24.	Shinhan Bank
25.	Woori Bank
26.	KEB Hana Bank
27.	Industrial Bank of Korea
28.	Kookmin Bank
29.	Bank of Ceylon
30.	Credit Suisse A.G
31.	CTBC Bank Co., Ltd.
32.	Krung Thai Bank Public Co. Ltd.
33.	Abu Dhabi Commercial Bank Ltd.
34.	Mashreq Bank PSC
35.	First Abu Dhabi Bank PJSC

36.	Emirates Bank NBD
37.	Barclays Bank Plc.
38.	Standard Chartered Bank
39.	NatWest Markets Plc
40.	American Express Banking Corporation
41.	Bank of America
42.	Citibank N.A.
43.	J.P. Morgan Chase Bank N.A.
44.	SBM Bank (India) Limited*
45.	DBS Bank India Limited*
46.	Bank of China Ltd.

[* Note: SBM Bank (India) Limited (Subsidiary of SBM Group) and DBS Bank India Limited (Subsidiary of DBS Bank Ltd.) have been issued licence on December 06, 2017 and October 04, 2018 respectively for carrying on banking business in India through Wholly Owned Subsidiary (WOS) mode. They have commenced operations as WOS with effect from December 01, 2018 and March 01, 2019.]

Tender No. : 21000110-HB-10155

Tender Published On : 25-Jul-2021 14:27

Technical Specifications and Imp TnC				
Sl.No.	Description	Attached File	Set Value	Supporting Doc. Req'd
1	Technical Specifications and Imp TnC	Tech Spec.pdf	-	No

Annexure 1

Specification for ~ 5.5 kWp solar PV hybrid power generating system, to be installed in HPGRDC, Nanotechnology lab roof top

Scope: HPCL proposes to procure minimum 5.5 kWp solar PV modules with inverter & battery breaker consisting of high efficiency solar modules utilizing Mono Crystalline (PERC) type solar PV cells with minimum 18.5% efficiency. The system should have capability in supporting AC loads, grid tied and can charge the batteries (lead acid/lithium ion battery/vanadium redox flow battery, **battery will be provided by the company**) as per the requirements.

The job involves, supply, installation, interconnection, testing and commissioning of the equipment with mountings and other accessories (including hybrid inverter) at Hindustan Petroleum Green R&D Centre (HPGRDC), Bangalore.

The solar PV module should have the following features which will form the basis for technical evaluation.

i. Solar PV module array shall consist of high efficiency Solar Modules utilizing Mono Crystalline (PERC) type solar PV cells with minimum 18.5 % efficiency.
ii. Solar PV module array shall consist of high efficiency Solar Modules utilizing Crystalline Silicon solar PV cells with **even number of panels.**
iii. Allowable annual degradation for first year shall be max. 2.5% (including Light Induced Degradation and 0.7% annual degradation). Allowable annual degradation for second year onwards shall be max. 0.7%.
iv. Crystalline high power cells shall be used in the Solar Photovoltaic module. Solar module shall be laminated using lamination technology with established polymer (EVA) and Tedlar / Polyester laminate. The solar modules shall have suitable encapsulation and sealing arrangements to protect the silicon cells from the environment. The arrangement and the material of encapsulation shall be compatible with the thermal expansion properties of the silicon cells and the module framing arrangement / material. The encapsulation arrangement shall ensure complete moisture proofing during life of the solar modules.
v. Hybrid inverter should be provided along with the module. All required accessories (ACDB, installation kit, module footing structure, cables-AC/DC,

earthing, lightning arrester etc.) should be included. The system should have capability in supporting AC loads, grid tied or charge the batteries (lead acid/lithium ion/vanadium redox flow battery) as per the requirements.

vi. The equipment & system shall comply with the requirements of latest revision of IEC and relevant BIS and other Indian/ International standards.

vii. All materials used shall be having a proven track record of reliable and stable operation in external outdoor applications.

viii. Module rating is considered under standard test conditions (STC), however, solar modules shall be designed to operate and perform in relative humidity up to 100% with temperatures between -10°C & +65°C and withstand gust as per the wind zone of the location from back side of the panel. The Geological data of site shall be referred for design to get optimum generation.

ix. Protective devices against surges at the PV module shall be provided. Low voltage drop bypass diodes shall be provided.

x. The PV modules shall be suitable for highly corrosive atmosphere throughout their lifetime.

xi. PV modules must qualify as per relevant IS/IEC standards (test reports/ certificate from IEC/NABL accredited laboratory shall be furnished). Additionally the performance of PV modules at STC conditions must be tested and approved by one of the IEC / NABL Accredited Testing Laboratories including Solar Energy Centre of MNRE. Qualification certificate from IEC/NABL accredited laboratory as per relevant standard for PV modules shall be accompanied with the STC report/ certificate.

xii. Modules shall be resistant to water, abrasion, hail impact, humidity and other environment factor for the worst site conditions/ situations.

xiii. Each module shall have low iron tempered glass front for strength and superior light transmission. It shall have tough multi-layered polymer back sheet for environment protection against moisture and provide high voltage electrical insulation. Transmitivity of glass shall not be less than 91%.

xiv. The fill factor of modules shall not be less than 0.72.

xv. The rated output of any module shall have maximum tolerance of ±3%.

xvi. Photo-electric conversion efficiency of SPV module shall not be less than 18.5% at STC.

xvii. I-V curves at STC for modules shall be furnished

xviii. Each PV module must have a RF identification tag (RFID). The following information must be mentioned in the RFID used on each module. This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions.

i. Name of the manufacturer of PV Module
ii. Name of the Manufacturer of Solar cells
iii. Month and year of the manufacture (separately for solar cells and module)
iv. Country of origin (separately for solar cells and module)
v. I-V curve for the module
vi. Peak Wattage, Im, Vm and FF for the module
vii. Unique Serial No. and Model No of the module
viii. Date and year of obtaining IEC PV module qualification certificate
ix. Name of the test lab issuing IEC certificate
x. Other relevant information on traceability of solar cells and module as per ISO 9001 and ISO 14001

Special Terms and Conditions

Consumables & Spares

Consumables & spares (Hardware, electrical etc) if any for **one** Year trouble free Operation should be provided for the quoted instrument. All the required spares should be made available as and when required for next 7 years from the date of commissioning.

1. **Installation, Commissioning & training**

Installation & Commissioning of the equipment for interconnection upto client LT panel should be done by Trained Engineers of the Company at HPCL R&D site. The demonstration to be given for at least 5 HPCL scientists/operators/instrumentation engineers. Cost of this activity to be included during quoting the equipment cost. The vendor shall connect the panels as per the site requirements and must advice the site engineer all necessary details. The panel will be placed on the terrace (1st floor roof) and inverter are to be positioned in the UPS room which will be provided in the ground floor. **Cables should have required length** and additional cables should be provided for connecting battery (at times of requirement).

2. **<u>After sales service</u>**

   The vendor shall give guaranteed after sales services as per HPCL's "General terms and conditions of contract". The vendor should have an authorized Indian representative to provide Installation, commissioning, training and after sale service. The detailed address of the service Agents to be provided along with the offer.

3. Guarantee: The vendors should provide guarantee for two year from the date of installation and commissioning of the equipment as per HPCL's "General terms and Conditions of Contract".

4. The vendor should provide the 'Soft' and 'Hard' Copies of All Operating Manuals, Service Manuals, catalogues and brochures giving particulars and details of operation/Maintenance of the instrument, & detailed list of all spare parts.

5. All performance and operational specifications as mentioned in the technical specification must be demonstrated satisfactorily at the user's laboratory.

6. The rate quoted should be inclusive of all the calibration and other requirements to meet proper functioning of the equipment.

7. The equipment offered shall have the performance track record for similar application and the vendor has to submit the customer certificate for the same.

8. Vendor shall furnish required installation details for the equipment including any special requirements like power supply, utilities etc. along-with the offer.

9. **Payment Terms:**

   The vendor should provide Performance Bank Guarantee (PBG) as per the "General Terms and Conditions of Contract" of HPCL.

   90% of the total order value will be paid after receipt of the materials on submission of PBG and 10% will be paid after successful completion of installation, commissioning & Training.

10. **Users list**

Users list for the quoted model along with the address and contact person should be provided. The offered instrument should be of latest version at the time of dispatch

11. **Delivery Schedule:** Eight weeks from the Date of purchase order/LOA.

12. Equipment must be supplied with complete standard accessories.

13. Approved Makes:

1	Inverter	Fuji Electric Solis / Delta / Sungrow /	As per IEC 60068-2 (1,2,14,30), IS/IEC 61683
2	Battery Breaker	L&T / Legrand / ABB	50 A, 2P 600 V, DC MCCB with Enclosure
3	Solar PV Module Mounting Structure	Made in India	Suitable for RCC Roof
4	Accessories	Ashlok	Earthing Kit with Moisture Booster
5	Accessories	Reputed	Franklin Lightning Arrestor
6	Cables	Unicab/ Polycab	

- Complete project design and engineering for interconnection upto client LT panel.
- PV modules supply, installation and interconnection
- Structural design, drawings
- Supply and installation of inverter
- Module mounting [MMS] PV support structures
- All DC cabling (including conduits, fasteners etc) upto inverter
- Cabling upto Inverter and batteries (as per length indicated in the offer)
- Output Cabling (as per length indicated in BOM and offer
- Spare feeder (only MCB / MCCB) in customer LT panel for interfacing solar power
- Installation and commissioning of system
- All local labour for installation & commissioning
- Training to client's staff for operation and maintenance support.
- All the Electrical equipment and Materials shall generally conform to **Indians Standards and CBIP** recommendations for Power Station & Substation Design **statutory guidelines** of the followings also have to be observed in implementation of Power plant:
  - Indian Electricity Act 2003
  - Indian Electricity rules 2011
  - Indian Standard Code (IS 1651/ IS 13369 IS 694 / IS 1554 etc.)
  - IEC code as appropriate (Module-IEC 61215 Ed. 2, IEC 61730 and IEC 61701, Inverter-IEC 62109 etc.)

Dr. Narayanan K

[BINITHA.G]

Tender No. : 21000110-HB-10155

Tender Published On : 25-Jul-2021 14:27

HPCL General Terms and Conditions				
Sl.No.	Description	Attached File	Set Value	Supporting Doc. Req'd
1	HPCL General Terms and Conditions for supply	GTC Supply.pdf	-	No
2	Conciliation Clause	Conciliation Clause.pdf	-	No

ANNEXURE 7b

7b. GENERAL TERMS & CONDITIONS OF CONTRACT FOR SUPPLY

1. PRELIMINARY

1.1 This is a Contract for execution of job as defined in tender document at the specified location

1.2 The tenderer for the abovementioned supply is the company/ proprietary concern/ individual (as per details & address mentioned in the unpriced bid) and undersigned (digitally) is authorized to submit the bid on behalf of tenderer.

1.3 The terms and conditions mentioned hereunder are the terms and conditions of the Contract for the execution of the job mentioned under item 1.1 above.

1.4 It is the clear understanding between Hindustan Petroleum Corporation Limited and the tenderer that in case the bid of tenderer is accepted by Hindustan Petroleum Corporation Limited and an intimation to that effect is so issued and also a Procurement Order is on the tenderer this document shall form part of the Contract between the parties and terms and conditions hereunder would govern the parties interest.

1.5 Interpretation of Contract Documents: All documents forming part of the Contract are to be taken mutually explanatory. Should there be any discrepancy, inconsistency, error or omission in the contract, the decision of the Owner/Engineer-in-Charge/Site-in-Charge shall be the final and the contractor shall abide by the decision. The decision shall not be arbitrable. Items shown upon the drawings but not mentioned in the specification or described in the specifications without being shown on the drawings shall nevertheless be deemed to be included in the same manner as if they are shown in the drawings and described in the specifications.

1.6 Special conditions of Contract : The special conditions of contract, if any provided and whenever and wherever referred to shall be read in conjunction with General Terms and Conditions of contract, specifications, drawings, and any other documents forming part of this contract wherever the context so requires. Notwithstanding the subdivision of the documents into separate sections, parts volumes, every section, part or volume shall be deemed to be supplementary or complementary to each other and shall be read in whole. In case of any misunderstanding arising the same shall be referred to decision of the Owner/ Engineer-in-Charge/Site-in-Charge and their decision shall be final and binding and the decision shall not be arbitrable.

It is the clear understanding that wherever it is mentioned that the Contractor shall do/perform a job and/or provide facilities for the performance of the job, the doing or the performance or the providing of the facilities is at the cost and expenses of the Contractor not liable to be paid or reimbursed by the Owner.