.	Existing Clause	Amended as
5.8 viii	New Clause	<p>1. Suitable sizing calculation to be furnished by supplier during detail engineering for Rectifier transformers, Rectifiers, Power cables and other electrical equipments during detail engineering for BHEL & End customer approval.</p> <p>2. Suitable hazardous category of equipment, termination accessories shall be consider by bidder for bidder scope of supplied equipment..</p>
15 ii	Raw Water/ Cooling Water: Water shall be provided by BHEL at one point near the container.	Raw Water/ Cooling Water: Raw water extraction (including Borewell) and suitable storage tank of adequate capacity shall be in Bidder's scope of supply.
6.1 i.	<p>Bidder's Responsibility: Supply of Electrolyser system along with spares, erection, testing and commissioning of the system</p>	<p>Bidder's Responsibility: Supply of Hydrogen Generation System (Electrolyser system <i>and its BoP</i>) along with spares, erection, testing and commissioning of the system.</p> <p>BoP consists of Rectifier, Rectifier transformer, Hydrogen separation, purification, Compression and Storage system, Heat exchangers, Chiller unit, Raw water extraction pump, DM Water treatment Plant, Nitrogen purging system etc . All utilities except Power shall be considered by bidder.</p>
6.1 iii.	<p>Bidder's Responsibility: Supply of all the consumables for 3 months of operation.</p>	<p>Bidder's Responsibility: Supply of all the consumables for 3 months of operation of Electrolyser, its BoP system and utilities w.r.t. bidder's scope of supply.</p> <p>Bidders to indicate the quantity and frequency of consumables for 10 years of operation.</p>
6.1 ix.	<p>Bidder's Responsibility: New clause</p>	<p>Bidder's Responsibility: ix. Spares rectifier control cards & Thyristors (IGBTs/MOSFETS ETC): 1Set Each variety & Rating</p>

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Clause No.	Existing Clause	Amended as
6.1 x.	New Clause	<p>Bidder's Scope shall include Hydrogen Storage System also with the followings:</p> <p>Storage Capacity: 150Kg @200 bar for usable hydrogen</p> <p>Storage Type: Type-1 or better Cylinders meeting all the PESO requirements (including approval from statutory bodies) of safety and handling. <i>Bidder to indicate size of cylinder outlet.</i></p> <p>Enclosure: Cascaded with mechanical & environment protection</p>
6.1 xi.	New Clause	<p>Hydrogen Compressors: Diaphragm/ Ionic gas compressor with cooling arrangement as per OEM.</p> <p>Buffer tank before compressor: <i>As per System design</i></p> <p>Compressor should be 2 x 100 % (01 main + 01 standby). VFD For compressor shall be considered along with compressor by bidder.</p>
	New Clause	<p>Qualification Requirements for Hydrogen Compressors: The sub vendor should have manufactured an ionic or diaphragm hydrogen compressor of minimum rated capacity of 50Nm³/ hr. and minimum discharge pressure rating of 200 bar during the last 7 years and should have been under satisfactory operation as on originally scheduled date of bid submission.</p>
6.2 v	<p>BHEL's Responsibility: 415V Power supply: Green Power will be supplied at 415V feeder</p>	<p>BHEL's Responsibility:</p> <p>a) 415V Power supply for electrolyser: Electrical Power shall be supplied at 415V at input terminals of Rectifier transformer.</p> <p>B) 415V Power supply for electrolyser auxiliaries:: one no. of 415V 3 phase feeder for electrolyser auxiliaries. Further distribution including PDB is in Bidder's scope.</p> <p>c) 110V AC UPS Power supply for control system: 1No of feeders shall be provided by purchaser for electrolyser control system at one point. Further distribution is in bidder scope.</p>

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Clause No.	Existing Clause	Amended as
6.2 vi	BHEL's Responsibility: Solar Plant, Hydrogen Compressor, Storage and Fuel cell and Integrated Control System	BHEL's Responsibility: Solar Plant, Fuel cell and Integrated Control System
6.2 ix.	BHEL's Responsibility: New Clause	BHEL's Responsibility: Earthing Two raisers shall be provided nearer electrolyser. Further earthing is in bidder scope.
	Price Bid Format: Technical Specification no. PYAS4T004843001	Price Bid Format: Technical Specification no. PY54050
9.0 ii.	The Performance Guarantee test shall be considered successful only if the entire integrated microgrid system runs trouble free for a continuous period of 96 hours	The Performance Guarantee test shall be considered successful only if the entire integrated microgrid system runs trouble free for a continuous period of 96 hours excluding outages imposed due to force majeure conditions.
9.0 ii.	Working of Electrolyser and BoP for production of desired amount of hydrogen at the rated values of input energy and water	Working of Electrolyser and BoP for production of desired amount of hydrogen corresponding to (i) hydrogen curve for the offered stack of the unit capacity with hydrogen purity not less than 99.995% and at rated pressure as per solar insolation available during the testing period. Additionally, bidder will also demonstrate the stackwise peak hydrogen generation capacity with desired purity of 99.995% and at rated pressure for 01 hour interval.
13.0	Mandatory Spares: The supply of Mandatory Spare Parts, if any, shall be included in the Contract. Beside the aforesaid Mandatory Spares parts, the Bidder shall list of spare parts required for the operation and maintenance of the Facilities to the Employer for a period of 10 years from Completion of the Facilities.	Mandatory and O&M Spares: The supply of Mandatory Spare Parts, if any, shall be included in the Contract. Beside the aforesaid Mandatory Spares parts, Bidder shall furnish list of spare parts (along with its optional price) required for the operation and maintenance of the Facilities to the Employer for a period of 10 years from Completion of the Facilities.

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Clause No.	Existing Clause	Amended as
15.0 i.	TP1. Electrical/Substation: Required input power at 415V shall be provided.	A). 415V AC, 3ph, 50Hz (Voltage Variation +/-10%, Frequency variation +/- 5%) 1.One number of feeder for each Electrolyser rectifier transformer. (terminated at transformer input terminals) 2. 1No of 415V feeders for electrolysier accessories. further distribution including ACDB is in bidder scopr of supply. 3. 1No of feeder for each compressor. B) 110V AC UPS Power supply for control system: 1No of feeders shall be provided by purchaser for electrolyser control system at one point. Further distribution is in bidder scope.
15.0 ii.	TP2. Raw Water/ Cooling Water: Water shall be provided by BHEL at one point near the container.	Deleted as Raw water is in scope of bidder.
15.0 iii.	TP3. Hydrogen outlet: H2 Outlet of Electrolyser system to feed the H2 compressor	Deleted as H2 Compressor and Storage is in Bidder's scope of supply.
	New Clause	To abide by any revision/ modifications/ changes in the applicable standards referred herein and/or relevant with regard to this project as extant on the original date of bid submission.