



REQUEST FOR QUOTATION (RFQ)
(Supply of Solar pumping system's for Hodeida)
 eTendering Event ID : 0000004991

NAME & ADDRESS OF FIRM	DATE: December 2, 2019
	REFERENCE: RFQ-YEM-0067-2019

Dear Sir / Madam:

We kindly request you to submit your quotation for **Supply, Delivery, Installation, Testing and Commissioning of solar pumping system's in four locations in Hodidah (Almarawa'ah- Almansoriah- Alsokhnah- Khamis Bani Sa'ad**, as detailed in Annex 2 of this RFQ. When preparing your quotation, please be guided by the form attached hereto as Annex 1.

Documents uploaded in the system as part of your quotation must be free from any form of virus or corrupted contents, or the quotations shall be rejected.

It shall remain your responsibility to ensure that your quotation is submitted on or before the deadline indicated by UNDP in the eTendering system . Bids must be submitted in the online eTendering system in the following link: <https://etendering.partneragencies.org> using your username and password. If you have not registered in the system before, you can register now by logging in using
 username: event.guest
 password: why2change

and follow the registration steps as specified in the system user guide.

Please take note of the following requirements and conditions pertaining to the supply of the abovementioned good/s:

Delivery Terms [INCOTERMS 2010] (Pls. link this to price schedule)	<input checked="" type="checkbox"/> DDP– DDP incoterms. This incoterm means delivery duty paid by the supplier and the items are delivered by the supplier to the requested locations at their own cost.	
Customs clearance ¹ , if needed, shall be done by:	<input checked="" type="checkbox"/> Supplier/Offeror	
Exact Address/es of Delivery Location/s (identify all, if multiple)	X Into four locations in Hodidah (Al-Marawa'ah- Al-Mansoriah- Al-Sokhnah- Khamis Bani Sa'ad)	
Pre-bid meeting	X December 9,2019 at 11:00 am UNDP office	
UNDP Preferred Freight Forwarder, if any ²	Up to the supplier	
Distribution of shipping documents (if using freight forwarder)	Up to the supplier as long as delivered items are neither tempered with nor damaged.	
Latest Expected Delivery Date and Time (if delivery time exceeds this, quote may be rejected by UNDP)	<input checked="" type="checkbox"/> 8 weeks from the issuance of the Purchase Order (PO)	
Delivery Schedule	<input checked="" type="checkbox"/> Required <input type="checkbox"/> Not Required	
Packing Requirements	Standard packing requirement to be done by supplier at no additional cost to UNDP and to be done in a way that laptops are not tempered with or damaged.	
Mode of Transport	<input type="checkbox"/> AIR <input type="checkbox"/> SEA	<input type="checkbox"/> LAND <input checked="" type="checkbox"/> OTHER It is up to the bidder to identify the proper way of transport.
Preferred Currency of Quotation ³	<input checked="" type="checkbox"/> United States Dollars <input type="checkbox"/> Euro <input type="checkbox"/> Local Currency: [pls. specify]	
Value Added Tax on Price Quotation ⁴	<input checked="" type="checkbox"/> Must be inclusive of VAT and other applicable indirect taxes <input type="checkbox"/> Must be exclusive of VAT and other applicable indirect taxes	

¹ Must be linked to INCO Terms chosen.

² Depends on INCO Terms. The suggestion to use a UNDP preferred courier is only for purposes of familiarity with procedures and documentary requirements applicable to the UNDP when clearing with customs.

³ Local vendors must comply with any applicable laws regarding doing business in other currencies. Conversion of currency into the UNDP preferred currency, if the offer is quoted differently from what is required, shall be based only on UN Operational Exchange Rate prevailing at the time of UNDP's issuance of Purchase Order.

⁴ This must be reconciled with the INCO Terms required by the RFQ. Furthermore, VAT exemption status varies from one country to another. Pls. tick whatever is applicable to the UNDP CO/BU requiring the goods.

After-sales services required	<input checked="" type="checkbox"/> The vendor should be committed to replace and damaged item if the item is below the minimum requirements or gets damaged during the transportation. <input checked="" type="checkbox"/> The vendor should be in agreement to provide a minimum warranty period mentioned in the technical specification (3 years)/ as well as Annex 2 <input checked="" type="checkbox"/> Provision of Service Unit when pulled out for maintenance/ repair
Deadline for the Submission of Quotation	COB, <i>Thursday, December 19, 2019 at 4:00 pm.</i>
All documentations, including catalogs, instructions and operating manuals, shall be in this language	<input checked="" type="checkbox"/> English
Documents to be submitted ⁵	<input checked="" type="checkbox"/> Duly Accomplished Form as provided in Annex 2, and in accordance with the list of requirements in Annex 1; <input checked="" type="checkbox"/> Company profile (15 pages); <input checked="" type="checkbox"/> A statement whether any import or export licenses are required in respect of the goods to be purchased including any restrictions on the country of origin, use/dual use nature of goods or services, including and disposition to end users; <input checked="" type="checkbox"/> Confirmation that licenses of this nature have been obtained in the past and an expectation of obtaining all the necessary licenses should the quotation be selected; <input checked="" type="checkbox"/> Quality Certificates (ISO, etc.); <input checked="" type="checkbox"/> Latest Business Registration Certificate ; <input checked="" type="checkbox"/> Latest Internal Revenue Certificate / Tax Clearance; <input checked="" type="checkbox"/> Manufacturer's Authorization of the Company as a Sales Agent (if Supplier is not the manufacturer); <input checked="" type="checkbox"/> Certificate of Exclusive Distributorship in the country (if applicable, and if Supplier is not the manufacturer); <input checked="" type="checkbox"/> Evidence/Certification of Environmental Sustainability ("Green" Standards) of the Company or the Product being supplied ; <input checked="" type="checkbox"/> Complete documentation, information and declaration of any goods classified or may be classified as "Dangerous Goods". <input checked="" type="checkbox"/> Patent Registration Certificates (if any of technologies submitted in the quotation is patented by the Supplier); <input checked="" type="checkbox"/> Written Self-Declaration of not being included in the UN Security Council 1267/1989 list, UN Procurement Division List or other UN Ineligibility List;
Period of Validity of Quotes starting the Submission Date	<input checked="" type="checkbox"/> 60 days In exceptional circumstances, UNDP may request the Vendor to extend the validity of the Quotation beyond what has been initially indicated in this RFQ. The Proposal shall then confirm the extension in writing, without any modification whatsoever on the Quotation.

⁵ First 2 items in this list are mandatory for the supply of imported goods

Partial Quotes	<input checked="" type="checkbox"/> Not permitted <input type="checkbox"/> Permitted [<i>pls. provide conditions for partial quotes, and ensure that requirements are properly listed to allow partial quotes (e.g., in lots, etc.)</i>]
Payment Terms ⁶	<input checked="" type="checkbox"/> 100% upon complete delivery of goods
Liquidated Damages	<input checked="" type="checkbox"/> Will be imposed under the following conditions: 0.5% penalty from total PO Value for each day of delay beyond 6 weeks (8 weeks delivery deadline + 2 weeks of tolerance). <i>When the liquidated damage amount reaches</i> maximum of 10% of the total contract amount, UNDP at its own discretion reserves the right to cancel the PO without making any payment to the supplier After which UNDP may terminate the contract.
Evaluation Criteria [<i>check as many as applicable</i>]	<input checked="" type="checkbox"/> Technical responsiveness/Full compliance to requirements and lowest price ⁷ <input checked="" type="checkbox"/> Comprehensiveness of after-sales services. <input checked="" type="checkbox"/> Full acceptance of the PO/Contract General Terms and Conditions <input checked="" type="checkbox"/> Earliest Delivery / Shortest Lead Time ⁸ <input checked="" type="checkbox"/> Minimum number of years of experience in supply and installation of solar systems: 3 years; <input checked="" type="checkbox"/> Minimum number of completed projects/contracts in solar system contracts over the past 5 years [previous 3 contracts/purchase orders]; <input checked="" type="checkbox"/> Full compliance of Bid to the Technical requirements; <input checked="" type="checkbox"/> Work Schedule (Timeline): 2 weeks. <input checked="" type="checkbox"/> CVs for key personnel, including Team Leader with 3 years' experience as a team leader or project manager with BA in Electrical Engineering; 3 Technicians (each technician must have 3 years' experience in solar systems installation). <input checked="" type="checkbox"/> Quality certificate from the manufacturer for section/categories mentioned in the technical specifications. <input checked="" type="checkbox"/> Warranty period for the system mentioned in the technical specifications.
UNDP will award to:	<input checked="" type="checkbox"/> Only one supplier
Type of Contract to be Signed	<input checked="" type="checkbox"/> Purchase Order

⁶ UNDP preference is not to pay advanced amount upon signing of contract. If vendor strictly requires advanced payment, it will be limited only up to 20% of the total price quoted. For any higher percentage, or advanced payment of \$30,000 or higher, UNDP shall require the vendor to submit a bank guarantee or bank cheque payable to UNDP, in the same amount as the advanced payment made by UNDP to the vendor.

⁷ UNDP reserves the right not to award the contract to the lowest priced offer, if the second lowest price among the responsive offer is found to be significantly more superior, and the price is higher than the lowest priced compliant offer by not more than 10%, and the budget can sufficiently cover the price difference. The term "more superior" as used in this provision shall refer to offers that have exceeded the pre-determined requirements established in the specifications.

⁸ This shall be used for time-critical and/or exigent requirements (e.g., post-crisis emergencies, elections, etc.).

Contract General Terms and Conditions	<input checked="" type="checkbox"/> General Terms and Conditions for contracts (goods and/or services) <input type="checkbox"/> General Terms and Conditions for de minimis contracts (services only, less than \$50,000) Applicable Terms and Conditions are available at http://www.undp.org/content/undp/en/home/procurement/business/how-we-buy.html
Special conditions of Contract	<input checked="" type="checkbox"/> Cancellation of PO/Contract if the delivery/completion is delayed beyond the deadline mentioned in the liquidated damage clause.
Conditions for Release of Payment	<input checked="" type="checkbox"/> Passing Inspection <input checked="" type="checkbox"/> Complete Installation <input checked="" type="checkbox"/> Passing all Testing <input checked="" type="checkbox"/> Completion of installation and training on Operation and Maintenance <input checked="" type="checkbox"/> Written Acceptance of Goods based on full compliance with RFQ requirements <input checked="" type="checkbox"/> Original invoice
Annexes to this RFQ ⁹	<input checked="" type="checkbox"/> Specifications of the Goods Required (Annex 1) <input checked="" type="checkbox"/> Form for Submission of Quotation (Annex 2) <input checked="" type="checkbox"/> General Terms and Conditions / Special Conditions: http://www.undp.org/content/undp/en/home/procurement/business/how-we-buy.html <input type="checkbox"/> Others <i>[pls. specify, if any]</i> Non-acceptance of the terms of the General Terms and Conditions (GTC) shall be grounds for disqualification from this procurement process.
Contact Person for Inquiries (Written inquiries only) ¹⁰	AbdulRaheem Almekhlafi/Procurement assistant Abdulraheem.almekhlafi@undp.org Samira Al-Farah/Procurement Analyst Samira.alfarah@undp.org/ Any delay in UNDP's response shall be not used as a reason for extending the deadline for submission, unless UNDP determines that such an extension is necessary and communicates a new deadline to the Proposers.

Goods offered shall be reviewed based on completeness and compliance of the quotation with the minimum specifications described above and any other annexes providing details of UNDP requirements.

⁹ Where the information is available in the web, a URL for the information may simply be provided.

¹⁰ This contact person and address is officially designated by UNDP. If inquiries are sent to other person/s or address/es, even if they are UNDP staff, UNDP shall have no obligation to respond nor can UNDP confirm that the query was received.

The quotation that complies with all of the specifications, requirements and offers the lowest price, as well as all other evaluation criteria indicated, shall be selected. Any offer that does not meet the requirements shall be rejected.

Any discrepancy between the unit price and the total price (obtained by multiplying the unit price and quantity) shall be re-computed by UNDP. The unit price shall prevail and the total price shall be corrected. If the supplier does not accept the final price based on UNDP's re-computation and correction of errors, its quotation will be rejected.

After UNDP has identified the lowest price offer, UNDP reserves the right to award the contract based only on the prices of the goods in the event that the transportation cost (freight and insurance) is found to be higher than UNDP's own estimated cost if sourced from its own freight forwarder and insurance provider.

At any time during the validity of the quotation, no price variation due to escalation, inflation, fluctuation in exchange rates, or any other market factors shall be accepted by UNDP after it has received the quotation. At the time of award of Contract or Purchase Order, UNDP reserves the right to vary (increase or decrease) the quantity of services and/or goods, by up to a maximum twenty-five per cent (25%) of the total offer, without any change in the unit price or other terms and conditions.

Any Purchase Order that will be issued as a result of this RFQ shall be subject to the General Terms and Conditions attached hereto. The mere act of submission of a quotation implies that the vendor accepts without question the General Terms and Conditions of UNDP indicated above - <http://www.undp.org/content/undp/en/home/procurement/business/how-we-buy.html>.

UNDP is not bound to accept any quotation, nor award a contract/Purchase Order, nor be responsible for any costs associated with a Supplier's preparation and submission of a quotation, regardless of the outcome or the manner of conducting the selection process.

Please be advised that UNDP's vendor protest procedure is intended to afford an opportunity to appeal for persons or firms not awarded a purchase order or contract in a competitive procurement process. **In the event that** you believe you have not been fairly treated, you can find detailed information about vendor protest procedures in the following link: <http://www.undp.org/content/undp/en/home/operations/procurement/protestandsanctions/>

UNDP encourages every prospective Vendor to avoid and prevent conflicts of interest, by disclosing to UNDP if you, or any of your affiliates or personnel, were involved in the preparation of the requirements, design, specifications, cost estimates, and other information used in this RFQ.

UNDP implements a zero tolerance on fraud and other proscribed practices, and is committed to identifying and addressing all such acts and practices against UNDP, as well as third parties involved in UNDP activities. UNDP expects its suppliers to adhere to the UN Supplier Code of Conduct found in this link : http://www.un.org/depts/ptd/pdf/conduct_english.pdf

Thank you and we look forward to receiving your quotation.

Sincerely yours,
Samira Al-Farah *Samira Al Farah*
Head of procurement
December 02, 2019

Technical Specifications

Hodaidah Governorate

Location 1: Al-Maraw'ah

Item No	Item Details	Quantity	Unit of Measurement	Offered Specs,
1.0	Solar PV Module:			
	<p>Total Wattage Capacity: Should be at least 1.4 of submersible pump capacity.</p> <p>Mono or Poly Crystalline Silicon.</p> <p>Panel capacity should be $\geq 350\text{Wp}$ under STC.</p> <p>Positive power tolerance +3% or 0-5 Watt.</p> <p>More than 17 % conversion efficiency under STC.</p> <p>Data sheet of PV module that contains the P-V & I-V Curves, all electrical and mechanical Data, Dimensions, Module area must be provided by bidder.</p> <p>40°C to 85°C operating temperature range.</p> <p>Temperature Characteristics:</p> <p>Pmax: $\leq -0.40\% / ^\circ\text{C}$</p> <p>VOC: $\leq -0.31\% / ^\circ\text{C}$</p> <p>Nominal operating cell temperature (NOCT): 45 $\pm 2^\circ\text{C}$.</p> <p>The operating voltage of proposed modules should not be less than 1000 VDC.</p> <p>Junction box of IP 67 and heat-resistance bypass diodes.</p> <p>High transparency and transmittance, tempered glass of 3 – 4 mm thickness.</p> <p>Must conform to CE, IEC 61215/ 61730/ 61701/62716, TUV, ISO, UL certificates or equivalent standards.</p> <p>Product warranty for 10 years.</p> <p>Linear performance: Nominal power output not less than 90% after 10 years, 80% after 25 years. annual linear degradation rate should be less than 0.9%.</p> <p>Product & Linear performance warranty certificate shall be provided by the manufacturer.</p> <p>The solar modules shall be provided with RF identification label. This should include following essential information.</p> <p>Information pertaining to design and manufacture of solar cells and modules;</p> <p>a. Name of the PV module manufacturer.</p> <p>b. Type or model number.</p> <p>c. Batch/serial number.</p>	As required	PCS	

	<p>d. Country of solar cells/module origin.</p> <p>e. Year of solar module manufacture.</p> <p>f. Module I-V curve.</p>			
2.0	Mounting Structure			
	<p>The PV modules shall be mounted on fixed metallic structures having adequate strength and appropriate design, which can withstand the load of the modules and high wind velocities.</p> <p>The support structure shall be hot dip galvanized steel or corrosion resistant aluminum.</p> <p>The structure should be capable of withstanding a wind load of 120 km/hr.</p> <p>The module alignment and tilt angle shall be calculated to provide maximum annual energy output wherever possible.</p> <p>Hot dip galvanized MS mounting structures should be used for mounting the modules / arrays. Minimum thickness of galvanization should be at least 80-120 microns as per ASTM A123 or ASTM A153 and ASTM A385.</p> <p>There should be adequate clearance between module and roofing material to prevent excessive heat being transferred to panels.</p> <p>The elevated structure must be Securely and directly anchored to the concrete rooftop using appropriate size nickel coated steel anchor bolts. Reinforced concrete of appropriate weight should be used for anchoring the structure feet's to keep their resistance for wind load.</p> <p>anti-theft bolts, nuts, fasteners, panel mounting clamps should be Stainless steel.</p> <p>Installation: The structures shall be designed for simple mechanical on-site installation.</p> <p>Access for panel cleaning and maintenance</p> <p>All solar panels must be accessible from the top for cleaning and from the bottom for access to the module-junction box.</p> <p>The Installer shall specify installation details of the solar PV modules and the support structures with lay-out drawings and array connection diagrams. Such details shall include, but not limited to, the following:</p> <p>Array tilt angle to the horizontal, Details with drawings for fixing the modules, Structure installation details and drawings,</p>	1	LS	

	electrical grounding (Earthing). The work shall be carried out as per the designs approved by the UNDP Project engineer.			
3.0	Combiner box			
	<p>The PV combiner box shall be used to combine the multiple DC input to one output, and it shall comply with the following specifications as minimum.</p> <p>Enclosure materials: Coated metal with lockable door.</p> <p>Enclosure protection: IP65.</p> <p>Number of input circuit: total number of strings + to 2 spare inputs. at least 5</p> <p>DC fuse rating for each string:1000V, 15 A.</p> <p>DC output circuit: not less than 100 A, 1000 VDC breaker;</p> <p>Built in surge protection device;</p> <p>Anti-backflow diodes.</p> <p>Operational Environment Temperature: -30 °C ~+70 °C;</p>	1	PCS	
4.0	Solar Off-Grid Inverter			
	<p>Solar pumping drive with in-built MPPT, VFD (Variable Frequency drive).</p> <p>The drive rating should be 1.25 X AC pump capacity.</p> <p>Three phase output, voltage range 380-420 V;</p> <p>Efficiency: Not less than 95%;</p> <p>Output Frequency: 50Hz±3%;</p> <p>Enclosure class should be not less than IP55.</p> <p>Maximum input voltage (Voc): not less than 770 VDC;</p> <p>Operating temperature: up to 50 °C;</p> <p>The device shall allow hybrid operation with external power source, where solar power should be configured as the primary power source;</p> <p>soft start, V/F stable speed control during solar radiation changes, adjustable auto/ manual start in early morning, auto wakeup after adjustable hibernation time in cloudy days, o inputs for pressure switch and water level sensor to protect the pump against dry running and tank full water or closed pipeline (high pressure)</p> <p>Display: LCD Screen display with Cover + LED status indicator;</p> <p>Protection: Over-Voltage, pump Over-Current, pump Over-Load, Over-Temperature, pump Phase Loss, pump Short-</p>	1	set	

	<p>Circuit, ground fault, solar low power, DC Input Anti-reverse, AC output unbalance (3Phase);</p> <p>Display content: PV status (Current, Voltage, Power, Energy), AC input voltage, AC output voltage, Load, Running Status, RPM, and Frequency</p> <p>the inverter should come with MTS 2 ways for backup source integration</p>			
5.0	Submersible Pump and Motor			
	<p>Required Capacity: $Q = 18 \text{ m}^3/\text{hr}$, TDH: 120 m</p> <p>Pump Submersible pump Mixed flow multi -stage separate type, AC 3PH motor type, the motor pump Sets should be used for the solar PV, Starting compatible with AC VFD operation, bidders shall indicate manufacture, country of origin and model. It shall follow below features as minimum: Cooling sleeve suitable for borehole well internal diameter Pump Efficiency at Duty Point: Not less than 70%; Clearance (well dia-pump max dia with cable) = not less than 40 mm; Casing (Pump Bowl) , Impeller , Wear Rings, Pump delivery and Housing , Check valve (None Return Valve) , Inlet strainer should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft and coupling, Shaft sleeve, Bearing bush, Guide bearing, Screw, stud, nut, washer.. etc should be comply with: (AISI 304 or equivalent) or higher specification materials. Maximum allowable sand: 100gr/m3. Coupling: according to NEMA.</p> <p>Motor The motors shall be Rewindable frame, insulation rating is compatible with AC VFD operation Rated Voltage:380/400VAC Insulation Material and Class, PE2+PA, F or H Ambient water temp:45 C° IP: not less than 68 Motor Efficiency: Not less than 80% Shaft, Motor Sleeve, Motor Housing, Diaphragm cover, bolts, Nuts, Studs, screws Washers etc. should be comply with: (AISI</p>	1	set	

	<p>304 or equivalent) or higher specification materials.</p> <p>Shaft Seal (Mechanical Seal) Tungsten carbide/ceramic- Diaphragm Nitrile Rubber Radial Bearing (Guide Bearing) Graphite or superior Axial Bearing (Thrust Bearing) Graphite/ S.S Pads superior, Rubber Parts NBR or equivalent</p> <p>Including Plastic cooling cover wssith diameter of 8 iches for pump & motor cooling.</p> <p>Product warranty should be at least 2 years.</p>			
6.0	System Cables (including cable pipes)			
	<p>Cables should be sized in accordance to IEC 60364-5-52 standard, bidders should indicate cable sizing, and voltage drop calculations considering the following:</p> <p>The total voltage drop on the cable segments from the solar PV modules to the system inverter shall not exceed 3.0%.</p> <p>The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 3.0%.</p> <p>Shall meet IEC 60227, EN 60228, IEC 60502 standards or equivalent.</p> <p>Temp. Range: -10°C to +80°C.</p> <p>Voltage rating: up to 1000V.</p> <p>DC Cables:</p> <p>conductors shall flexible tinned copper, Multi-stranded, Insulated and Sheathed. Soft annealed tin-coated flexible stranded copper. Halogen-free, thermoset polyolefin specifically designed for maximum flexibility. low smoke non-halogenated, flame retardant, oil, abrasion, chemical and sunlight resistant cross-linked compound meeting UL 44 and TUV.</p> <p>Cable ends connections are to be made through suitable lugs or terminals, crimped properly & with use of cable glands.</p> <p>AC Cables:</p> <p>Type of Conductor: copper, flexible, finely multi stranded, Insulation: black poly chloroprene, HO7RN -F or equivalent material.</p> <p>All cable/wires are to be routed in pipes and suitably tagged and marked with proper manner so that the cable easily identified.</p>			
6.1	Array to Combiner Box: 6 sqr.mm.	as required	meter	

6.2	Cable between combiner box and inverter: 25 sqr.mm, 1000 V	as required	meter	
6.3	AC Submersible Pump Cable: 4*25 sqr.mm	100	meter	
6.4	Level Sensor Cable with probe :1.5 sqr.mm	100	meter	
7.0	Earthing and lightening protection			
	<p>AC and DC Earthing</p> <p>All PV modules shall be grounded in accordance to the manufacturer instruction</p> <p>Each array structure of the PV modules should be grounded properly.</p> <p>All metal casing/shielding of the system and its components should be thoroughly grounded.</p> <p>Earthing System shall be comply with IEC/BS EN 62305-3.</p> <p>Earthing clamps shall be used</p> <p>Grounding and lightening protection equipment shall include SPD, earth pits and rods</p> <p>Grounding resistance should be not more than 3 ohm.</p> <p>Lightning System</p> <p>Lighting arrester should be provided.</p> <p>Lightning arrester shall be installed with height to protect all PV arrays.</p> <p>Lightning System shall be comply with IEC/BS EN 62305-3.</p> <p>Minimum height of lightning arrester is 1.5 m.</p> <p>System resistance should be not more than 1 ohm.</p>	1	Set	
8.0	Raiser Pipes			
	<p>Materials: UPVC</p> <p>Joint Type: Square Type Threaded Couplings.</p> <p>Pipes package shall include the following:</p> <p>Top and bottom Adaptors, SS AISI 304 or equivalent</p> <p>Pump guard set and all other accessories</p> <p>Diameter: 3 Inch, 3 m, 25 bar.</p>	25	pcs	
9.0	Carbon Steel Non-return Valves			
	<p>Nominal Diameter (DN): 3 inch</p> <p>Nominal Pressure (PN): 25 bar.</p> <p>Connection Type: Flanged.</p> <p>BS Standard or Equivalent</p> <p>Body Material: Stainless steel 304 or higher grade</p> <p>Including all required accessories</p>	1	pcs	
10.0	Carbon Steel Gate Valves			
	Nominal Diameter (DN): 3 inch.	1	pcs	

	Nominal Pressure (PN): 25. Connection Type: Flanged. BS standard or Equivalent. Operator: Hand Wheel Resilient Seated. Stem: Stainless Steel Including flanges, gaskets, bolts and nuts			
11.0	Mechanical Water Flow Meter			
	Inline, Flanged, Magnetic type, Dray dial, turbine flow meter with all needed accessories such as threaded flanges, gaskets and bolts. Nominal Pressure (PN): 25. Body: Cast Iron EN14154, ISO4064 or equivalent Transient Flow Qt : Shall be less than 50% of Pump flow rate. Accuracy: ±2% of Nominal flow Maximum dial indication: 999999 Measuring Units: cubic meter m3	1	pcs	
12.0	Analog Pressure Gage			
	Reading range: Shall be specified according to the pressure on the installation point. Process connection: NPT connection 1/2" or 1/4". Pressure gauge should be equipped with isolation Stainless steel 1/2 inch Ball valve of the same pressure rating. Casing: Stainless steel, 3 inch	1	pcs	
13.0	Well Cap / cover			
	Material: made from A36 or equivalent CS plate Min. thickness: 18 mm for borehole wells caps Painted by Anti-corrosion Paint Diameter: as per well diameter (12 inches) Fabricated with stiffeners and holes for pump and sensor cables	1	pcs	
14.0	Security Fence (Chain Link Fabric)			
	The fencing shall have at least proper entrance gate with key and lock arrangement. The work covers supply, providing & fixing of Chain Link Fencing. Fencing shall be erected to a smooth alignment with no abrupt irregularities. The ground shall be trimmed or filled in such a manner that the bottom of the fence will approximately follow the level of the ground. The distance between the bottom of chain link mesh and hoardings and the ground shall not exceed 100 mm and any gap between the bottom of hoardings and the	1	Set	

<p>ground shall be sealed to the satisfaction of the Engineer.</p> <p>-Security Fence (Chain Link Fabric). Material: The Mesh Wire and the Line Wire of the Fabric shall be manufactured from galvanized steel wire.</p> <p>-Mesh Size: The Mesh Size must be not less than 50 mm x 50 mm (wire dia 3.15mm, hole 50x50mm).</p> <p>-Workmanship & Finish: Each roll shall be warranted to contain no weld joint or splice whatsoever.</p> <p>The wire shall be circular and shall be free from scales, irregularities, imperfections, flaws, sand splits and other defects.</p> <p>The Zinc Coating shall be smooth, even and bright.</p> <p>The rust formation on the cut ends of the wire at the fabric selvages are inherent characteristics of this material and do not warrant rejection of the fabric.</p> <p>- Weaving Woven Diamond Pattern provides strong, durable and flexible construction.</p> <p>- Corrosion Resistant: HDG(Hot Dip Galvanized) and if adding the PPC (Polyester Powder Coated), it will be preferred.</p> <p>Fittings, including eye bolt strainers, cleats, winding brackets, stretcher bars, extension arms, hook bolts and base plates, shall be galvanized mild steel.</p> <p>The length of bolts shall be such that the threaded portion of each bolt projects through the nut by at least one thread and by not more than four threads.</p> <p>Bolts, nuts, washers and fittings for fixing to steel shall have the same protective treatment as the steel.</p> <p>All fittings including nuts and bolts are to be spot-welded to stop removal and coating quality as the chain link fabric.</p> <p>Staples shall be D-section galvanized wire.</p> <p>- Panels: Height is to be 2m or 2.5m.(min 2m, max 2.5m overall fabric height and proper fencing to stop unauthorized entrance).</p> <p>Length / Width: is to be 3m for each panel and shall be checked in fully stretched condition. The Fabric shall be supplied in rolls of 15.0m to 20.0m. The supplied length shall be enough to surround the site from all directions.</p> <p>Wire Diameter: Nominal diameter of Mesh Wire shall be ≥ 3.15 mm.</p> <p>All wire and clips for fencing, including plastic coated wire, shall be galvanized steel.</p>			
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<p>Barbed wire shall be galvanized and consist of two-line wires 2.5 mm dia and point 2.5 mm dia with 150 mm maximum distance between two barbs. Wires weighing shall be not less 110 g/m (minimum).</p> <p>Tension wire and chain link mesh for fencing shall be strained tightly between straining posts by using winding brackets.</p> <p>Barbed wire for fencing shall be strained tightly between straining posts by using eye bolts.</p> <p>Chain link mesh shall be secured at each straining post by a stretcher bar 8mm.</p> <p>Chain link mesh shall be tied to the line wire by tying wire at 450 mm intervals.</p> <p>The tension in the wire on each side of straining posts shall be equal.</p> <p>Wire shall not be strained until at least 14 days after concrete has been placed in the foundation</p> <p>-Posts and Rails</p> <ul style="list-style-type: none"> - Straining posts for fencing shall be provided at all ends and corners, at changes in direction, at abrupt changes in level, at gate posts and at intervals not exceeding 3m along straight lengths of fencing. Struts shall be fitted to straining posts in the direction of each wire secured to the post as detailed in the shop drawings. - Posts and struts for fencing shall be set in excavations for foundations and the excavations shall be filled with C25 concrete up to 50 mm below ground level. - The ground surface around posts shall be made good with the same material as in the adjoining area. - Corner posts are to be galvanized pipe \geq DN65. - Intermediate posts are to be galvanized pipe \geq DN50. - Single gate posts are to be galvanized pipe \geq DN50. - Double gate posts are to be galvanized pipe \geq DN65. - Top rail posts are to be galvanized pipe \geq DN50 or suitable MS Angle/MS Flat. - Bottom rails are to be galvanized pipe \geq DN50 or suitable MS Angle/MS Flat. - All posts must be completed with plastic or Galva bond metal cap. - Bracing rails, bracing stays and backstays if required are to be provided without joint and will be 32mm extra light nominal bore. - All rails will be securely connected to posts with galvanized bolted split clamp. - The steel shall not be welded after galvanizing unless permitted by the Engineer and if permitted, the welded areas shall be free of scale and slag and shall be treated with an alternative 			
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	<p>galvanizing or zinc coating system approved by the Engineer.</p> <p>- Post footings:- End/corner/gate posts are to be (W× L× H) 50cm x 50cm x 60cm Concrete base C20 for appropriate installation concrete footings. Intermediate posts are to be (W× L× H) 30cm x 30cm x 60cm Concrete base for appropriate installation and strength concrete footings. Above ground concrete finish is to be domed with steel trowel finish to eliminate water lying at base of posts and is to be completed at time of original concrete pour. Knotted joins in cable wire are not permitted.</p> <p>- Gates Gates to be manufactured from medium-quality galvanized pipe. Single/Double leaf gate Maximum width of gate to be 2.m. Gates to open 180 degrees and lock back against fence line where ground contour allow - Base plates. Base plates can be installed where suitable concrete pavement or similar surfaces are available.If required, there are to be 4 holes in a heavy-duty base plate. The base plates are to be fixed with heavy duty galvanized dyne bolts to the fence line by using suitable posts. Posts are to be fully secured and the bolt nuts are welded or burred to prevent removal.</p>			
15.0	Warranty			
	3 years product and performance warranty			
16.0	Others			
	Project board that contain the project information written in Arabic and English	1	pcs	
	End user training on operation and maintenance	1		

❖ **Location 2 : Al-Manoriah**

Item No	Item Details	Quantity	Unit of Measurement	Offered Specs,
1.0	Solar PV Module:			
	<p>Total Wattage Capacity: Should be at least 1.4 of submersible pump capacity.</p> <p>Mono or Poly Crystalline Silicon.</p> <p>Panel capacity should be $\geq 350\text{Wp}$ under STC.</p> <p>Positive power tolerance +3% or 0-5 Watt.</p> <p>More than 17 % conversion efficiency under STC.</p> <p>Data sheet of PV module that contains the P-V & I-V Curves, all electrical and mechanical Data, Dimensions, Module area must be provided by bidder.</p> <p>40°C to 85°C operating temperature range.</p> <p>Temperature Characteristics:</p> <p>Pmax: $\leq -0.40\% / ^\circ\text{C}$</p> <p>VOC: $\leq -0.31\% / ^\circ\text{C}$</p> <p>Nominal operating cell temperature (NOCT): 45 $\pm 2^\circ\text{C}$.</p> <p>The operating voltage of proposed modules should not be less than 1000 VDC.</p> <p>Junction box of IP 67 and heat-resistance bypass diodes.</p> <p>High transparency and transmittance, tempered glass of 3 – 4 mm thickness.</p> <p>Must conform to CE, IEC 61215/ 61730/ 61701/62716, TUV, ISO, UL certificates or equivalent standards.</p> <p>Product warranty for 10 years.</p> <p>Linear performance: Nominal power output not less than 90% after 10 years, 80% after 25 years. annual linear degradation rate should be less than 0.9%.</p> <p>Product & Linear performance warranty certificate shall be provided by the manufacturer.</p> <p>The solar modules shall be provided with RF identification label. This should include following essential information.</p> <p>Information pertaining to design and manufacture of solar cells and modules;</p> <ol style="list-style-type: none"> Name of the PV module manufacturer. Type or model number. Batch/serial number. Country of solar cells/module origin. Year of solar module manufacture. Module I-V curve. 	As required	PCS	
2.0	Mounting Structure			
	The PV modules shall be mounted on fixed metallic structures having adequate strength and appropriate design, which can withstand the load of the modules and high wind velocities.	1	LS	

	<p>The support structure shall be hot dip galvanized steel or corrosion resistant aluminum.</p> <p>The structure should be capable of withstanding a wind load of 120 km/hr.</p> <p>The module alignment and tilt angle shall be calculated to provide maximum annual energy output wherever possible.</p> <p>Hot dip galvanized MS mounting structures should be used for mounting the modules / arrays. Minimum thickness of galvanization should be at least 80-120 microns as per ASTM A123 or ASTM A153 and ASTM A385.</p> <p>There should be adequate clearance between module and roofing material to prevent excessive heat being transferred to panels.</p> <p>The elevated structure must be Securely and directly anchored to the concrete rooftop using appropriate size nickel coated steel anchor bolts. Reinforced concrete of appropriate weight should be used for anchoring the structure feet's to keep their resistance for wind load.</p> <p>anti-theft bolts, nuts, fasteners, panel mounting clamps should be Stainless steel.</p> <p>Installation: The structures shall be designed for simple mechanical on-site installation.</p> <p>Access for panel cleaning and maintenance</p> <p>All solar panels must be accessible from the top for cleaning and from the bottom for access to the module-junction box.</p> <p>The Installer shall specify installation details of the solar PV modules and the support structures with lay-out drawings and array connection diagrams. Such details shall include, but not limited to, the following:</p> <p>Array tilt angle to the horizontal, Details with drawings for fixing the modules, Structure installation details and drawings, electrical grounding (Earthing). The work shall be carried out as per the designs approved by the UNDP Project engineer.</p>			
3.0	Combiner box			
	<p>The PV combiner box shall be used to combine the multiple DC input to one output, and it shall comply with the following specifications as minimum.</p>	1	PCS	

	<p>Enclosure materials: Coated metal with lockable door.</p> <p>Enclosure protection: IP65.</p> <p>Number of input circuit: total number of strings + to 2 spare inputs. at least 5</p> <p>DC fuse rating for each string:1000V, 15 A.</p> <p>DC output circuit: not less than 100 A, 1000 VDC breaker;</p> <p>Built in surge protection device;</p> <p>Anti-backflow diodes.</p> <p>Operational Environment Temperature: -30 °C ~+70 °C;</p>			
4.0	Solar Off-Grid Inverter			
	<p>solar pumping drive with in-built MPPT, VFD (Variable Frequency drive).</p> <p>The drive rating should be 1.25 X AC pump capacity.</p> <p>Three phase output, voltage range 380-420 V;</p> <p>Efficiency: Not less than 95%;</p> <p>Output Frequency: 50Hz±3%;</p> <p>Enclosure class should be not less than IP55.</p> <p>Maximum input voltage (Voc): not less than 770 VDC;</p> <p>Operating temperature: up to 50 °C;</p> <p>The device shall allow hybrid operation with external power source, where solar power should be configured as the primary power source;</p> <p>soft start, V/F stable speed control during solar radiation changes, adjustable auto/manual start in early morning, auto wakeup after adjustable hibernation time in cloudy days, 0 inputs for pressure switch and water level sensor to protect the pump against dry running and tank full water or closed pipeline (high pressure)</p> <p>Display: LCD Screen display with Cover + LED status indicator;</p> <p>Protection: Over-Voltage, pump Over-Current, pump Over-Load, Over-Temperature, pump Phase Loss, pump Short-Circuit, ground fault, solar low power, DC Input Anti-reverse, AC output unbalance (3Phase);</p> <p>Display content: PV status (Current, Voltage, Power, Energy), AC input voltage, AC output voltage, Load, Running Status, RPM, and Frequency</p>	1	set	

	the inverter should come with MTS 2 ways for backup source integration			
5.0	Submersible Pump and Motor			
	<p>Required Capacity: $Q = 18 \text{ m}^3/\text{hr}$, TDH: 150 m</p> <p>Pump Submersible pump Mixed flow multi -stage separate type, AC 3PH motor type, the motor pump Sets should be used for the solar PV, Starting compatible with AC VFD operation, bidders shall indicate manufacture, country of origin and model. It shall follow below features as minimum: Cooling sleeve suitable for borehole well internal diameter Pump Efficiency at Duty Point: Not less than 70%; Clearance (well dia-pump max dia with cable) = not less than 40 mm; Casing (Pump Bowl), Impeller , Wear Rings, Pump delivery and Housing , Check valve (None Return Valve) , Inlet strainer should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft and coupling, Shaft sleeve, Bearing bush, Guide bearing, Screw, stud, nut, washer.. etc should be comply with: (AISI 304 or equivalent) or higher specification materials. Maximum allowable sand: 100gr/m3. Coupling: according to NEMA.</p> <p>Motor The motors shall be Rewindable frame, insulation rating is compatible with AC VFD operation Rated Voltage:380/400VAC Insulation Material and Class, PE2+PA, F or H Ambient water temp:45 C° IP: not less than 68 Motor Efficiency: Not less than 80% Shaft, Motor Sleeve, Motor Housing, Diaphragm cover, bolts, Nuts, Studs, screws Washers etc. should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft Seal (Mechanical Seal) Tungsten carbide/ceramic- Diaphragm Nitrile Rubber Radial Bearing (Guide Bearing) Graphite or superior Axial Bearing (Thrust Bearing)</p>	1	set	

	<p>Graphite/ S.S Pads superior, Rubber Parts NBR or equivalent</p> <p>Including Plastic cooling cover with diameter of 8 inches for pump & motor cooling.</p> <p>Product warranty should be at least 2 years.</p>			
6.0	System Cables (including cable pipes)			
	<p>Cables should be sized in accordance to IEC 60364-5-52 standard, bidders should indicate cable sizing, and voltage drop calculations considering the following:</p> <p>The total voltage drop on the cable segments from the solar PV modules to the system inverter shall not exceed 3.0%.</p> <p>The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 3.0%.</p> <p>Shall meet IEC 60227, EN 60228, IEC 60502 standards or equivalent.</p> <p>Temp. Range: -10°C to +80°C.</p> <p>Voltage rating: up to 1000V.</p> <p>DC Cables:</p> <p>conductors shall flexible tinned copper, Multi-stranded, Insulated and Sheathed.</p> <p>Soft annealed tin-coated flexible stranded copper. Halogen-free, thermoset polyolefin specifically designed for maximum flexibility.</p> <p>low smoke non-halogenated, flame retardant, oil, abrasion, chemical and sunlight resistant cross-linked compound meeting UL 44 and TUV.</p> <p>Cable ends connections are to be made through suitable lugs or terminals, crimped properly & with use of cable glands.</p> <p>AC Cables:</p> <p>Type of Conductor: copper, flexible, finely multi stranded, Insulation: black poly chloroprene, HO7RN -F or equivalent material.</p> <p>All cable/wires are to be routed in pipes and suitably tagged and marked with proper manner so that the cable easily identified</p>			
6.1	Array to Combiner Box: 6 sq.m.	as required	meter	
6.2	Cable between combiner box and inverter: 25 sq.m, 1000 V	as required	meter	
6.3	AC Submersible Pump Cable: 4*25 sq.m	115	meter	
6.4	Level Sensor Cable with probe :1.5 sq.m	115	meter	
7.0	Earthing and lightning protection			

	AC and DC Earthing All PV modules shall be grounded in accordance to the manufacturer instruction Each array structure of the PV modules should be grounded properly. All metal casing/shielding of the system and its components should be thoroughly grounded. Earthing System shall be comply with IEC/BS EN 62305-3. Earthing clamps shall be used Grounding and lightening protection equipment shall include SPD, earth pits and rods Grounding resistance should be not more than 3 ohm. Lightning System Lighting arrester should be provided. Lightning arrester shall be installed with height to protect all PV arrays. Lightning System shall be comply with IEC/BS EN 62305-3. Minimum height of lightning arrester is 1.5 m. System resistance should be not more than 1 ohm.	1	Set	
8.0	Raiser Pipes			
	Materials: UPVC Joint Type: Square Type Threaded Couplings. Pipes package shall include the following: Top and bottom Adaptors, SS AISI 304 or equivalent Pump guard set and all other accessories Diameter: 3 Inch, 3 m, 25 bar.	29	pcs	
9.0	Carbon Steel Non-return Valves			
	Nominal Diameter (DN): 3 inch Nominal Pressure (PN): 25 bar. Connection Type: Flanged. BS Standard or Equivalent Body Material: Stainless steel 304 or higher grade Including all required accessories	1	pcs	
10.0	Carbon Steel Gate Valves			
	Nominal Diameter (DN): 3 inch. Nominal Pressure (PN): 25. Connection Type: Flanged. BS standard or Equivalent. Operator: Hand Wheel Resilient Seated. Stem: Stainless Steel	1	pcs	

	Including flanges, gaskets, bolts and nuts			
11.0	Mechanical Water Flow Meter			
	<p>Inline, Flanged, Magnetic type, Dray dial, turbine flow meter with all needed accessories such as threaded flanges, gaskets and bolts.</p> <p>Nominal Pressure (PN): 25.</p> <p>Body: Cast Iron</p> <p>EN14154, ISO4064 or equivalent</p> <p>Transient Flow Qt : Shall be less than 50% of Pump flow rate.</p> <p>Accuracy: $\pm 2\%$ of Nominal flow</p> <p>Maximum dial indication: 999999</p> <p>Measuring Units: cubic meter m3</p>	1	pcs	
12.0	Analog Pressure Gage			
	<p>Reading range: Shall be specified according to the pressure on the installation point.</p> <p>Process connection: NPT connection 1/2" or 1/4".</p> <p>Pressure gauge should be equipped with isolation Stainless steel 1/2 inch Ball valve of the same pressure rating.</p> <p>Casing: Stainless steel, 3 inch</p>	1	pcs	
13.0	Well Cap / cover			
	<p>Material: made from A36 or equivalent CS plate</p> <p>Min. thickness: 18 mm for borehole wells caps</p> <p>Painted by Anti-corrosion Paint</p> <p>Diameter: as per well diameter (12 inches)</p> <p>Fabricated with stiffeners and holes for pump and sensor cables</p>	1	pcs	
14.0	Security Fence (Chain Link Fabric)			
	<p>The fencing shall have at least proper entrance gate with key and lock arrangement.</p> <p>The work covers supply, providing & fixing of Chain Link Fencing.</p> <p>Fencing shall be erected to a smooth alignment with no abrupt irregularities. The ground shall be trimmed or filled in such a manner that the bottom of the fence will approximately follow the level of the ground. The distance between the bottom of chain link mesh and hoardings and the ground shall not exceed 100 mm and any gap between the bottom of hoardings and the ground shall be sealed to the satisfaction of the Engineer.</p> <p>-Security Fence (Chain Link Fabric). Material: The Mesh Wire and the Line Wire of the Fabric shall be manufactured from galvanized steel wire.</p> <p>-Mesh Size:</p>	1	Set	

<p>The Mesh Size must be not less than 50 mm x 50 mm (wire dia 3.15mm, hole 50x50mm).</p> <p>-Workmanship & Finish: Each roll shall be warranted to contain no weld joint or splice whatsoever.</p> <p>The wire shall be circular and shall be free from scales, irregularities, imperfections, flaws, sand splits and other defects.</p> <p>The Zinc Coating shall be smooth, even and bright.</p> <p>The rust formation on the cut ends of the wire at the fabric selvages are inherent characteristics of this material and do not warrant rejection of the fabric.</p> <p>- Weaving Woven Diamond Pattern provides strong, durable and flexible construction.</p> <p>- Corrosion Resistant: HDG(Hot Dip Galvanized) and if adding the PPC (Polyester Powder Coated), it will be preferred.</p> <p>Fittings, including eye bolt strainers, cleats, winding brackets, stretcher bars, extension arms, hook bolts and base plates, shall be galvanized mild steel.</p> <p>The length of bolts shall be such that the threaded portion of each bolt projects through the nut by at least one thread and by not more than four threads.</p> <p>Bolts, nuts, washers and fittings for fixing to steel shall have the same protective treatment as the steel.</p> <p>All fittings including nuts and bolts are to be spot-welded to stop removal and coating quality as the chain link fabric.</p> <p>Staples shall be D-section galvanized wire.</p> <p>- Panels: Height is to be 2m or 2.5m.(min 2m, max 2.5m overall fabric height and proper fencing to stop unauthorized entrance).</p> <p>Length / Width: is to be 3m for each panel and shall be checked in fully stretched condition. The Fabric shall be supplied in rolls of 15.0m to 20.0m. The supplied length shall be enough to surround the site from all directions.</p> <p>Wire Diameter: Nominal diameter of Mesh Wire shall be ≥ 3.15 mm.</p> <p>All wire and clips for fencing, including plastic coated wire, shall be galvanized steel.</p> <p>Barbed wire shall be galvanized and consist of two-line wires 2.5 mm dia and point 2.5 mm dia with 150 mm maximum distance between two barbs. Wires weighing shall be not less 110 g/m (minimum).</p>			
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<p>Tension wire and chain link mesh for fencing shall be strained tightly between straining posts by using winding brackets.</p> <p>Barbed wire for fencing shall be strained tightly between straining posts by using eye bolts.</p> <p>Chain link mesh shall be secured at each straining post by a stretcher bar 8mm.</p> <p>Chain link mesh shall be tied to the line wire by tying wire at 450 mm intervals.</p> <p>The tension in the wire on each side of straining posts shall be equal.</p> <p>Wire shall not be strained until at least 14 days after concrete has been placed in the foundation</p> <p>-Posts and Rails</p> <ul style="list-style-type: none"> - Straining posts for fencing shall be provided at all ends and corners, at changes in direction, at abrupt changes in level, at gate posts and at intervals not exceeding 3m along straight lengths of fencing. Struts shall be fitted to straining posts in the direction of each wire secured to the post as detailed in the shop drawings. - Posts and struts for fencing shall be set in excavations for foundations and the excavations shall be filled with C25 concrete up to 50 mm below ground level. - The ground surface around posts shall be made good with the same material as in the adjoining area. - Corner posts are to be galvanized pipe \geq DN65. - Intermediate posts are to be galvanized pipe \geq DN50. - Single gate posts are to be galvanized pipe \geq DN50. - Double gate posts are to be galvanized pipe \geq DN65. - Top rail posts are to be galvanized pipe \geq DN50 or suitable MS Angle/MS Flat. - Bottom rails are to be galvanized pipe \geq DN50 or suitable MS Angle/MS Flat. - All posts must be completed with plastic or Galva bond metal cap. - Bracing rails, bracing stays and backstays if required are to be provided without joint and will be 32mm extra light nominal bore. - All rails will be securely connected to posts with galvanized bolted split clamp. - The steel shall not be welded after galvanizing unless permitted by the Engineer and if permitted, the welded areas shall be free of scale and slag and shall be treated with an alternative galvanizing or zinc coating system approved by the Engineer. - Post footings:- 			
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	<p>End/corner/gate posts are to be (W× L× H) 50cm x 50cm x 60cm Concrete base C20 for appropriate installation concrete footings.</p> <p>Intermediate posts are to be (W× L× H) 30cm x 30cm x 60cm Concrete base for appropriate installation and strength concrete footings.</p> <p>Above ground concrete finish is to be domed with steel trowel finish to eliminate water lying at base of posts and is to be completed at time of original concrete pour.</p> <p>Knotted joins in cable wire are not permitted.</p> <p>- Gates</p> <p>Gates to be manufactured from medium-quality galvanized pipe.</p> <p>Single/Double leaf gate</p> <p>Maximum width of gate to be 2.m.</p> <p>Gates to open 180 degrees and lock back against fence line where ground contour allow</p> <p>- Base plates.</p> <p>Base plates can be installed where suitable concrete pavement or similar surfaces are available.If required, there are to be 4 holes in a heavy-duty base plate.</p> <p>The base plates are to be fixed with heavy duty galvanized dyne bolts to the fence line by using suitable posts.</p> <p>Posts are to be fully secured and the bolt nuts are welded or burred to prevent removal.</p>			
15.0	Warranty			
	3 years product and performance warranty			
16.0	Others			
	Project board that contain the project information written in Arabic and English	1	pcs	
	End user training on operation and maintenance			

Location 3 : Al-Sokhnah

Item No	Item Details	Quantity	Unit of Measurement	Offered Specs,
1.0	Solar PV Module:			
	<p>Total Wattage Capacity: Should be at least 1.4 of submersible pump capacity.</p> <p>Mono or Poly Crystalline Silicon.</p> <p>Panel capacity should be $\geq 350\text{Wp}$ under STC.</p> <p>Positive power tolerance +3% or 0-5 Watt.</p> <p>More than 17 % conversion efficiency under STC.</p> <p>Data sheet of PV module that contains the P-V & I-V Curves, all electrical and mechanical Data, Dimensions, Module area must be provided by bidder.</p> <p>40°C to 85°C operating temperature range.</p> <p>Temperature Characteristics:</p> <p>Pmax: $\leq -0.40\% / ^\circ\text{C}$</p> <p>VOC: $\leq -0.31\% / ^\circ\text{C}$</p> <p>Nominal operating cell temperature (NOCT): 45 $\pm 2^\circ\text{C}$.</p> <p>The operating voltage of proposed modules should not be less than 1000 VDC.</p> <p>Junction box of IP 67 and heat-resistance bypass diodes.</p> <p>High transparency and transmittance, tempered glass of 3 – 4 mm thickness.</p> <p>Must conform to CE, IEC 61215/ 61730/ 61701/62716, TUV, ISO, UL certificates or equivalent standards.</p> <p>Product warranty for 10 years.</p> <p>Linear performance: Nominal power output not less than 90% after 10 years, 80% after 25 years. annual linear degradation rate should be less than 0.9%.</p> <p>Product & Linear performance warranty certificate shall be provided by the manufacturer.</p> <p>The solar modules shall be provided with RF identification label. This should include following essential information.</p> <p>Information pertaining to design and manufacture of solar cells and modules;</p> <ol style="list-style-type: none"> Name of the PV module manufacturer. Type or model number. Batch/serial number. Country of solar cells/module origin. Year of solar module manufacture. Module I-V curve. 	As required	PCS	

2.0	Mounting Structure			
	<p>The PV modules shall be mounted on fixed metallic structures having adequate strength and appropriate design, which can withstand the load of the modules and high wind velocities.</p> <p>The support structure shall be hot dip galvanized steel or corrosion resistant aluminum.</p> <p>The structure should be capable of withstanding a wind load of 120 km/hr.</p> <p>The module alignment and tilt angle shall be calculated to provide maximum annual energy output wherever possible.</p> <p>Hot dip galvanized MS mounting structures should be used for mounting the modules / arrays. Minimum thickness of galvanization should be at least 80-120 microns as per ASTM A123 or ASTM A153 and ASTM A385.</p> <p>There should be adequate clearance between module and roofing material to prevent excessive heat being transferred to panels.</p> <p>The elevated structure must be Securely and directly anchored to the concrete rooftop using appropriate size nickel coated steel anchor bolts. Reinforced concrete of appropriate weight should be used for anchoring the structure feet's to keep their resistance for wind load.</p> <p>anti-theft bolts, nuts, fasteners, panel mounting clamps should be Stainless steel.</p> <p>Installation: The structures shall be designed for simple mechanical on-site installation.</p> <p>Access for panel cleaning and maintenance</p> <p>All solar panels must be accessible from the top for cleaning and from the bottom for access to the module-junction box.</p> <p>The Installer shall specify installation details of the solar PV modules and the support structures with lay-out drawings and array connection diagrams. Such details shall include, but not limited to, the following:</p> <p>Array tilt angle to the horizontal, Details with drawings for fixing the modules, Structure installation details and drawings, electrical grounding (Earthing). The work shall be carried out as per the designs approved by the UNDP Project engineer.</p>	1	LS	

3.0	Combiner box			
	<p>The PV combiner box shall be used to combine the multiple DC input to one output, and it shall comply with the following specifications as minimum.</p> <p>Enclosure materials: Coated metal with lockable door.</p> <p>Enclosure protection: IP65.</p> <p>Number of input circuit: total number of strings + to 2 spare inputs. at least 5</p> <p>DC fuse rating for each string:1000V, 15 A.</p> <p>DC output circuit: not less than 100 A, 1000 VDC breaker;</p> <p>Built in surge protection device;</p> <p>Anti-backflow diodes.</p> <p>Operational Environment Temperature: -30 °C ~+70 °C;</p> <p>Product warranty shall be at least 2 years.</p>	1	PCS	
4.0	Solar Off-Grid Inverter			
	<p>solar pumping drive with in-built MPPT, VFD (Variable Frequency drive).</p> <p>The drive rating should be 1.25 X AC pump capacity.</p> <p>Three phase output, voltage range 380-420 V;</p> <p>Efficiency: Not less than 95%;</p> <p>Output Frequency: 50Hz±3%;</p> <p>Enclosure class should be not less than IP55.</p> <p>Maximum input voltage Voc): not less than 770 VDC;</p> <p>Operating temperature: up to 50 °C;</p> <p>The device shall allow hybrid operation with external power source, where solar power should be configured as the primary power source;</p> <p>soft start, V/F stable speed control during solar radiation changes, adjustable auto/ manual start in early morning, auto wakeup after adjustable hibernation time in cloudy days, 0 inputs for pressure switch and water level sensor to protect the pump against dry running and tank full water or closed pipeline (high pressure)</p> <p>Display: LCD Screen display with Cover + LED status indicator;</p> <p>Protection: Over-Voltage, pump Over-Current, pump Over-Load, Over-Temperature, pump Phase Loss, pump Short-Circuit, ground fault, solar low power, DC</p>	1	set	

	<p>Input Anti-reverse, AC output unbalance (3Phase);</p> <p>Display content: PV status (Current, Voltage, Power, Energy), AC input voltage, AC output voltage, Load, Running Status, RPM, and Frequency</p> <p>the inverter should come with MTS 2 ways for backup source integration.</p>			
5.0	Submersible Pump and Motor			
	<p>Required Capacity: Q = 25.2 m³/hr , TDH: 150 m</p> <p>Pump</p> <p>Submersible pump Mixed flow multi -stage separate type, AC 3PH motor type, the motor pump Sets should be used for the solar PV, Starting compatible with AC VFD operation, bidders shall indicate manufacture, country of origin and model. It shall follow below features as minimum: Cooling sleeve suitable for borehole well internal diameter Pump Efficiency at Duty Point: Not less than 70%; Clearance (well dia-pump max dia with cable) = not less than 40 mm; Casing (Pump Bowl) , Impeller , Wear Rings, Pump delivery and Housing , Check valve (None Return Valve) , Inlet strainer should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft and coupling, Shaft sleeve, Bearing bush, Guide bearing, Screw, stud, nut, washer.. etc should be comply with: (AISI 304 or equivalent) or higher specification materials. Maximum allowable sand: 100gr/m3. Coupling: according to NEMA.</p> <p>Motor</p> <p>The motors shall be Rewindable frame, insulation rating is compatible with AC VFD operation Rated Voltage:380/400VAC Insulation Material and Class, PE2+PA, F or H Ambient water temp:45 C° IP: not less than 68 Motor Efficiency: Not less than 80% Shaft, Motor Sleeve, Motor Housing, Diaphragm cover, bolts, Nuts, Studs, screws Washers etc. should be comply with: (AISI</p>	1	set	

	<p>304 or equivalent) or higher specification materials.</p> <p>Shaft Seal (Mechanical Seal) Tungsten carbide/ceramic- Diaphragm Nitrile Rubber Radial Bearing (Guide Bearing) Graphite or superior Axial Bearing (Thrust Bearing) Graphite/ S.S Pads superior, Rubber Parts NBR or equivalent</p> <p>Including Plastic cooling cover with appropriate diameter for pump & motor cooling.</p> <p>Product warranty should be at least 2 years.</p>			
6.0	System Cables (including cable pipes)			
	<p>Cables should be sized in accordance to IEC 60364-5-52 standard, bidders should indicate cable sizing, and voltage drop calculations considering the following:</p> <p>The total voltage drop on the cable segments from the solar PV modules to the system inverter shall not exceed 3.0%.</p> <p>The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 3.0%.</p> <p>Shall meet IEC 60227, EN 60228, IEC 60502 standards or equivalent.</p> <p>Temp. Range: -10°C to +80°C.</p> <p>Voltage rating: up to 1000V.</p> <p>DC Cables:</p> <p>conductors shall flexible tinned copper, Multi-stranded, Insulated and Sheathed. Soft annealed tin-coated flexible stranded copper. Halogen-free, thermoset polyolefin specifically designed for maximum flexibility. low smoke non-halogenated, flame retardant, oil, abrasion, chemical and sunlight resistant cross-linked compound meeting UL 44 and TUV.</p> <p>Cable ends connections are to be made through suitable lugs or terminals, crimped properly & with use of cable glands.</p> <p>AC Cables:</p> <p>Type of Conductor: copper, flexible, finely multi stranded, Insulation: black poly chloroprene, HO7RN -F or equivalent material.</p> <p>All cable/wires are to be routed in pipes and suitably tagged and marked with proper manner so that the cable easily identified.</p>			

6.1	Array to Combiner Box: 6 sqr.mm.	as required	meter	
6.2	Cable between combiner box and inverter: 25 sqr.mm, 1000 V	as required	meter	
6.3	AC Submersible Pump Cable: 4*25 sqr.mm	105	meter	
6.4	Level Sensor Cable with probe :1.5 sqr.mm	105	meter	
7.0	Earthing and lightening protection			
	<p>AC and DC Earthing</p> <p>All PV modules shall be grounded in accordance to the manufacturer instruction</p> <p>Each array structure of the PV modules should be grounded properly.</p> <p>All metal casing/shielding of the system and its components should be thoroughly grounded.</p> <p>Earthing System shall be comply with IEC/BS EN 62305-3.</p> <p>Earthing clamps shall be used</p> <p>Grounding and lightening protection equipment shall include SPD, earth pits and rods</p> <p>Grounding resistance should be not more than 3 ohm.</p> <p>Lightning System</p> <p>Lighting arrester should be provided.</p> <p>Lightning arrester shall be installed with height to protect all PV arrays.</p> <p>Lightning System shall be comply with IEC/BS EN 62305-3.</p> <p>Minimum height of lightning arrester is 1.5 m.</p> <p>System resistance should be not more than 1 ohm.</p>	1	Set	
8.0	Raiser Pipes			
	<p>Materials: UPVC</p> <p>Joint Type: Square Type Threaded Couplings.</p> <p>Pipes package shall include the following:</p> <p>Top and bottom Adaptors, SS AISI 304 or equivalent</p> <p>Pump guard set and all other accessories</p> <p>Diameter: 3 Inch, 3 m, 25 bar.</p>	27	pcs	
9.0	Carbon Steel Non-return Valves			
	<p>Nominal Diameter (DN): 3 inch</p> <p>Nominal Pressure (PN): 25 bar.</p> <p>Connection Type: Flanged.</p> <p>BS Standard or Equivalent</p> <p>Body Material: Stainless steel 304 or higher grade</p> <p>Including all required accessories</p>	1	pcs	

10.0	Carbon Steel Gate Valves			
	Nominal Diameter (DN): 3 inch. Nominal Pressure (PN): 25. Connection Type: Flanged. BS standard or Equivalent. Operator: Hand Wheel Resilient Seated. Stem: Stainless Steel Including flanges, gaskets, bolts and nuts	1	pcs	
11.0	Mechanical Water Flow Meter			
	Inline, Flanged, Magnetic type, Dray dial, turbine flow meter with all needed accessories such as threaded flanges, gaskets and bolts. Nominal Pressure (PN): 25. Body: Cast Iron EN14154, ISO4064 or equivalent Transient Flow Qt : Shall be less than 50% of Pump flow rate. Accuracy: ±2% of Nominal flow Maximum dial indication: 999999 Measuring Units: cubic meter m3	1	pcs	
12.0	Analog Pressure Gage			
	Reading range: Shall be specified according to the pressure on the installation point. Process connection: NPT connection 1/2" or 1/4". Pressure gauge should be equipped with isolation Stainless steel 1/2 inch Ball valve of the same pressure rating. Casing: Stainless steel, 3 inch	1	pcs	
13.0	Well Cap / cover			
	Material: made from A36 or equivalent CS plate Min. thickness: 18 mm for borehole wells caps Painted by Anti-corrosion Paint Diameter: as per well diameter (10 inches) Fabricated with stiffeners and holes for pump and sensor cables.	1	pcs	
14.0	Security Fence (Chain Link Fabric)			
	The fencing shall have at least proper entrance gate with key and lock arrangement. The work covers supply, providing & fixing of Chain Link Fencing. Fencing shall be erected to a smooth alignment with no abrupt irregularities. The ground shall be trimmed or filled in such a manner that the bottom of the fence will approximately follow the level of the ground. The distance between the bottom of chain link mesh and hoardings and	1	Set	

	<p>the ground shall not exceed 100 mm and any gap between the bottom of hoardings and the ground shall be sealed to the satisfaction of the Engineer.</p> <p>-Security Fence (Chain Link Fabric). Material: The Mesh Wire and the Line Wire of the Fabric shall be manufactured from galvanized steel wire.</p> <p>-Mesh Size: The Mesh Size must be not less than 50 mm x 50 mm (wire dia 3.15mm, hole 50x50mm).</p> <p>-Workmanship & Finish: Each roll shall be warranted to contain no weld joint or splice whatsoever.</p> <p>The wire shall be circular and shall be free from scales, irregularities, imperfections, flaws, sand splits and other defects.</p> <p>The Zinc Coating shall be smooth, even and bright.</p> <p>The rust formation on the cut ends of the wire at the fabric selvages are inherent characteristics of this material and do not warrant rejection of the fabric.</p> <p>- Weaving Woven Diamond Pattern provides strong, durable and flexible construction.</p> <p>- Corrosion Resistant: HDG(Hot Dip Galvanized) and if adding the PPC (Polyester Powder Coated), it will be preferred.</p> <p>Fittings, including eye bolt strainers, cleats, winding brackets, stretcher bars, extension arms, hook bolts and base plates, shall be galvanized mild steel.</p> <p>The length of bolts shall be such that the threaded portion of each bolt projects through the nut by at least one thread and by not more than four threads.</p> <p>Bolts, nuts, washers and fittings for fixing to steel shall have the same protective treatment as the steel.</p> <p>All fittings including nuts and bolts are to be spot-welded to stop removal and coating quality as the chain link fabric.</p> <p>Staples shall be D-section galvanized wire.</p> <p>- Panels: Height is to be 2m or 2.5m.(min 2m, max 2.5m overall fabric height and proper fencing to stop unauthorized entrance).</p> <p>Length / Width: is to be 3m for each panel and shall be checked in fully stretched condition. The Fabric shall be supplied in rolls of 15.0m to 20.0m. The supplied length shall be enough to surround the site from all directions.</p> <p>Wire Diameter: Nominal diameter of Mesh Wire shall be ≥ 3.15 mm.</p>			
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	<p>All wire and clips for fencing, including plastic coated wire, shall be galvanized steel.</p> <p>Barbed wire shall be galvanized and consist of two-line wires 2.5 mm dia and point 2.5 mm dia with 150 mm maximum distance between two barbs. Wires weighing shall be not less 110 g/m (minimum).</p> <p>Tension wire and chain link mesh for fencing shall be strained tightly between straining posts by using winding brackets.</p> <p>Barbed wire for fencing shall be strained tightly between straining posts by using eye bolts.</p> <p>Chain link mesh shall be secured at each straining post by a stretcher bar 8mm.</p> <p>Chain link mesh shall be tied to the line wire by tying wire at 450 mm intervals.</p> <p>The tension in the wire on each side of straining posts shall be equal.</p> <p>Wire shall not be strained until at least 14 days after concrete has been placed in the foundation</p> <p>-Posts and Rails</p> <ul style="list-style-type: none"> - Straining posts for fencing shall be provided at all ends and corners, at changes in direction, at abrupt changes in level, at gate posts and at intervals not exceeding 3m along straight lengths of fencing. Struts shall be fitted to straining posts in the direction of each wire secured to the post as detailed in the shop drawings. - Posts and struts for fencing shall be set in excavations for foundations and the excavations shall be filled with C25 concrete up to 50 mm below ground level. - The ground surface around posts shall be made good with the same material as in the adjoining area. - Corner posts are to be galvanized pipe \geq DN65. - Intermediate posts are to be galvanized pipe \geq DN50. - Single gate posts are to be galvanized pipe \geq DN50. - Double gate posts are to be galvanized pipe \geq DN65. - Top rail posts are to be galvanized pipe \geq DN50 or suitable MS Angle/MS Flat. - Bottom rails are to be galvanized pipe \geq DN50 or suitable MS Angle/MS Flat. - All posts must be completed with plastic or Galva bond metal cap. - Bracing rails, bracing stays and backstays if required are to be provided without joint and will be 32mm extra light nominal bore. - All rails will be securely connected to posts with galvanized bolted split clamp. - The steel shall not be welded after galvanizing unless permitted by the Engineer and if 			
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	<p>permitted, the welded areas shall be free of scale and slag and shall be treated with an alternative galvanizing or zinc coating system approved by the Engineer.</p> <p>- Post footings:- End/corner/gate posts are to be (W× L× H) 50cm x 50cm x 60cm Concrete base C20 for appropriate installation concrete footings. Intermediate posts are to be (W× L× H) 30cm x 30cm x 60cm Concrete base for appropriate installation and strength concrete footings. Above ground concrete finish is to be domed with steel trowel finish to eliminate water lying at base of posts and is to be completed at time of original concrete pour. Knotted joins in cable wire are not permitted.</p> <p>- Gates Gates to be manufactured from medium-quality galvanized pipe. Single/Double leaf gate Maximum width of gate to be 2.m. Gates to open 180 degrees and lock back against fence line where ground contour allow - Base plates. Base plates can be installed where suitable concrete pavement or similar surfaces are available.If required, there are to be 4 holes in a heavy-duty base plate. The base plates are to be fixed with heavy duty galvanized dyne bolts to the fence line by using suitable posts. Posts are to be fully secured and the bolt nuts are welded or burred to prevent removal.</p>			
15.0	Warranty			
	3 years product and performance warranty			
16.0	Others			
	Project board that contain the project information written in Arabic and English	1	pcs	
	End user training on operation and maintenance			

Location 4: Khamis Bani Sa'ad

Item No	Item Details	Quantity	Unit of Measurement	Offered Specs,
1.0	Solar PV Module:			
	<p>Total Wattage Capacity: Should be at least 1.4 of submersible pump capacity.</p> <p>Mono or Poly Crystalline Silicon.</p> <p>Panel capacity should be $\geq 350\text{Wp}$ under STC.</p> <p>Positive power tolerance +3% or 0-5 Watt.</p> <p>More than 17 % conversion efficiency under STC.</p> <p>Data sheet of PV module that contains the P-V & I-V Curves, all electrical and mechanical Data, Dimensions, Module area must be provided by bidder.</p> <p>40°C to 85°C operating temperature range.</p> <p>Temperature Characteristics:</p> <p>Pmax: $\leq -0.40\% / ^\circ\text{C}$</p> <p>VOC: $\leq -0.31\% / ^\circ\text{C}$</p> <p>Nominal operating cell temperature (NOCT): 45 $\pm 2^\circ\text{C}$.</p> <p>The operating voltage of proposed modules should not be less than 1000 VDC.</p> <p>Junction box of IP 67 and heat-resistance bypass diodes.</p> <p>High transparency and transmittance, tempered glass of 3 – 4 mm thickness.</p> <p>Must conform to CE, IEC 61215/ 61730/ 61701/62716, TUV, ISO, UL certificates or equivalent standards.</p> <p>Product warranty for 10 years.</p> <p>Linear performance: Nominal power output not less than 90% after 10 years, 80% after 25 years. annual linear degradation rate should be less than 0.9%.</p> <p>Product & Linear performance warranty certificate shall be provided by the manufacturer.</p> <p>The solar modules shall be provided with RF identification label. This should include following essential information.</p> <p>Information pertaining to design and manufacture of solar cells and modules;</p> <ol style="list-style-type: none"> Name of the PV module manufacturer. Type or model number. Batch/serial number. Country of solar cells/module origin. Year of solar module manufacture. Module I-V curve. 	As required	PCS	
2.0	Mounting Structure			
	The PV modules shall be mounted on fixed metallic structures having adequate strength and appropriate design, which can withstand	1	LS	

	<p>the load of the modules and high wind velocities.</p> <p>The support structure shall be hot dip galvanized steel or corrosion resistant aluminum.</p> <p>The structure should be capable of withstanding a wind load of 120 km/hr.</p> <p>The module alignment and tilt angle shall be calculated to provide maximum annual energy output wherever possible.</p> <p>Hot dip galvanized MS mounting structures should be used for mounting the modules / arrays. Minimum thickness of galvanization should be at least 80-120 microns as per ASTM A123 or ASTM A153 and ASTM A385.</p> <p>There should be adequate clearance between module and roofing material to prevent excessive heat being transferred to panels.</p> <p>The elevated structure must be Securely and directly anchored to the concrete rooftop using appropriate size nickel coated steel anchor bolts. Reinforced concrete of appropriate weight should be used for anchoring the structure feet's to keep their resistance for wind load.</p> <p>anti-theft bolts, nuts, fasteners, panel mounting clamps should be Stainless steel.</p> <p>Installation: The structures shall be designed for simple mechanical on-site installation.</p> <p>Access for panel cleaning and maintenance</p> <p>All solar panels must be accessible from the top for cleaning and from the bottom for access to the module-junction box.</p> <p>The Installer shall specify installation details of the solar PV modules and the support structures with lay-out drawings and array connection diagrams. Such details shall include, but not limited to, the following:</p> <p>Array tilt angle to the horizontal, Details with drawings for fixing the modules, Structure installation details and drawings, electrical grounding (Earthing). The work shall be carried out as per the designs approved by the UNDP Project engineer.</p>			
3.0	Combiner box			
	The PV combiner box shall be used to combine the multiple DC input to one	1	PCS	

	<p>output, and it shall comply with the following specifications as minimum.</p> <p>Enclosure materials: Coated metal with lockable door.</p> <p>Enclosure protection: IP65.</p> <p>Number of input circuit: total number of strings + to 2 spare inputs. at least 5</p> <p>DC fuse rating for each string:1000V, 15 A.</p> <p>DC output circuit: not less than 100 A, 1000 VDC breaker;</p> <p>Built in surge protection device;</p> <p>Anti-backflow diodes.</p> <p>Operational Environment Temperature: -30 °C ~+70 °C;</p>			
4.0	Solar Off-Grid Inverter			
	<p>Solar pumping drive with in-built MPPT, VFD (Variable Frequency drive).</p> <p>The drive rating should be 1.25 X AC pump capacity.</p> <p>Three phase output, voltage range 380-420 V;</p> <p>Efficiency: Not less than 95%;</p> <p>Output Frequency: 50Hz±3%;</p> <p>Enclosure class should be not less than IP55.</p> <p>Maximum input voltage (Voc): not less than 770 VDC;</p> <p>Operating temperature: up to 50 °C;</p> <p>The device shall allow hybrid operation with external power source, where solar power should be configured as the primary power source;</p> <p>soft start, V/F stable speed control during solar radiation changes, adjustable auto/manual start in early morning, auto wakeup after adjustable hibernation time in cloudy days, 0 inputs for pressure switch and water level sensor to protect the pump against dry running and tank full water or closed pipeline (high pressure)</p> <p>Display: LCD Screen display with Cover + LED status indicator;</p> <p>Protection: Over-Voltage, pump Over-Current, pump Over-Load, Over-Temperature, pump Phase Loss, pump Short-Circuit, ground fault, solar low power, DC Input Anti-reverse, AC output unbalance (3Phase);</p> <p>Display content: PV status (Current, Voltage, Power, Energy), AC input voltage, AC output</p>	1	set	

	voltage, Load, Running Status, RPM, and Frequency.			
5.0	Submersible Pump and Motor			
	<p>Required Capacity: Q = 5 m³/hr , TDH: 90 m</p> <p>Pump Submersible pump Mixed flow multi -stage separate type, AC 3PH motor type, the motor pump Sets should be used for the solar PV, Starting compatible with AC VFD operation, bidders shall indicate manufacture, country of origin and model. It shall follow below features as minimum: Cooling sleeve suitable for borehole well internal diameter Pump Efficiency at Duty Point: Not less than 70%; Clearance (well dia-pump max dia with cable) = not less than 40 mm; Casing (Pump Bowl), Impeller , Wear Rings, Pump delivery and Housing , Check valve (None Return Valve) , Inlet strainer should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft and coupling, Shaft sleeve, Bearing bush, Guide bearing, Screw, stud, nut, washer.. etc should be comply with: (AISI 304 or equivalent) or higher specification materials. Maximum allowable sand: 100gr/m3. Coupling: according to NEMA.</p> <p>Motor The motors shall be Rewindable frame, insulation rating is compatible with AC VFD operation Rated Voltage:380/400VAC Insulation Material and Class, PE2+PA, F or H Ambient water temp:45 C° IP: not less than 68 Motor Efficiency: Not less than 80% Shaft, Motor Sleeve, Motor Housing, Diaphragm cover, bolts, Nuts, Studs, screws Washers etc. should be comply with: (AISI 304 or equivalent) or higher specification materials. Shaft Seal (Mechanical Seal) Tungsten carbide/ceramic- Diaphragm Nitrile Rubber Radial Bearing (Guide Bearing) Graphite or superior Axial Bearing (Thrust Bearing)</p>	1	set	

	<p>Graphite/ S.S Pads superior, Rubber Parts NBR or equivalent</p> <p>Including Plastic cooling cover with appropriate diameter for pump & motor cooling.</p> <p>Product warranty should be at least 2 years.</p>			
6.0	System Cables (including cable pipes)			
	<p>Cables should be sized in accordance to IEC 60364-5-52 standard, bidders should indicate cable sizing, and voltage drop calculations considering the following:</p> <p>The total voltage drop on the cable segments from the solar PV modules to the system inverter shall not exceed 3.0%.</p> <p>The total voltage drop on the cable segments from the solar grid inverter to the building distribution board shall not exceed 3.0%.</p> <p>Shall meet IEC 60227, EN 60228, IEC 60502 standards or equivalent.</p> <p>Temp. Range: -10°C to +80°C.</p> <p>Voltage rating: up to 1000V.</p> <p>DC Cables:</p> <p>conductors shall flexible tinned copper, Multi-stranded, Insulated and Sheathed.</p> <p>Soft annealed tin-coated flexible stranded copper. Halogen-free, thermoset polyolefin specifically designed for maximum flexibility.</p> <p>low smoke non-halogenated, flame retardant, oil, abrasion, chemical and sunlight resistant cross-linked compound meeting UL 44 and TUV.</p> <p>Cable ends connections are to be made through suitable lugs or terminals, crimped properly & with use of cable glands.</p> <p>AC Cables:</p> <p>Type of Conductor: copper, flexible, finely multi stranded, Insulation: black poly chloroprene, HO7RN -F or equivalent material.</p> <p>All cable/wires are to be routed in pipes and suitably tagged and marked with proper manner so that the cable easily identified</p>			
6.1	Array to Combiner Box: 6 sqr.mm.	as required	meter	
6.2	Cable between combiner box and inverter: 16 sqr.mm, 1000 V	as required	meter	
6.3	AC Submersible Pump Cable: 4*6 sqr.mm	20	meter	
6.4	Level Sensor Cable with probe :1.5 sqr.mm	20	meter	
7.0	Earthing and lightning protection			
	AC and DC Earthing	1	Set	

	<p>All PV modules shall be grounded in accordance to the manufacturer instruction</p> <p>Each array structure of the PV modules should be grounded properly.</p> <p>All metal casing/shielding of the system and its components should be thoroughly grounded.</p> <p>Earthing System shall be comply with IEC/BS EN 62305-3.</p> <p>Earthing clamps shall be used</p> <p>Grounding and lightening protection equipment shall include SPD, earth pits and rods</p> <p>Grounding resistance should be not more than 3 ohm.</p> <p>Lightning System</p> <p>Lighting arrester should be provided.</p> <p>Lightning arrester shall be installed with height to protect all PV arrays.</p> <p>Lightning System shall be comply with IEC/BS EN 62305-3.</p> <p>Minimum height of lightning arrester is 1.5 m.</p> <p>System resistance should be not more than 1 ohm.</p>			
8.0	Raiser Pipes			
	<p>Materials: UPVC</p> <p>Joint Type: Square Type Threaded Couplings.</p> <p>Pipes package shall include the following:</p> <p>Top and bottom Adaptors, SS AISI 304 or equivalent</p> <p>Pump guard set and all other accessories</p> <p>Diameter: 1.5 Inch, 3 m, 25 bar.</p>	4	pcs	
9.0	Carbon Steel Non-return Valves			
	<p>Nominal Diameter (DN): 1.5 inch</p> <p>Nominal Pressure (PN): 25 bar.</p> <p>Connection Type: Flanged.</p> <p>BS Standard or Equivalent</p> <p>Body Material: Stainless steel 304 or higher grade</p> <p>Including all required accessories</p>	1	pcs	
10.0	Carbon Steel Gate Valves			
	<p>Nominal Diameter (DN): 1.5 inch.</p> <p>Nominal Pressure (PN): 25.</p> <p>Connection Type: Flanged.</p> <p>BS standard or Equivalent.</p> <p>Operator: Hand Wheel</p> <p>Resilient Seated.</p> <p>Stem: Stainless Steel</p> <p>Including flanges, gaskets, bolts and nuts.</p>	1	pcs	

11.0	Mechanical Water Flow Meter			
	<p>Inline, Flanged, Magnetic type, Dray dial, turbine flow meter with all needed accessories such as threaded flanges, gaskets and bolts.</p> <p>Nominal Pressure (PN): 25.</p> <p>Body: Cast Iron</p> <p>EN14154, ISO4064 or equivalent</p> <p>Transient Flow Qt : Shall be less than 50% of Pump flow rate.</p> <p>Accuracy: $\pm 2\%$ of Nominal flow</p> <p>Maximum dial indication: 999999</p> <p>Measuring Units: cubic meter m3</p>	1	pcs	
12.0	Analog Pressure Gage			
	<p>Reading range: Shall be specified according to the pressure on the installation point.</p> <p>Process connection: NPT connection 1/2" or 1/4".</p> <p>Pressure gauge should be equipped with isolation Stainless steel 1/2 inch Ball valve of the same pressure rating.</p> <p>Casing: Stainless steel</p>	1	pcs	
13.0	Well Cap / cover			
	<p>Material: made from A36 or equivalent CS plate</p> <p>Min. thickness: 18 mm for borehole wells caps</p> <p>Painted by Anti-corrosion Paint</p> <p>Diameter: as per well diameter (1.2 inches)</p> <p>Fabricated with stiffeners and holes for pump and sensor cables</p>	1	pcs	
14.0	Security Fence (Chain Link Fabric)			
	<p>The fencing shall have at least proper entrance gate with key and lock arrangement.</p> <p>The work covers supply, providing & fixing of Chain Link Fencing.</p> <p>Fencing shall be erected to a smooth alignment with no abrupt irregularities. The ground shall be trimmed or filled in such a manner that the bottom of the fence will approximately follow the level of the ground. The distance between the bottom of chain link mesh and hoardings and the ground shall not exceed 100 mm and any gap between the bottom of hoardings and the ground shall be sealed to the satisfaction of the Engineer.</p> <p>-Security Fence (Chain Link Fabric). Material:</p> <p>The Mesh Wire and the Line Wire of the Fabric shall be manufactured from galvanized steel wire.</p> <p>-Mesh Size:</p>	1	Set	

	<p>The Mesh Size must be not less than 50 mm x 50 mm (wire dia 3.15mm, hole 50x50mm).</p> <p>-Workmanship & Finish: Each roll shall be warranted to contain no weld joint or splice whatsoever.</p> <p>The wire shall be circular and shall be free from scales, irregularities, imperfections, flaws, sand splits and other defects.</p> <p>The Zinc Coating shall be smooth, even and bright.</p> <p>The rust formation on the cut ends of the wire at the fabric selvages are inherent characteristics of this material and do not warrant rejection of the fabric.</p> <p>- Weaving Woven Diamond Pattern provides strong, durable and flexible construction.</p> <p>- Corrosion Resistant: HDG(Hot Dip Galvanized) and if adding the PPC (Polyester Powder Coated), it will be preferred.</p> <p>Fittings, including eye bolt strainers, cleats, winding brackets, stretcher bars, extension arms, hook bolts and base plates, shall be galvanized mild steel.</p> <p>The length of bolts shall be such that the threaded portion of each bolt projects through the nut by at least one thread and by not more than four threads.</p> <p>Bolts, nuts, washers and fittings for fixing to steel shall have the same protective treatment as the steel.</p> <p>All fittings including nuts and bolts are to be spot-welded to stop removal and coating quality as the chain link fabric.</p> <p>Staples shall be D-section galvanized wire.</p> <p>- Panels: Height is to be 2m or 2.5m.(min 2m, max 2.5m overall fabric height and proper fencing to stop unauthorized entrance).</p> <p>Length / Width: is to be 3m for each panel and shall be checked in fully stretched condition. The Fabric shall be supplied in rolls of 15.0m to 20.0m. The supplied length shall be enough to surround the site from all directions.</p> <p>Wire Diameter: Nominal diameter of Mesh Wire shall be ≥ 3.15 mm.</p> <p>All wire and clips for fencing, including plastic coated wire, shall be galvanized steel.</p> <p>Barbed wire shall be galvanized and consist of two-line wires 2.5 mm dia and point 2.5 mm dia with 150 mm maximum distance between two barbs. Wires weighing shall be not less 110 g/m (minimum).</p>			
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	<p>Tension wire and chain link mesh for fencing shall be strained tightly between straining posts by using winding brackets.</p> <p>Barbed wire for fencing shall be strained tightly between straining posts by using eye bolts.</p> <p>Chain link mesh shall be secured at each straining post by a stretcher bar 8mm.</p> <p>Chain link mesh shall be tied to the line wire by tying wire at 450 mm intervals.</p> <p>The tension in the wire on each side of straining posts shall be equal.</p> <p>Wire shall not be strained until at least 14 days after concrete has been placed in the foundation</p> <p>-Posts and Rails</p> <ul style="list-style-type: none"> - Straining posts for fencing shall be provided at all ends and corners, at changes in direction, at abrupt changes in level, at gate posts and at intervals not exceeding 3m along straight lengths of fencing. Struts shall be fitted to straining posts in the direction of each wire secured to the post as detailed in the shop drawings. - Posts and struts for fencing shall be set in excavations for foundations and the excavations shall be filled with C25 concrete up to 50 mm below ground level. - The ground surface around posts shall be made good with the same material as in the adjoining area. - Corner posts are to be galvanized pipe \geq DN65. - Intermediate posts are to be galvanized pipe \geq DN50. - Single gate posts are to be galvanized pipe \geq DN50. - Double gate posts are to be galvanized pipe \geq DN65. - Top rail posts are to be galvanized pipe \geq DN50 or suitable MS Angle/MS Flat. - Bottom rails are to be galvanized pipe \geq DN50 or suitable MS Angle/MS Flat. - All posts must be completed with plastic or Galva bond metal cap. - Bracing rails, bracing stays and backstays if required are to be provided without joint and will be 32mm extra light nominal bore. - All rails will be securely connected to posts with galvanized bolted split clamp. - The steel shall not be welded after galvanizing unless permitted by the Engineer and if permitted, the welded areas shall be free of scale and slag and shall be treated with an alternative galvanizing or zinc coating system approved by the Engineer. - Post footings:- 			
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	<p>End/corner/gate posts are to be (W× L× H) 50cm x 50cm x 60cm Concrete base C20 for appropriate installation concrete footings.</p> <p>Intermediate posts are to be (W× L× H) 30cm x 30cm x 60cm Concrete base for appropriate installation and strength concrete footings.</p> <p>Above ground concrete finish is to be domed with steel trowel finish to eliminate water lying at base of posts and is to be completed at time of original concrete pour.</p> <p>Knotted joins in cable wire are not permitted.</p> <p>- Gates</p> <p>Gates to be manufactured from medium-quality galvanized pipe.</p> <p>Single/Double leaf gate</p> <p>Maximum width of gate to be 2.m.</p> <p>Gates to open 180 degrees and lock back against fence line where ground contour allow</p> <p>- Base plates.</p> <p>Base plates can be installed where suitable concrete pavement or similar surfaces are available. If required, there are to be 4 holes in a heavy-duty base plate.</p> <p>The base plates are to be fixed with heavy duty galvanized dyne bolts to the fence line by using suitable posts.</p> <p>Posts are to be fully secured and the bolt nuts are welded or burred to prevent removal.</p>			
15.0	Warranty			
	3 years product and performance warranty			
16.0	Others			
	End user training on operation and maintenance			
	Project board that contain the project information written in Arabic and English	1	pcs	

**Pls. attach delivery schedule, if relevant, and cluster by lot, if partial bids will be allowed. Specify delivery locations if goods multiple destinations.*

[Enter name of authorized staff]

[Designation]

[Click here to enter a date]

Annex 2**FORM FOR SUBMITTING SUPPLIER'S QUOTATION¹¹*****(This Form must be submitted only using the Supplier's Official Letterhead/Stationery¹²)***

We, the undersigned, hereby accept in full the UNDP General Terms and Conditions, and hereby offer to supply the items listed below in conformity with the specification and requirements of UNDP as per RFQ Reference No. RFQ-YEM-0067-2019 :

TABLE 1 : Offer to Supply Goods Compliant with Technical Specifications and Requirements

Item No.	Description/Specification of Goods	Quantity	Latest Delivery Date	Unit Price	Total Price per Item
1	Supply, Delivery, Installation, Testing and Commissioning of solar pumping system's in Hodidah (Almarawa'ah)	As mentioned in Annex 1	8 weeks		
2	Supply, Delivery, Installation, Testing and Commissioning of solar pumping system's in Hodidah (Almansoriah)	As mentioned in Annex 1			
3	Supply, Delivery, Installation, Testing and Commissioning of solar pumping system's in Hodidah (Alsokhnah)	As mentioned in Annex 1			
4	Supply, Delivery, Installation, Testing and Commissioning of solar pumping system's in Hodidah (Khamis Bani Sa'ad)	As mentioned in Annex 1			
	Total Prices of Goods¹³				
	Add : Cost of Transportation				
	Add : Cost of Insurance				
	Add : Other Charges (pls. specify)				
	Total Final and All-Inclusive Price Quotation				

¹¹ This serves as a guide to the Supplier in preparing the quotation and price schedule.

¹² Official Letterhead/Stationery must indicate contact details – addresses, email, phone and fax numbers – for verification purposes

¹³ Pricing of goods should be consistent with the INCO Terms indicated in the RFQ

TABLE 2 : Offer to Comply with Other Conditions and Related Requirements

Other Information pertaining to our Quotation are as follows:	Your Responses		
	<i>Yes, we will comply</i>	<i>No, we cannot comply</i>	<i>If you cannot comply, pls. indicate counter proposal</i>
Delivery Lead Time			
Estimated weight/volume/dimension of the Consignment:			
Country/ies Of Origin ¹⁴ :			
Warranty and After-Sales Requirements			
a) Training on Operations and Maintenance			
b) Minimum one (3) year warranty on both parts and labor			
c) Service Unit to be Provided when the Purchased Unit is Under Repair			
d) Brand new replacement if Purchased Unit is beyond repair			
e) Others			
Validity of Quotation			
All Provisions of the UNDP General Terms and Conditions			
Other requirements <i>[pls. specify]</i>			

All other information that we have not provided automatically implies our full compliance with the requirements, terms and conditions of the RFQ.

[Name and Signature of the Supplier's Authorized Person]
[Designation]
[Date]

¹⁴ *If the country of origin requires Export License for the goods being procured, or other relevant documents that the country of destination may require, the supplier must submit them to UNDP if awarded the PO/contract.*