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IBA
Institute of Business Administration Karachi

Financial Proposal For Design, Supply, Installation, Testing & Commissioning of

- **146.26 kWp**

Carport Grid Tied Utility Interactive Photo Voltaic Solar Power System at IBA Main Campus Karachi

Bidder: **Ideal Power Solutions (Pvt) Ltd.**

Address: **D-197, Block 5, KDA Scheme 2, Clifton, Karachi.**

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Tender # CW/05/26-27

SCHEDULE - A TO BID: SCHEDULE OF PRICES

A. Price Schedule of Solar PV Systems

SUMMARY OF BID PRICES

Item No.	Description	Total Installed Capacity (kWp)	Amount (PKR)	Total Unit Generation Yearly (Minimum) kWh
(A)	Design, Supply, Installation, Testing & Commissioning of 146.26kWp Carport Grid Tied Utility Interactive Photo Voltaic Solar Power System	146.26	27,965,773.35	228,200 kWh.
TOTAL COST OF THE PROJECT WITHOUT TAX			24,358,447.58	
TOTAL COST OF THE PROJECT WITH TAX			27,965,773.35	
TOTAL COST OF THE PROJECT PER WATT WITH TAX			191.21	

IDEAL POWER SOLUTIONS (PVT) LTD PROJECT SALES DEPARTMENT

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Tender # CW/05/26-27

BOQ SOLAR PV SYSTEM AT IBA MAIN CAMPUS - ESTIMATED CAPACITY 146.26 kWp

Item No.	Product	Unit	Qty	Unit Price (PKR)	Amount without Tax (PKR)	Tax Amount (PKR)	Amount with Tax (PKR)
1	**MODULE MOUNTING STRUCTURE**						
	BOUNDARY WALL CARPORT						
i)	Supply of PV Mounting structure in MS Iron with footings. The mounting structures and the civil concrete footings must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) minimum wind speed 35m/s with 3sec of gust pressure in harsh environment. The design submission must be as per ASTM-A36 and ASCE 7-10. The mounting structure components are bonded together to guarantee potential equalization. The work is to be carried out strictly as per attached drawings approved by IBA Engineer. Supply, Fabrication and the rate quoted is inclusive of the following:	Watt	146,260	50.00	6,197,457.63	1,115,542.37	7,313,000.00
a	Layout at Site approved by IBA Engineer as per attached drawing						
b	Civil work as per attached drawing and specifications approved by IBA Engineer.						
c	Placing of J Bolts, Nuts bolts as per attached drawing approved by IBA Engineer.						
d	Tilt angle is to be maintained as per recommended.						
e	The Contractor shall remove all the debris and clear the site before & after the completion of work as per IBA direction						
f	After completion of the work the contractor shall submit the as-built drawing.						
g	All Allen bolts, nuts, bolts, washers, spring washers and screws for the project should be Stainless steel (SS 316).						
h	Applying protective coating system on MS steel structure, including proper surface preparation by mechanical cleaning to remove rust, mill scale, dust, oil, grease, and other contaminants. The coating system shall comprise two coats of Jotun Jotamastic 90 epoxy primer followed by two coats of Jotun Hardtop XP polyurethane topcoat, complete as per manufacturer's specifications, including all materials, labor, tools, equipment, and surface preparation.						

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2	PV MODULES - 186.66 KWp	Unit	Qty	Unit Price (PKR)	Amount without Tax (PKR)	Tax Amount (PKR)	Amount with Tax (PKR)
i)	Supply of N-Type or any latest tech. Bifacial Photovoltaic Solar Modules Tier 1 Type anti-reflective high transparency low iron tempered glass, with earthing provision. The modules STC parameters must be as under: (a) Min Power Pmax 710 or above Wp rated power (b) Junction Box Protection Degree, IP 68 (c) Connection box, 4.0mm2 conductor cross section, (d) Cable with, MC4 male and female connectors, (e) Anodized Aluminum Frame and Support Bars (f) PVC duct, Clamps & Accessories, support and labels to be installed under PV Array. The Contractor shall provide manufacturer warranty for solar panel for a period not less than 25 years. Contractor must submit all the required certificates for each PV solar panel from manufacturer as per specification. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval. Make: Jinko/Longi/Canadian	Watt	146,260.00	66.33	8,819,810.41	881,981.04	9,701,791.45

3	GRID-TIED INVERTER (PCU)	Unit	Qty	Unit Price (PKR)	Amount without Tax (PKR)	Tax Amount (PKR)	Amount with Tax (PKR)
i)	Supply of DC/AC grid tie 3-phase inverter with data communication unit with Ethernet connection. The inverter with must be suited to any PV module configuration, and depending on the system design and installation proposed and for the future extended also. (Leading Market brand, having annual production greater than 1GW). The DC max power input rating should be at least 1.2 times of AC power at standard test condition (STC). The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter must include safety concepts such as (triple protection with Opti protect, electronic strings fuses, self-learning string failure detection, DC surge arrestor type (2) to ensure max availability. The inverter includes online monitoring with Wi-Fi Dongle. All works and materials must be according to the drawings, specifications and supervisor engineer instructions and approval. Make: Sungrow/Huawei/SMA Power Rating: 110KW to 125KW.	Each	1.00	1,240,000.00	1,050,847.46	189,152.54	1,240,000.00

	Brief specification is as under:
a	Max Input DC Voltage: 1100V
b	MPPT Operating Voltage Range: 200V~1000V
c	Min 09 Independent MPPT Trackers
d	Minimum Efficiency 98.0%
e	Warranty: 5 Years (Extendable to 10 Years)
f	Minimum IP rating should be IP65

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ii)	Supply of DC/AC grid tie 3-phase inverter with data communication unit with Ethernet connection. The inverter with must be suited to any PV module configuration, and depending on the system design and installation proposed and for the future extended also. (Leading Market brand, having annual production greater than 1GW). The DC max power input rating should be at least 1.2 times of AC power at standard test condition (STC). The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter must include safety concepts such as (triple protection with Opti protect, electronic strings fuses, self-learning string failure detection, DC surge arrestor type (2) to ensure max availability. The inverter includes online monitoring with Wi-Fi Dongle. All works and materials must be according to the drawings, specifications and supervisor engineer instructions and approval. Make: Sungrow/Huawei/SMA Power Rating: 50KW to 60KW.	Each	1.00	640,000.00	542,372.88	97,627.12	640,000.00
	Brief specification is as under:						
a	Max Input DC Voltage: 1100V						
b	MPPT Operating Voltage Range: 200V~1000V						
c	Min 04 Independent MPPT Trackers						
d	Minimum Efficiency 98.0%						
e	Warranty: 5 Years (Extendable to 10 Years)						
f	Minimum IP rating should be IP65						
4	**COMBINER BOXES**	**Unit**	**Qty**	**Unit Price (PKR)**	**Amount without Tax (PKR)**	**Tax Amount (PKR)**	**Amount with Tax (PKR)**
a	**DC COMBINER BOX**						
i)	Supply of DC box/Array Junction Box 14-gauge wall/frame mounted, Colour Code: RAL7035, MS Powder Coated with all accessories for outdoor usage IP65, proper cable glands as per cable size, slotted cable ducts should be installed for internal DC cabling. DC Combiner Box shall be provided with One DC Breaker 4Pole per string. DC Breaker 4Pole 25A/32A,1000VDC, Qty=20 DC Breaker Make: ABB/Zjbeny/Dehn/Chint	Each	1.00	150,000.00	127,118.64	22,881.36	150,000.00

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b	**AC COMBINER BOX (LV PANEL)**						
i)	Supply of AC Combiner Box (LV Panel) with RCC pad floor standing Locally fabricated in 14 gauge with complete frame structure fitting scheme, Railing, Colour Code: RAL7035, MS Powder Coated minimum 2 coats, Phase indication lights, Tin Coated Copper Busbar for 3 Phases with colour coded heat shrinkable sleeves, Neutral & Earth with Polycarbonate cover sheet. Brass glands at bottom In & Out, CT's, Energy meter, Nameplates and labeling, Door-activated light, flame retardant low smoke (FRLS) cable Color-coded, ferruled, and properly terminated with all related accessories for outdoor usage IP65. AC Breaker 250A, Isc= 36kA, 4P,MCCB,400V/415V, Qty:01 AC Breaker 125A, Isc=36kA, 4P,MCCB,400V/415V, Qty:01 Main AC Breaker 400A Adj, Isc=50kA, 4P, MCCB, 400V/415V, Qty:01 AC SPD 4Pole Type-II, 65kA with HRC Fuses Energy Meter: Janitza CT's: Ficco/Saci MCCB Make: ABB/Schneider SPD Make: ABB/Schneider/Dehn Busbar Make: Luvata Tin Coated Copper Busbar HRC Fuses Make: Schnieder/ABB/Voltron or Equivalent Documentation: (Wiring diagram, Panel GA drawing, Manufacturer's test certificates, IP rating certification) Protection & Safety: (Overload, short-circuit, and earth fault protection, Lockable doors and breakers for safety, Earthing studs provided inside and outside the panel, Door Hinged type with gasket for weatherproofing; pad lockable handle, Gasket Neoprene or EPDM for dust and water seal, IP Rating: Certified IP65 as per IEC 60529 - fully dust-tight and protected against water jets) Note: For the AC combiner box, use tin coated copper links for each breaker on both the incoming and outgoing sides, including the main breaker. Direct cable termination at the breaker will not be allowed.	Each	1.00	650,000.00	550,847.46	99,152.54	650,000.00

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5	CABLES	Unit	Qty	Unit Price (PKR)	Amount without Tax (PKR)	Tax Amount (PKR)	Amount with Tax (PKR)
a	**DC CABLES**						
	Supply of DC Cable, 1 Core 6mm2 Cu/XLPO/XLPO cable complete in all respect with accessories to connect the PV solar cells together and to the inverter directly to have a complete operational circuit, clamps, trays and cable end terminations which shall be DC plug and socket connectors. The allowable voltage drop for DC cables between PV Arrays and inverter should be less than 2%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.5kV DC, Standard Double insulated: Cross link polyolefin, Tinned copper conductor: Cable should be Certified from TUV Approved. Standard: EN50618 Make: Pakistan Cable/Fast Cable/Kuka/ Jiukai as IBA Engineer Approved.	Meter	4,500.00	310.00	1,182,203.39	212,796.61	1,395,000.00
b	**AC Cables**						
	Supply of the power cables with all required works in different sizes of ducts/pipes, Cable lugs, Clamps and all needed fittings to connect cables terminals from source to destination with LV termination kit (Raychm). According to drawings, specifications, instructions, and demand of the supervising engineer as follow: Brand: Pakistan Cable/Fast Cable as IBA Engineer Approved.						
i)	4C x 95mm2,0.6/1kV Cu/PVC/PVC STD Pure Copper	Meter	15.00	21,400.00	272,033.90	48,966.10	321,000.00
ii)	4C x 35mm2,0.6/1kV Cu/PVC/PVC STD Pure Copper	Meter	15.00	7,906.00	100,500.00	18,090.00	118,590.00
iii)	4Cx240mm2,0.6/1kV Cu/PVC/PVC STD Pure Copper	Meter	35.00	54,367.00	1,612,580.51	290,264.49	1,902,845.00
c	**Earthing Cables**						
	Supply, Installation & Testing of Earthing Cable, Including uPVC Pipe with related accessories. Brand: Pakistan Cable/Fast Cable as IBA Engineer Approved.						
i)	1 core 2.5 sqmm, CU/PVC/FLEX (Green) from panel to panel	Meter	270.00	180.00	41,186.44	7,413.56	48,600.00
ii)	1 core 6 sqmm, CU/PVC/FLEX (Green) from panel/Structure to ECP	Meter	60.00	392.00	19,932.20	3,587.80	23,520.00
iii)	1 core, 50 sqmm, CU/PVC/STD (Green) from Inverter to LV Panel	Meter	15.00	2,672.00	33,966.10	6,113.90	40,080.00
iv)	1 core, 16 sqmm, CU/PVC/STD (Green) from Inverter to LV Panel	Meter	15.00	846.00	10,754.24	1,935.76	12,690.00
v)	1 core, 120 sqmm, CU/PVC/STD (Green) from LV Panel to ECP	Meter	30.00	7,960.28	202,380.00	36,428.40	238,808.40

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D-197, KDA Scheme 2,
Block 5, Clifton, Karachi, 75600.

6	**EARTHING SYSTEM**						
i)	Supply, Installation, testing and commissioning of Earth Electrodes (Rod Type) for Earthing System with 25mm Dia 3 meters (10feet) long driven Pure copper Solid rod, tin coated pure copper busbar 50 mm (width) x 6 mm (thickness). complete with clamps lugs, washer/bolts, connected with 1x70mmsq bare copper 50mm dia G.I pipe/UPVC pipe class 'D/E' up to Earth chamber, job includes copper conductor to earth electrode rod at one end and provision/fixing of cable lugs at other end, including all accessories and RCC inspection chamber, heavy duty G.I. Cover having earth symbol, etc as per the specifications and drawings and to the entire satisfaction and approval of the IBA Engineer. Minimum depth of the earth pit should be 80ft, Earthing result should be less than 1 Ohm for AC/DC/LA	Each	3.00	138,000.00	360,000.00	54,000.00	414,000.00
7	**DATA LOGGER REMOTE MONITORING SYSTEM**						
i)	Supply of Data Logger Remote Monitoring System with cat6/fiber cable as per site requirement for internet connectivity consists of the following parameter: a) Total energy generation of PV Plant. b) Instantaneous Power been generated by solar PV plant. c) Current load of client. d) Load profile v/s energy generation. e) Daily Solar Plant generation report in PDF/Excel format.	Each	1.00	170,000.00	144,067.80	25,932.20	170,000.00
8	**CABLE TRAY**						
i)	Supply of following sizes 14SWG heavy Duti Perforated Powder coated Colour Code RAL 7035 as per site requirement. Cable Tray 150mm x 100mm. Complete with all installation material such as angle iron support of size, round bar, elbows, Tee, Washer, Hilti drop-in anchor, etc. Complete in all respects, as per the specification and drawings.	Meter	20.00	3,500.00	59,322.03	10,677.97	70,000.00
ii)	Supply of following sizes 14SWG heavy Duti Perforated Powder coated Colour code RAL 7035 as per site requirement. Cable Tray 100mm x 75mm. Complete with all installation material such as angle iron support of size, round bar, elbows, Tee, Nuts, Bolts, Washer, Hilti drop-in anchor, etc. Complete in all respect, as per the specification and drawings.	Meter	135.00	2,800.00	320,338.98	57,661.02	378,000.00

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9	**MISCELLANEOUS ITEMS**						
i)	Supply of 3-inch UPVC SCH 40 conduit sockets, Bends, Elbows, T-Joints, G.I Clamps, complete in all respects. Make: Dadex/Jeddah/Galco/Steelex as IBA Engineer Approved.	Meter	30.00	1,320.00	33,559.32	6,040.68	39,600.00
ii)	Supply of 2-inch UPVC SCH 40 conduit sockets, Bends, Elbows, T-Joints, G.I Clamps, complete in all respects. Make: Dadex/Jeddah/Galco/Steelex as IBA Engineer Approved.	Meter	50.00	640.00	27,118.64	4,881.36	32,000.00
iii)	Supply of 1-inch UPVC SCH 40 conduit sockets, Bends, Elbows, T-Joints, G.I Clamps, complete in all respects. Make: Dadex/Jeddah/Galco/Steelex as IBA Engineer Approved.	Meter	40.00	330.00	11,186.44	2,013.56	13,200.00
iv)	Supply of 6-inch G.I conduit sockets, Bends, Elbows, T-Joints, G.I Clamps, complete in all respects. Make: IIL as IBA Engineer Approved.	Meter	20.00	3,600.00	61,016.95	10,983.05	72,000.00
v)	Supply and installation of a shed structure fabricated from 10-gauge steel, designed for Inverters, AC combiners, and DC combiners. The structure shall be engineered to safely withstand all relevant static loads, including the weight of equipment, and wind pressure corresponding to a minimum wind speed of 35 m/s. Structural and Installation Requirements: *The structure shall include complete footing works suitable for site conditions. *Minimum spacing of 500 mm shall be maintained between each inverter. *RCC Concrete 3000PSI footing pads shall be constructed. *Shed dimensions shall be adequate to accommodate the installation of at least two inverters, DC combiner boxes and AC combiner box, or as per actual site layout requirements. *All fasteners including nuts, bolts, plain washers, spring washers, Rawal bolts, and any other hardware components shall be of stainless steel grade SS316 to ensure corrosion resistance and durability. *The complete shed structure shall be finished with a minimum of two coats of weather-resistant powder coating suitable for outdoor environmental conditions.	Job	1.00	500,000.00	423,728.81	76,271.19	500,000.00
vi)	Supply & Installation of 400A TP MCCB in existing LV Panel, including installation, testing, and commissioning. Ensure new breakers should be compatible with physical size and mounting to fit existing panels. Use appropriate insulation sleeves or heat shrink for phase identification. All installations to follow manufacturer's torque settings and guidelines. Ensure proper alignment and mechanical fixing using SS hardware.	Job	1.00	150,000.00	127,118.64	22,881.36	150,000.00

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11	SERVICES	Unit	Qty	Unit Price (PKR)	Amount without Tax (PKR)	Tax Amount (PKR)	Amount with Tax (PKR)
	Designing, Fabrication, Installation, Testing & Commissioning of following items complete in all respects:						
i - xi)	i) Fabrication, Installation, Testing & Commissioning of PV Mounting structure ii) Installation, Testing & Commissioning of Photovoltaic Solar Modules iii) Installation, Testing & Commissioning of Grid tie 3-phase Inverter with data communication unit with Ethernet connection iv) Installation, Testing & Commissioning of DC Box/Array Junction Box 14-gauge wall mounted with all accessories for outdoor usage v) Installation, Testing & Commissioning of AC Combiner Box (LV Panel) 14 gauge with all accessories for outdoor usage vi) Installation, Testing & Termination of DC Cable, 1 Core 6mm2 Cu/XLPO/XLPO cable complete in all respect with accessories vii) Installation, Testing & Termination of the AC power cables complete in all respect with accessories viii) Installation, Testing & Termination of Earthing Cables complete in all respect with	Watt	146,260.00	2.51	319,390.00	47,908.50	367,298.50
xii)	Re-fixing pavers/Tiles/ Road Cutting as in position including providing sand, backfilling etc for AC & DC cables as per site requirements.	Job	1.00	400,000.00	347,826.09	52,173.91	400,000.00
xiii)	Removal/Cutting of trees or shrubs at designated places for avoiding shadow at solar structure. Contractor also removes the debris/Trees from the site before start of the project and after completion of the project.	Job	1.00	92,000.00	80,000.00	12,000.00	92,000.00
xiv)	Removal/dismantling of street lighting poles at designated places for avoiding shadow at solar structure. The dismantled poles were subsequently transported safely from the IBA Main Campus to the IBA Staff Town scrap yard without any damage.	Job	1.00	500,000.00	434,782.61	65,217.39	500,000.00
xv)	Construct of concrete manholes/cable chambers (600mm x 600mm x 600mm deep) with heavy duty RCC covers with anti-rust paint, including all required sleeves for pulling underground power cables laid in pipes.	Each	5.00	28,750.00	125,000.00	18,750.00	143,750.00

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12	OPERATION & MAINTENANCE	Unit	Qty	Unit Price (PKR)	Amount without Tax (PKR)	Tax Amount (PKR)	Amount with Tax (PKR)
i)	Two years of operations and maintenance is an integral activity of this EPC project, which will determine the success of this project. It is to be noted that 2 years O&M will be initiated after project closet is intended that the project performs as per design "Performance Commitment Table" while also maintaining the project to ensure reliability and longevity for 25 years. Industry best practices to be used to operate and maintain the solar PV Project. All necessary preventive and corrective actions to be shared and implemented before the start of the O&M contract. The following key performance metrics to be monitored and reported are as follows: - Cleaning of solar panels to remove dirt, dust, and debris (minimum twice in a month). - Inspection of cables, connectors, junction boxes, and grounding systems. - Tightening of bolts, screws, and clamps in mounting structures. - Identifying and resolving faults in modules, inverters, or other components. - Rapid response to critical failures to minimize downtime. - Tracking key performance indicators (KPIs) such as energy output, PR (performance ratio), and system availability. - Implementing software updates for inverters and monitoring systems. - Managing claims for defective components under warranty. - Implementing and maintaining safety measures for O&M personnel. Performance Ratio (burn test) to be carried out for 15 days once project is completely installed and ready for testing. Monthly reports to be shared covering all aspects of solar PV performance including an event log. Any system under performance or failure of equipment will automatically trigger the requirement of a detailed root cause analysis RCA (based on site-based tests) and a report will have to be submitted at the earliest completion of an RCA.	Watt	146,260.00	5.66	720,000.00	108,000.00	828,000.00

Total Cost in PKR without Tax	**24,358,447.58**
Total Tax Amount	**3,607,325.77**
Grand Total Amount in PKR with Tax	**27,965,773.35**

Grand Total Amount Rupees in Words: Rupees Twenty-Seven Million Nine Hundred Sixty-Five Thousand Seven Hundred Seventy-Three and Thirty-Five Paisa Only.

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