

ANNEX - B

REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT CHANDNA, MIANWALI

SPECIFICATIONS AND BOQ			
Sr. No.	Description	Unit	Quantity
	TUBEWELL BAZAR AREA		
A	PUMPING MACHINERY		
1	Supplying and installation at site and testing of Submersible pumping unit having discharge of 0.5cusec against total head of 300ft with 200ft length of column pipe, bowl assembly coupled with 30 BHP or higher as recommended by the manufacturer, with complete top set, 380/440 volts, 50 Hz, A.C. Submersible electric motor including cost of piping reducers / adopters or any other necessary electro-mechanical component as required.	Set	1
2	Supply and installation of pump manufacturers made automatic motor control unit (MCU) for 30 BHP (rating to be matched with the motor proposed as part of item 1), electric motor comprising solar pumping inverter (35 kVA); main circuit breaker; contactors; motor protection relay including protection features such as thermal overload/overcurrent, over/under voltage, phase failure & phase reversal etc.; voltmeter and ampere meter; indication bulbs for ON, OFF and FAULT; current transformer (as required); push buttons (ON and OFF), all contained in a lockable steel cabinet complete with internal wiring, in all respects	Set	1
3	Safe dismantling of existing pumping machinery, including associated fittings and fixtures. The scope covers the complete disconnection of electrical, mechanical, and piping connections, removal of the equipment, and transportation of the dismantled components to the designated storage or departmental facility as instructed. All work must comply with safety standards and ensure no damage to the equipment or surrounding infrastructure.	Job	1
B	SOLARIZATION		
1	Solar PV Modules (Mono-Crystalline) A-Grade : S/I of Solar PV Module (Solar Panel) Mono-crystalline A-Grade N Type (per Watt)	Watt	45000
2	ATS : S/I Automatic Transfer Switch Capable of switching from PV solar to Wapda.	Watt	35000

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
3	Fixed Mounting Structure : Supply and Erection of hot dipped (80 microns Average) galvanized steel of minimum thickness of 12 SWG / 2.64 mm Channel / Pipe or 8 SWG /4.06 mm Angle	Per Watt	45000
4	Nuts/Bolts : Supply and Erection of Stainless Steel Nuts and Bolts	Watt	45000
5	Submersible Flat Cable 4-Core (AC Wiring) : S/I of Submersible Flat Cable made of 99.9% copper, coated with double PVC as per BSS Standards, 4x25 mm ²	Meter	100
6	DC Cable (Red) : S/I Single core double insulated cable (35 mm ²)	Meter	20
7	DC Cable (Black) : S/I Single core double insulated cable (35 mm ²)	Meter	20
8	Cable Ties : Supply and Installation Cable Ties (100 pieces pack)	Each	7
9	MC4 Connectors : S/I Supply and Erection MC4 connector (TUV Approved)	Pair	7
10	Earthing : Supply and Erection of Complete Earthing unit	Watt	45000
11	Cables/wires (Red DC Wiring) : S/I Pure copper 6mm ² XLPE/XLPO for PV to junction Box. Positive	Meter	20
12	Cables/wires (Black DC Wiring) : S/I Pure copper 6mm ² XLPE/XLPO for PV to junction Box. Negative	Meter	20
13	Current Oriented Single Pole DC Breaker: S/I Suitable Capacity Breakers for each string, 15 A	Each	7
14	Junction Box : S/I Hot dipped galvanized SWG 14	Watt	45000
15	PVC Pipe : S/I PVC Flexible Pipe 2" i/d	Meter	20
16	RCC foundation : RCC in roof slab, beam, column & other structural members, insitu or precast. (1:2:4)	100m ³	3

Note:

- a. Vendor has to verify the design on ground by physically visiting the site
- b. Vendor has to perform BED Test (to evaluate the performance of water pumps under various conditions - assess key parameters such as flow rate, head pressure, power consumption, and efficiency) and share the report
- c. Provision and installation of above mentioned on site in complete respect
- d. Vendor has to ensure smooth and uninterrupted water supply at tail end

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
	<u>IPS AT LAL TANKI AREA</u>		
A	PUMPING MACHINERY		
1	Supplying and installation at site and testing of Vertical Turbine pumping unit having discharge of 0.5cusec against total head of 300ft with 30ft length of column pipe, bowl assembly coupled with 30 BHP or higher as recommended by the manufacturer 380/440 volts, 50 Hz, A.C. Vertical electric motor including cost of electro-mechanical component as mentioned.	Set	2
2	Supply and installation of ASD pump manufacturers made automatic motor control unit (MCU) for 30 BHP (rating to be matched with the motor proposed as part of item 1), electric motor comprising ASD star-delta starter; main circuit breaker; contactors; motor protection relay including protection features such as thermal overload/ overcurrent, over/under voltage, phase failure & phase reversal etc.; voltmeter and ampere meter; indication bulbs for ON, OFF and FAULT; current transformer (as required); push buttons (ON and OFF), all contained in a lockable steel cabinet complete with internal wiring, in all respects	Set	2
3	Safe dismantling of existing pumps, including associated fittings and fixtures. The scope covers the complete disconnection of electrical, mechanical, and piping connections, removal of the equipment, and transportation of the dismantled components to the designated storage or departmental facility as instructed. All work must comply with safety standards and ensure no damage to the equipment or surrounding infrastructure.	Job	1
B-1	SOLARIZATION - SYSTEM-1		
1	Solar Panel (PV module) mono-crystalline, A Grade, 20% Module efficiency minimum and 25 years power output warranty, IEC 61215 and IEC 61730 certified.	per Watt	14625
2	Supply and Installation of On Grid Inverter (Grid Tie Inverter)	per Watt	15000

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
3	Customized Elevated H-Beam Structure minimum 8 SWG with C-Channel for PV Panels Mounting as per Site Requirement	per Watt	14625
4	Supply and Erection of Stainless Steel Nuts and Bolts	per Watt	14625
5	Single Core DC Flexible Copper Cables 6mm sq from PV module to DC Combiner box and from DC Combiner Box to Inverter	R.M	300
6	DC Breakers 32A-2P between DC combiner box and Inverter	No	2
7	AC Cables 6 mm sq (4 core) from Main Distribution Box (MDB) to inverter then back to MDB	R.M	30
8	32 Amp 4-P MCCB Breaker btw WAPDA & Inverter	No	1
9	2 Pole Surge Protection device at DC inputs	No	2
10	4 Pole Surge Protection device at AC input	No	1
11	S/I Supply and Erection MC4 connector (TUV Approved)	No	4
12	Supply, Installation and Commissioning of 18 SWG Powder Coated Combiner Box for housing Circuit Breakers, DC Surge Protective Devices and AC Surge Protective Devices having Grounding Busbar with Digital Multimeter (Voltmeter and Ammeter), showing Current and Voltage of each Phase. All circuits must be properly tagged as per site installations	No	1
13	Lightening Arrestor having 1" dia & 1m long rod with 5 spikes ball & base, Earthing Plate 1" x 1" x 4mm, Earthing Rod 6 Feet Long 16 mm Dia, and 16 mm ² Earthing Cable, all made of Copper material, and Earthing powder.	No	1
14	Inauguration/Sign Board	No	1
15	Civil foundation work, HDPE pipe, Flexible PVC pipe, PVC ducts etc for cable ducting, Copper thimbles, sleeves, Butt joint connectors, Ring thimbles, PVC shrouds, Heat shrink tubes for all termination, connection and jointing as per International practices. DC Combiner box. Dry chemical powder Fire Extinguisher 6Kg capacity complete in all respect. Inverter, Batteries and Protective Devices must be Labelled Properly along with detail user manual.	Job	1

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
16	Preparation & Submission of Complete Net-Metering Case as per the guidelines of FESCO, AEDB, NEPRA including Supply and Installation of Bi-directional Meter, Extension of Load, Approved Energy Meter with all requisite utility fee on behalf of the Employer and fulfillment of all prescribed formalities, complete in all respect.	Job	1
B-2	SOLARIZATION - SYSTEM-2		
1	Solar Panel (PV module) mono-crystalline, A Grade, 20% Module efficiency minimum and 25 years power output warranty, IEC 61215 and IEC 61730 certified.	per Watt	14625
2	Supply and Installation of On Grid Inverter (Grid Tie Inverter)	per Watt	15000
3	Customized Elevated H-Beam Structure minimum 8 SWG with C-Channel for PV Panels Mounting as per Site Requirement	per Watt	14625
4	Supply and Erection of Stainless Steel Nuts and Bolts	per Watt	14625
5	Single Core DC Flexible Copper Cables 6mm sq from PV module to DC Combiner box and from DC Combiner Box to Inverter	R.M	300
6	DC Breakers 32A-2P between DC combiner box and Inverter	No	2
7	AC Cables 6 mm sq (4 core) from Main Distribution Box (MDB) to inverter then back to MDB	R.M	30
8	32 Amp 4-P MCCB Breaker btw WAPDA & Inverter	No	1
9	2 Pole Surge Protection device at DC inputs	No	2
10	4 Pole Surge Protection device at AC input	No	1
11	S/I Supply and Erection MC4 connector (TUV Approved)	No	4
12	Supply, Installation and Commissioning of 18 SWG Powder Coated Combiner Box for housing Circuit Breakers, DC Surge Protective Devices and AC Surge Protective Devices having Grounding Busbar with Digital Multimeter (Voltmeter and Ammeter), showing Current and Voltage of each Phase. All circuits must be properly tagged as per site installations	No	1

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
13	Lightening Arrestor having 1" dia & 1m long rod with 5 spikes ball & base, Earthing Plate 1" x 1" x 4mm, Earthing Rod 6 Feet Long 16 mm Dia, and 16 mm ² Earthing Cable, all made of Copper material, and Earthing powder.	No	1
14	Inauguration/Sign Board	No	1
15	Civil foundation work, HDPE pipe, Flexible PVC pipe, PVC ducts etc for cable ducting, Copper thimbles, sleeves, Butt joint connectors, Ring thimbles, PVC shrouds, Heat shrink tubes for all termination, connection and jointing as per International practices. DC Combiner box. Dry chemical powder Fire Extinguisher 6Kg capacity complete in all respect. Inverter, Batteries and Protective Devices must be Labelled Properly along with detail user manual.	Job	1
16	Preparation & Submission of Complete Net-Metering Case as per the guidelines of FESCO, AEDB, NEPRA including Supply and Installation of Bi-directional Meter, Extension of Load, Approved Energy Meter with all requisite utility fee on behalf of the Employer and fulfillment of all prescribed formalities, complete in all respect.	Job	1
C	CIVIL WORK		
1	Dismantling of one room quarter structure (including toilet) Brick Masonry / Concrete Works and removal of Doors / Windows including, while utilizing the bricks in the repair of boundary wall. Disposal of all surplus material outside the site premises in the range of 200m radius, as advised by the in-charge on site.	Job	1
2	Repairing/construction of existing 350Rft boundary wall and increasing the height of the existing brick masonry wall to the height of 6ft where required, including surface preparation, material supply (bricks, mortar, and reinforcement if required), construction, and alignment to match the existing structure. The work also includes curing, finishing, and ensuring stability.	Job	1
Note:			
a. Vendor has to verify the design on ground by physically visiting the site			

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
b.	Vendor has to perform BED Test (to evaluate the performance of water pumps under various conditions - assess key parameters such as flow rate, head pressure, power consumption, and efficiency) and share the report		
c.	Provision and installation of above mentioned on site in complete respect		
d.	Vendor has to ensure smooth and uninterrupted water supply at tail end		

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
	<u>TOLA MOR</u>		
A	SOLARIZATION		
1	Solar Panel (PV module) mono-crystalline, A Grade, 20% Module efficiency minimum and 25 years power output warranty, IEC 61215 and IEC 61730 certified.	per Watt	45000
2	Supply and Installation of On Grid Inverter (Grid Tie Inverter)	per Watt	45000
3	Supply and Erection of hot dipped (80 microns Average) galvanized steel of minimum thickness of 12 SWG / 2.64 mm Channel / Pipe or 8 SWG / 4.06 mm Angle as per Site Requirement	per Watt	45000
4	Supply and Erection of Stainless Steel Nuts and Bolts	Watt	45000
5	Single Core DC Flexible Copper Cables 6mm sq from PV module to DC Combiner box and from DC Combiner Box to Inverter	R.M	600
6	DC Breakers 32A-2P between DC combiner box and Inverter	No	6
7	AC Cables 25 mm sq (4 core) from Main Distribution Box (MDB) to inverter then back to MDB	R.M	30
8	100 Amp 4-P MCCB btw WAPDA & Inverter	No	1
9	2 Pole Surge Protection device at DC inputs	No	6
10	4 Pole Surge Protection device at AC input	No	1
11	Supply, Installation and Commissioning of 18 SWG Powder Coated Combiner Box for housing Circuit Breakers, DC Surge Protective Devices and AC Surge Protective Devices having Grounding Busbar with Digital Multimeter (Voltmeter and Ammeter), showing Current and Voltage of each Phase. All circuits must be properly tagged as per site installations	No	1
12	S/I Supply and Erection MC4 connector (TUV Approved)	No	4
13	Lightening Arrestor having 1" dia & 1m long rod with 5 spikes ball & base, Earthing Plate 1" x 1" x 4mm, Earthing Rod 6 Feet Long 16 mm Dia, and 16 mm ² Earthing Cable, all made of Copper material, and Earthing powder.	No	1
14	Inauguration/Sign Board	No	1

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
15	Civil foundation work, HDPE pipe, Flexible PVC pipe, PVC ducts etc for cable ducting, Copper thimbles, sleeves, Butt joint connectors, Ring thimbles, PVC shrouds, Heat shrink tubes for all termination, connection and jointing as per International practices. DC Combiner box. Dry chemical powder Fire Extinguisher 6Kg capacity complete in all respect. Inverter, Batteries and Protective Devices must be Labelled Properly along with detail user manual.	Job	1
16	Preparation & Submission of Complete Net-Metering Case as per the guidelines of FESCO, AEDB, NEPRA including Supply and Installation of Bi-directional Meter, Extension of Load, Approved Energy Meter with all requisite utility fee on behalf of the Employer and fulfillment of all prescribed formalities, complete in all respect.	Job	1

Note:

- a. Vendor has to verify the design on ground by physically visiting the site
- b. Provision and installation of above mentioned on site in complete respect

**REPLACEMENT OF EXISTING PUMPING MACHINERY AND SOLARIZATION IN KOT
CHANDNA, MIANWALI**

SPECIFICATIONS AND BOQ

Sr. No.	Description	Unit	Quantity
	DIESEL ENGINE-DRIVEN WELDER/AC GENERATOR		
A	ENGINE		
	Turbo Charged Diesel Engine; Water Cooled; Exhaust System with flame/ Spark Arrestor; Power 3600 rpm; Fuel Tank Capacity: Min. 06 hours at full load; Fuel cap of fuel tank should be lockable Complete with welding plant as one unit		
B	CONTROL PANEL		
	Following meters should be installed: <ul style="list-style-type: none"> • Hours meter • Volt meter • Ammeter • Cooling water temperature guage • Oil pressure guage • Speedometer • On/Off switch 		
C	GENERATOR	Set	1
	Electric welding generator should have following specifications: <ul style="list-style-type: none"> • Current Range- 50-240 A • Voltage range. 40-220 V • Generator Capacity: 5 kVA • Mounted on 04 wheeler (tubeless tyres) with iron frame 		
D	GENERATOR COVER		
	Corrosion resistant 16 SWG galvanized sheet case with side panels, hand operated locks and handrails		
E	ACCESSORIES		
	<ul style="list-style-type: none"> • 20 meter Earthing lead (16mm²) and 50 meter welding lead (16mm²) with welding holder rolled on hand-driven portable cable reel • Spanner set and other necessary tools within the toolbox 		

SOLAR PUMP INVERTER SPECIFICATIONS

Sr. No.	Description
1	The solar pump inverter should have built-in advance version of Auto MPPT controller, over load protection, Soft start/Soft Stop Features and Variable Frequency Drive (VFD) with integrated Gate Bipolar Transistors (IGBTs) of European, USA or Japanese origin or at least equivalent.
2	The inverter offered should comply to or Equivalent standards:
	CE/RoHS
	Low Voltage Directive 2014/35/EU
	EMC Directive 2014/30/EuOS
	IEC 62109-1 (Safety of Power Converters for use in PV Systems)
3	Efficiency of inverter should be 96% and above at Rated Capacity.
4	Efficiency of MPPT should be 98% and above.
5	The inverter ingress protection of inverter must be minimum IP 65 Rating or above.
6	Inverter / Controller having the capability to run both on AC and DC Power would be given, preference.
7	Inverter should have at least three (3) years product and performance warranty.
8	The Pump Controller/Inverter should have an ON/OFF Switch/Button to Start and Stop the Pump. Inverter should port have can active used for RS232 Remote /485 Monitoring etc. communication port available, the data available through this port available can be used for remote communication,
9	Inverter circuit must include protection against:
	Over or Low voltages and currents beyond critical level of the inverter's circuits.
	Protection against accidental short circuits & reverse polarity connections.
	Protection against lightning induced transients Over load protection.
	Low RPM Protection (i.e: Frequency < 30 Hz or as per pump characteristic curve) Motor Should Stop.
	Dry run protection. (PF / Current Based).

GRID-TIE / ON-GRID INVERTER SPECIFICATIONS

Sr. No.	Description
1	UL-1741 Certified or IEC 62109-1 and IEC 62109-2 or Equivalent Certificates.
2	Minimum 95% Conversion Efficiency at rated capacity (High Frequency Inverters).
3	The inverter should have built-in MPPT controller.
4	Rated output voltage of inverter / Controller shall be pure sine wave AC.
5	Total Harmonic Distortion (THD) in AC output should not exceed 3% at rated capacity.
6	The degree of protection of the ON-Grid Inverter Installation should be IP-65 rated.
7	Wide input voltage range capability. (i.e: Voltage Range can be adjustable / selectable)
8	Natural convection cooling for maximum reliability.
9	Outdoor enclosure for unrestricted use under any environmental conditions
10	The output of the inverter must synchronize automatically its AC output to the exact AC voltage and frequency of the grid.
11	Inverter should have active RS232/485 etc communication port, the Data available through this port can be used for Remote Monitoring.
12	Liquid crystal display should at least be provided on the inverters front panel or on separate data logging/display device to display following
	a. DC Input Voltage
	b. DC Input current
	c. AC Power output (kW)
	d. Converter status
13	Inverter circuit must include protection against:
	Over or Low voltages and currents beyond critical level of the inverter's circuits.
	Protection against accidental short circuits.
	Protection against lightning induced transients.
	Over load protection.