## SUMMARY OF BID PRICES

Item no.	Description	TOTAL INSTALLED CAPACITY KWp	AMOUNT	TOTAL UNIT GENERATION YEARLY (Minimum)
2(A)	Design, Procurement, Supply, Installation, Testing and Commissioning of On Grid Solar Power System . (BUS PORT)		23,894,269	
2(B)	Design, Procurement, Supply, Installation, Testing and Commissioning of On Grid Solar Power System. (CAR PORT)	COLLEGE CO.	33,443,22	
2(C)	Design, Procurement, Supply, Installation, Testing and Commissioning of On Grid Solar Power System(ADAMJEE CAR PORT)	The second secon	16,232,1961	241,851 KWW
2(D)	Design & Construction of Control Room Civil Work:  a) Control Room 12'-0"x16'-0" 1 No	5/	368,079/	247,200
2(E)	Design, Supply, Install, Testing & Commission of Fuel Control System.		738,504/	
2(F)	Design, Supply, Install, Remote Monitoring Unit		124691/	
?(G)	Design, Supply, Install, Weather Station	-	160,5141	
(H)	Grid Study & Net Metering including all relevant accessories as per KE requirement.	5 (2)	492,366/	_
	TOTAL AMOUNT OF THE PROJECT COST	791.78		1,135,469 KM

Per walt rate (PKR) = 94.22/-Inclusive of Tames



PROJECT TITILE: Designing, supply, Erection Testing, Commissioning of Bus Port, Car Port, & Roof Mounted Grid Tied Utility Interactive Photo Voltaic Solar Power System at IBA Main Campus Karachi

# BUS PORT CLEARANCE HEIGHT FROM ROAD LEVEL 20'-0" MINIMUM BILL OF QUANTITY ABSTRACT OF COST

Sr. No	Product	Capacity Unit Quanti Price						
U .	Photovoltaic Solar System works							
	General: The system is designed to cover the Essential loads	in IBA Karachi Main Campus						
1	The system will be grid interactive connected which will allow many power sources options. The system will import from the grid when loads are being more than the generated from PV and supply surplus electricity to the grid when PV generates more than the loads.							
2	Contractor shall submit shop drawings for all civil, electrical and a complete photovoltaic solar system works, including a single line diagram showing all the components of the PV system, DC and AC distribution boards, PV Arrays lay out, connections and cables, wires cross section for all the system to be approved by the Engineer before executing the work.							
3	Contractor shall submit the catalogs of each component show thebill of quantity.	ring the requested specifications stated at						
4	The contractor shall submit the Manufacture testing certificate test performance curves, spare parts regular (as recommende and manufacturers warranty for each components of the syste	d by manufacturer, maintenance manuals						
5	As-built drawings shall be submitted after handing over the wo	rk.						
6	All junction boxes and DBs will be lockable type.							
7	Upon completion of the installation, the contractor shall organi nominated employer's staff. Such a program shall be carried o cost of the training shall be deemed to have been included in the state of the cost of the training shall be deemed to have been included in the cost of the training shall be deemed to have been included in the cost of the training shall be deemed to have been included in the contractor shall organic	out during the commissioning phase. The						
8	The price includes all builders' works, making good and reinstatement including necessary materials and workmanship as well as removal of unwanted materials to dump sites approved by the engineer to complete the job successfully.							
9	All the following items include supply, install, commission and							
10	Contractor must provide Bank Maintenance Guarantee for per solar system.	riod One years for all components of the						
(e)		1 1						
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	. (1)							
	MEMBER	50115 5118						
	PENTRAL DIRCHASE COMM	TIER (S) (S)						
	INSTITUTE OF BUSINESS ADMINIS	STRATION						
	CHIPPLE SECONDATE Sed Belongel							
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CENTRAL PURCHASE COMMITTEE

	BOQ of BUSPORT with 5 Degree Tilt Estir	mated Ca	pacity = 1	219.4 KV	Νp
Sr No	Product	Unit	Qty	Unit	AMOL
1	MODULE MOUNTING STRUCTURE (MMS)		<u>Italian kanadi</u>		NT
	Designing, Supplying, Fabrication & Installation of PV Mounting structure (MMS) for Bus Port Minimum height 20'-0" from FFL /Road Level. The Module Mounted Structure (MMS) shall Comprising of Corrosion resistant anodized aluminum Section or hot dipped galvanized Steel Profile. The mounting structures and the foundations must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) min. wind pressure 150 KM /hour in harsh environment. The design submission must be as per ASTM-A36, ASTM-123 and ASCE 7-10, for anodized aluminum AL6005/6063.The mounting structure components are bonded together to guaranty potential equalization. The tilt angle shall be not less than 5° for self-cleaning purposes and not more than 8° and for optimal exposure to direct solar irradiation. The	Kwp.	219.4 252.81	285	X San
	work is to be carried out strictly as per approved drawing, design and specification and the rate quoted is inclusive of the following:  Designing of the structure as per design specification approved  Lay out at Site				
	Footing & Foundation work as per approved drawing and specification.				/
	Placing of Anchor Bolts & Base Plate as per design & length & Details.	1			
	Supply, Fabrication & Erection of Column, Beams, purlins & braces as per approved design	1			
	Tilt angle is to be maintained as per Site Condition.  RCC Drain with RCC grating Cover is to be provided to drain				
	out rain/ cleaning water.  Re do the Pavement work to its original condition after	3;	1 alasty		· · · · · · · · · · · · · · · · · · ·
	completion of the work.	1			
11	The Contractor shall remove all the debris and clear the site as per direction				
1000	The contractor shall submit the detail technical shop drawing before execution of work.	1./			
S. Surray	After completion of the work the contractor shall submit the as built drawing.	//			
		1			
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CENTRAL PURCHASE COMMITTEE

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Product	Unit	Qty	RATE	AMOU
PV Modules - 219.4 Kwp:	State State	THE AREA	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	NT
Supply, install, Testing & Commissioning (SITC) Mono Crystalline 144 Cells 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 530 or above Wp rated power  (b), open circuit voltage (Voc) +/- 5 % 49.05V-49.65V  (c) MPP Voltage Vmpp 41.2 V - 41.8 V  (d) MPP Current Impp 12.75 A - 13.04 A  (e) Short Circuit Current Isc +/-5 % 13.65A-13.92 A.  '(f) Module Efficiency 20.0 - 20.5 %  (g) Operating Temp. Degree Centigrade - 40 ~ +85  (h) Maximum System Voltage 1500 V UL 1000 V IEC  (i) Maximum Series Fuse Rating 25 A  (j) Junction Box Protection Degree, IP 68  (k) connection box, 4.0 mm2 conductor cross section,  (m) cable with, MC4 male and female connectors,  (o) Anodized Aluminum Frame and Support Bars  (p) PVC duct, Clamps & Accessories, support and labels to be stalled 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.	Kwp.	219.4	No de la constante de la const	14 72 5K2
GRID -TIED INVERTER ( PCU )	1			
Supply, install, testing & commissioning (SITC) 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 P65. The inverter must include the safety concepts such	EACH	2	The state of the s	2630,250
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THE PRINT OF THE PARTY OF THE P	STRATION		V	3
Sharman 28 (9)	5			h .
MEMBER STITUTE OF BUSINESS ADMINISTRATION  CENTRAL PURCHASE COMMITTEE  CENTRAL PURCHASE COMMITTEE  CENTRAL PURCHASE COMMITTEE  CENTRAL PURCHASE COMMISSION  CENTR	N CS A	El Cl	LADAPERS	SON Dr.

-	STATE OF					
		Brief specification is as under :				
-	a	MPPT Voltage Range : 550V-850V,				
20.	b.	Total go range . 2007 - 10007.				
31	С	Trackers,				
	d	Minimum Efficiency 98.0 % ,				
	е.	,				
	f					
	4	BREAKER BOXES			A Particular Control	
	а	DC BOX		W. Carrie		
		Supply, installation, testing & commissioning (SITC) of DC Box/ Array Junction Box with all accessories for out-door usage with water proof enclosure. Each Junction Box Shall be provided with suitable Metal Oxide Varistors (Mov's), Surge Arrestors, one fuse, one SPD (Surge Protection device) and one DC Protection per string.  DC Protection 16A, 1200VDC Qty: 09 nos	1	2	110,50%	2351541
	7000	DC SPD's Type 2 Qty : 09 nos ( Refer Single Line Diagram Sheet E-09 )				
	. b	AC BREAKER BOXES				
*	i)	Supply, installation, testing & commissioning (SITC) of of AC Breakers Box with all related accessories for outdoor usage with water proof enclosure. AC Breaker 200A, 4P, MCCB, 600V, Qty: 02 Main AC Breaker 400A, 4P, MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH	1	2017	Soll
		Supply, installation, testing & commissioning (SITC) of				Y
	11)	of LV Panel with all related accessories including termination of cables in existing panel. AC Breaker adj 400A, 4P, MCCB, 600V, Qty: 01 AC Breaker adj 800A, 4P, MCCB, 600V, Qty: 01 Main AC Breaker adi 1000A, 4P, MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH (HOUKEP	1 with	N/A car port	Also (C
	5	CABLES				
	а	DC Cables		hard a little and a second a second		
		Supply, Installation & Testing of DC Cable, 1 Core 4mm2 Cu/XLPE/XLPE 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 less than 1%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.8kV DC, Standard Double insulated: Cross link polyolefin. Tinned copper conductor: Certified from DIN VDE 0295 CL.5, Fine-wire, IEC 60228 CL.5. Cable should be Certified from TUV Approved. Standard: EN50618	Meter	3520	John	360
	-	supplying, connecting, and termination of the XLPE				
Ce		CU cables with all required works, in different sizes of ducts or pipes for internal cables , clamps and	Well source	3		OJEC
CENTRAL P DISTRICTE OF	URCHA BUSINES KADA	ASSON SEMBER SECONMITTEE STATE OF BUSINESS ADMINISTRATION	7		D	RIME

N. Commercial Commerci	all needed fittings to connect cables terminals from source to destination. According to drawings,				
	specifications, instructions, and demands of the				
	supervising engineer, as follow:				
)	4C x 70mm², Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	20	50931-	101,86
i)	4C x 240 mm², Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	30	19 2001	E20 20
	Earthing Cables	Meter	30	11,525	+37777
	Supply, Installation & Testing of Earthing Cable,			1 12/	N
	Including PVC Pipe with related accessories.			1 6	
	Brand : Pakistan Cable or Equivalent as Engineer				11
	approved.				
	Single Core 4 sqmm, CU/PVC/FLEX(Green)	Meter	140	30/-	70001-
)	1 core, 10 sqmm, Bare Conductor	Meter	150	1811-	27150
)	1 core, 35 sqmm, CU/PVC/FLEX(Green).	Meter	20	7491-	14,980
)	1 core, 120 sqmm, CU/PVC/STD(Green)	Meter	30	2,0741-	62,220
	EARTHING SYSTEM				
	Earthing System. Supply, installation, testing and commissioning of Earth Electrodes (Rod Type) for Earthing System with 25mm dia 3 meters (10 feet) long driven copper rod, complete with clamps lugs, washers/bolts, connected with 2x70mmsq bare copper earth conductors to Earth connecting point including 50mm dia G.I pipe/UPVC pipe class 'D/E' up to Earth Chamber, job includes cad-welding of 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 Engineer. Earthing result should be less than 5 Ohm for AC combiner, less than 1 Ohm for DC combiner and less than 10 ohm for Structure/lighting protection system.	Each	6	53 & S.	323,30
3	LIGHTINING PROTECTION SYSTEM				
	Supply, Installation ,Testing & Commissioning of Air rod with Base, rod length 500 mm high from PV panels, rod diameter 15mm, thread size M16, conductor material copper With all related accessories as per drawing & specification	Each	10	43091	13,000
	Supply, Installation ,Testing & Commissioning of lighting protection pole 20 ft long with RCC foundation with all related accessories as per drawing & specification	Each	10	8,616	A6,160/
	Supply, Installation ,Testing & Commissioning of test clamp. Test Clamp shall be made of copper	Each	6	YENEY	11,032
The state of the s	Supply, Installation & Testing of 1 core, 70 sqmm, CU/PVC/STD(Green) Earthing Cable, Including PVC Pipe with related accessories.  CABLE TRAY	Meter	400	13105/	44200
	Supply and installation of following sizes 16 SWG heavy duty G.I Perforated Cable Tray 150mm x 75mm with 16 SWG G.I. Covers as per details given in the drawings and specifications. Complete with all installation material such as angle iron support of size, MS round bar, elbows, Tee, nuts, bolts, washer, Hiltidrop-in anchour, etc,	Meter	10	52311	12310

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	complete in all respect, as per the Specification and Drawings.			
9	MISC. CIVIL WORK	1		1
a	Providing, Laying in Position, RCC rain water disposal Channel size 3'-0"x2'-0" (average) with slope with RCC Perforated Cover 2" thick as per design & direction to collect & dispose rain water to a sump out side the station. Concrete min. Class B and MS steel Grade 60 Deformed.	Job	1	asial asial
b	Supply and installation of 150 mm dia RCC Pipe for DC/AC cable, including excavation, sand bedding, back-filling, manholes etc., complete in all respects, in the following sizes:	Meter	80	2011 1222
	Construction of concrete manholes / cable chambers (900 mm x 900 mm x 900 mm deep) with heavy duty RCC covers with anti-rust paint , including all required sleeves for pulling under ground power cables laid in pipes.	Each	2	MAXING CA
	Construction of concrete manholes / cable chambers (600 mm x 600 mm x 900 mm deep) with heavy duty RCC covers with anti-rust paint , including all required sleeves for pulling under ground power cables laid in pipes.	Each	1	30,251/ 2091
	Re-fixing Paver as in Position including providing sand etc required & Removal /Cutting of trees etc  TOTAL AMOUNT FOR BUS PORT	Job	1	2010 2020 1
3	TOTAL AMOUNT FOR BUS PORT	1	- Level	N. Ha.

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381,60 BOQ of CARPORT with 5 Degree Tilt Estimated Capacity = 400.68 KWp. MIN. HT. 12'-0" Unit Product Unit No Qty AMOUNT Price MODULE MOUNTING STRUCTURE ( MMS ) 1 Designing, Supplying, Fabrication & Installation of PV Mounting structure (MMS) for Car Port Minimum height 10'-0" from FFL /Road Level. The Module Mounted Structure (MMS) shall Comprising of Corrosion resistant anodized aluminum Section or hot dipped galvanized Steel Profile. The mounting structures and the foundations must be designed structurally to be suitable to withstand all static loads (weight of modules, 381.60 20 235 wind loads etc) min. wind pressure 150 KM /hour in harsh environment. The design submission must be as Kwp. per ASTM-A36, ASTM-123 and ASCE 7-10, for anodized aluminum AL6005/6063. The mounting structure components are bonded together to guaranty potential equalization. The tilt angle shall be not less than 5° for self-cleaning purposes and not more than 8° and for optimal exposure to direct solar irradiation. The work is to be carried out strictly as per approved drawing, design and specification and the rate quoted is inclusive of the following: Designing of the structure as per design specification a approved b Lay out at Site Footing & Foundation work as per drawing and specification C Placing of Anchor Bolts & Base Plate as per design & length d & Details. Supply, Fabrication & Erection of Column, Beams, purlins & e braces as per design f Tilt angle is to be maintained as per Site Condition. RCC Drain with RCC grating Cover is to be provided to drain g out rain/ cleaning water. Re do the Pavement work to its original condition after h completion of the work. The Contractor shall remove all the debris and clear the site as per direction The contractor shall submit the detail technical shop drawing before execution of work. After completion of the work the contractor shall submit the k as built drawing. Dr. Status CHAL CENTRAL PURCHASE COMMITTEE CENTRAL PURCHASE JOSSATTES INSTITUTE OF BUSINESS ADMINISTRATION INSTITUTE OF BUSINESS ADMINISTRATION KARACHI KARACHI

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Sr No	Product	Unit	Qty	RATE	AMOUNT
2	PV Modules – 400.68 Kwp:				Lave at 12 Post
	Supply, install, Testing & Commissioning (SITC) Mono Crystalline 144 Cells 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 530 or above Wp rated power (b), open circuit voltage (Voc) +/- 5 % 49.05V-49.65V (c) MPP Voltage Vmpp 41.2 V - 41.8 V (d) MPP Current Impp 12.75 A - 13.04 A (e) Short Circuit Current Isc +/-5 % 13.65A-13.92A.  '(f) Module Efficiency 20.0 - 20.5 % (g) Operating Temp. Degree Centigrade - 40 ~ +85 (h) Maximum System Voltage 1500 V UL 1000 V IEC (i) Maximum Series Fuse Rating 20 A (j) Junction Box Protection Degree, IP 68 (k) connection box, 4.0 mm2 conductor cross section, (m) cable with, MC4 male and female connectors, (o) Anodized Aluminum Frame and Support Bars (p) PVC duct, Clamps & Accessories, support and labels to be stalled under PV Array. 3 bypass diodes per module, and 1 bypass diode per each string of modules and 1 bypass diode for each array of modules, Modules must have in built blocking diodes, 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.	Kwp.	400.68	No. of the state o	43 x 22 x 3 x 3 x 3 x 3 x 3 x 3 x 3 x 3 x
3	GRID -TIED INVERTER ( PCU )				
	Supply, install, testing & commissioning (SITC) 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 the 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. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.	EACH	3 Juresh	35.50	24467
	Make: Sungrow /Huawei/SMA	R (EXTERNAL)	ITTEE		0
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	Power Rating: 100 KW or above.	
	Brief specification is as under :	<del>                                     </del>
а	MPPT Voltage Range : 550V-850V,	-
b	MPPT Operating Voltage Range : 200V ~ 1000V,	-
c	Min 06 Independent MPP Trackers ,	
d	Minimum Efficiency 98.0 % ,	
е	Warranty: 5 Years	
f	Certification Required : CE, IEC 61727, IEC 62109-1/2	
4	BREAKER BOXES	
а	DC BOX	
	Supply, installation, testing & commissioning (SITC) of DC Box/ Array Junction Box with all accessories for out door usage with water proof enclosure. Each Junction Box Shall be provided with suitable Metal Oxide Varistors (Mov's), Surge Arrestors, one fuse, one SPD (Surge Protection device) and one DC Protection per string. DC Protection 16A, 1200V Qty: 10 nos DC SPD's Type 2 Qty: 10 nos (Refer Single Line Diagram Sheet E-09)	EACH 3 12052 3661
b	AC BREAKER BOXES	
	Supply, installation, testing & commissioning (SITC) of of AC Breakers Box with all related accessories for out door usage with water proof enclosure.  AC Breaker 200A, 4P, MCCB, 600V, Qty: 04  Main AC Breaker 800A, 4P, MCCB, 600V, Qty: 01  (Refer Single Line Diagram Sheet E-09)	EACH 1 1231908X
5.	CABLES	
а	DC Cables	
	Supply, Installation,& Testing of DC Cable, 1 Core 4mm2 including XLPE/XLPE Pipe 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 less than 1%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.8kV DC, Standard. Double insulated: Cross link polyolefin. Tinned copper conductor: Certified from DIN VDE 0295 CL.5, Fine-wire, IEC 60228 CL.5. Cable should be Certified from TUV Approved.	Meter 8000 out gaza
	Standard: EN50618	Say Cyucoto
b	AC Cables	MEMBER (EXTERNAL)
	supplying, connecting, and termination of the XLPE CU cables with all required works, in different sizes of ducts or pipes for internal cables, clamps and all needed fittings to connect cables terminals from source to destination. According to drawings, specifications, instructions, and demands of the supervising engineer, as follow:	NTRAL PURCHASE COMMITTEE UTE OF BUSINESS ADMINISTRATION KARACHI
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i)	4C x 70mm², Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	50	5,0931	1254.650
ii)	2 x 4C x 240 mm², Cu 0.6/1kV XLPE/PVC Pure Copper	Meter	30	19.200	(70 70
С	Earthing Cables		100	+11363	017,130
	Supply, Installation & Testing of Earthing Cable, Including PVC Pipe with related accessories.  Brand: Pakistan Cable or Equivalent as Engineer approved.				
i)	Single Core 2.5/4 sqmm, CU/PVC/FLEX(Green)	Meter	260	SOF	13,000/
li)	1 core, 10sqmm, Bare Conductor	Meter	250	1811-	45,250
iii)	1 core, 35 sqmm, CU/PVC/FLEX(Green).	Meter	50	7491-	37,450
iv)	1 core, 120 sqmm, CU/PVC/STD(Green)	Meter	240	2.0741	491760
6	EARTHING SYSTEM			7.10 19/	177,100
	Earthing System. Supply, installation, testing and commissioning of Earth Electrodes (Rod Type) for Earthing System with 25mm dia 3 meters (10 feet) long driven copper rod, complete with clamps lugs, washers/bolts, connected with 2x70mmsq bare copper earth conductors to Earth connecting point including 50mm dia G.I pipe/UPVC pipe class 'D/E' up to Earth Chamber, job includes cad-welding of 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 Engineer. Earthing result should be less than 5 Ohm for AC combiner, less than 1 Ohm for DC combiner and less than 10 ohm for Structure/lighting protection system.	Job	6	Sylven	37.70
7	LIGHTINING PROTECTION SYSTEM	6-1			
	Supply, Installation ,Testing & Commissioning of Air rod with Base, rod length 500 mm high from PV panels, rod diameter 15mm, thread size M16, conductor material copper With all related accessories as per drawing & specification	Each	23	4309/	97.004
li	Supply, Installation ,Testing & Commissioning of lighting protection pole 12 ft long with RCC foundation with all related accessories as per drawing & specification	Each	23	3,616/	198,168
ii	Supply, Installation ,Testing & Commissioning of test clamp. Test Clamp shall be made of copper	Each	6	1849/	11-052
V	Supply, Installation & Testing of 1 core, 70 sqmm CU/PVC/STD(Green) Earthing Cable, Including PVC Pipe with related accessories.  CABLE TRAY	Meter	6 035 Que	1705/	418,250
الما	Supply and installation of following sizes 40 0040	TUTE OF BUSIN	EXTERNAL) HASE COMMITTEESS ADMINISTRACHI 30	ATION	26, 2301

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ii)	Supply and installation of following sizes 16 SWG heavy duty G.I Perforated Cable Tray 300mm x 75mm with 16 SWG G.I. Covers as per details given in the drawings and specifications. Complete with all installation material such as angle iron support of size,MS round bar, elbows, Tee, nuts, bolts, washer, Hiltidrop-in anchour, etc, complete in all respect, as per the Specification and Drawings	Meter	30	24621	23,560/
9	MISC. CIVIL WORK	1			
а	Providing, Laying in Position, RCC rain water disposal Channel size 3'-0"x2'-0" (average) with slope with RCC Perforated Cover 2" thick as per design & direction to collect & dispose rain water to a sump out side the station. Concrete min. Class B and MS steel Grade 60 Deformed.	dot	1	asion	95,101/
b	Supply and installation of 150 mm dia RCC Pipe for DC/AC cable, including excavation, sand bedding, back-filling, manholes etc., complete in all respects, in the following sizes:	Meter	100	2784	7004 BF.
C	Construction of concrete manholes / cable chambers (600 mm x 600 mm x 900 mm deep) with heavy duty RCC covers with anti-rust paint , including all required sleeves for pulling under ground power cables laid in pipes.	Each	5	20,209/	101,045/
d	Re-fixing Paver as in Position including providing sand etc required & Removal /Cutting of trees etc	Job	1	475,504	145,504/
1.7.7.6	TOTAL AMOUNT FOR CAR PORT (4 Nos)			-	
			1	1	

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BOQ of ADAMJEE CARPORT with 5 Degree Tilt Estimated Capacity = 171.72 KWp. MIN. HT. 12'-0" Sr Unit Unit Product AMOUNT Qtv No Price 1 MODULE MOUNTING STRUCTURE (MMS) Designing, Supplying, Fabrication & Installation of PV Mounting structure (MMS) for Car Port Minimum height 10'-0" from FFL /Road Level. The Module Mounted Structure (MMS) shall Comprising of Corrosion resistant anodized aluminum Section or hot dipped galvanized Steel Profile. The mounting structures and the foundations must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) min. wind pressure 150 KM /hour in 171.72 harsh environment. The design submission must be as Kwp. per ASTM-A36, ASTM-123 and ASCE 7-10, for anodized aluminum AL6005/6063. The mounting structure components are bonded together to guaranty potential equalization. The tilt angle shall be not less than 5° for self-cleaning purposes and not more than 8° and for optimal exposure to direct solar irradiation. The work is to be carried out strictly as per approved drawing, design and specification and the rate quoted is inclusive of the following: Designing of the structure as per design specification a approved Lay out at Site b Footing & Foundation work as per drawing and specification C Placing of Achor Bolts & Base Plate as per design & length d Supply, Fabrication & Erection of Column, Beams, purins & e braces as per design Tilt angle is to be maintained as per Site Condition. f RCC Drain with RCC grating Cover is to be provided to drain g out rain/ cleaning water. Re do the Pavement work to its original condition after h completion of the work. The Contractor shall remove all the debris and clear the site as per direction The contractor shall submit the detail technical shop drawing before execution of work. After completion of the work the contractor shall submit the k as built drawing. Hairis Quallo MEMBER TEXTERNAL! CENTRAL PURCHASE COMMITTEE INSTITUTE OF BUSINESS ADMINISTRATION CHAIRPERSOIN CENTRAL FURCHASE COSLITTEE OF BUSINESS ADMINISTRATE KARACHI

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Sr No	Product	Unit	Qty	RATE	AMOUNT
2	PV Modules - 171.7 Kwp:	HIC - 1075 H / S	THE STREET		(A)
	Supply, install, Testing & Commissioning (SITC) Mono Crystalline. 144 Cells 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 530 or above Wp rated power (b), open circuit voltage (Voc) +/- 5 % 49.05V-49.65V (c) MPP Voltage Vmpp 41.2 V - 41.8 V (d) MPP Current Impp 12.75 A - 13.04 A (e) Short Circuit Current Isc +/-5 % 13.65A-13.92A, (f) Module Efficiency 20.0 - 20.5 % (g) Operating Temp. Degree Centigrade - 40 ~ +85 (h) Maximum System Voltage 1500 V UL 1000 V IEC (i) Maximum Series Fuse Rating 20 A (j) Junction Box Protection Degree, IP 68 (k) connection box, 4.0 mm2 conductor cross section, (m) cable with, MC4 male and female connectors, (o) Anodized Aluminum Frame and Support Bars (p) PVC duct, Clamps & Accessories, support and labels to be stalled under PV Array.	Kwp.	171.72	No such	2000
	3 bypass diodes per module, and 1 bypass diode per each string of modules and 1 bypass diode for each array of modules, Modules must have in built blocking diodes, 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.				Ø.
3	GRID -TIED INVERTER ( PCU )	<del></del>	<del></del>	<u></u>	
	Supply, install, testing & commissioning (SITC) 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 the 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. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.	EACH	To Sandi	853 × 550	L'ALLAN STATE OF THE STATE OF T
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	Power Rating: 60KW × 1			-	
1	: 100 kw xd	-			-
500	Brief specification is as under:	-	J		- Lands
a	MPPT Voltage Range : 550V-850V,	_			
b	MPPT Operating Voltage Range : 200V ~ 1000V,	_			
C	Min 06 Independent MPP Trackers ,				
d .	Minimum Efficiency 98.0 % ,	-			
e	Warranty : 5 Years	-			
f	Certification Required : CE, IEC 61727, IEC 62109-1/2	- /			
4	BREAKER BOXES	-			
a	DC BOX		-		-
	Supply, installation, testing & commissioning (SITC) of DC Box/ Array Junction Box with all accessories for out door usage with water proof enclosure. Each Junction Box Shall be provided with suitable Metal Oxide Varistors (Mov's), Surge Arrestors, one fuse, one SPD (Surge Protection device) and one DC Protection per string. DC Protection 16A, 1200V Qty: 07 nos DC SPD's Type 2 Qty: 07 nos (Refer Single Line Diagram Sheet E-09)	EACH	3 24	100	220
b	AC BREAKER BOXES	— <u>)</u>	9/		
	Supply, installation, testing & commissioning ( SITC ) of		T .	1	1
i	of AC Breakers Box with all related accessories for out door usage with water proof enclosure. AC Breaker 120A, 4P, MCCB, 600V, Qty: 03 Main AC Breaker 400A, 4P, MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH	1	327,27	32%
11	Supply, installation, testing & commissioning (SITC) of of LV Panel with all related accessories including termination of cables in existing panel Main AC Breaker 400A, 4P, adj MCCB, 600V, Qty: 01 (Refer Single Line Diagram Sheet E-09)	EACH	1	245171	2451
5	CABLES				
а	DC Cables				
	Supply, Installation,& Testing of DC Cable, 1 Core 4mm2 including XLPE/PVC Pipe 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 less than 1%. Minimum voltage capacity 1500VDC, Highest permissible voltage conductor/conductor should be 1.8kV DC, Standard. Double insulated: Cross link polyolefin. Tinned copper conductor: Certified from DIN VDE 0295 CL.5, Fine-wire, IEC 60228 CL.5. Cable should be Certified from TUV Approved. Standard: EN50618.	Meter	2530 esh '	,ouX	3000
b	AC Cables INSTITUTE OF 8	USINESS APRILIT	RTPATION		
	supplying, connecting, and termination of the XLPE CU gables with all required works, in	KARACHI (LO	ST.		N
6	At Ni Seland Miles (20) - RANGO AND	NETRATION NETRATION	SOL	2	V

ii) 40 x Armo c Earl Sup Inclu	ands of the supervising engineer. as follow:  35mm², Cu 0.6/1kV XLPE/PVC Pure Copper  185 mm², Cu 0.6/1kV XLPE/PVC	Meter	25 70	1941 J	-48,525/- -1,048,320
c Earl Sup Inclu	ching Cables  Oply, Installation & Testing of Earthing Cable, adding PVC Pipe with related accessories.  Ind: Pakistan Cable or Equivalent as Engineer coved.  The Core 2.5/4 sqmm, CU/PVC/FLEX(Green)	Meter		1	1,048,320
Sup Inclu Brar	oply, Installation & Testing of Earthing Cable, ading PVC Pipe with related accessories. ad: Pakistan Cable or Equivalent as Engineer roved.  le Core 2.5/4 sqmm, CU/PVC/FLEX(Green)			7,480/	72,048,320
Bran	iding PVC Pipe with related accessories.  id: Pakistan Cable or Equivalent as Engineer oved.  e Core 2.5/4 sqmm, CU/PVC/FLEX(Green)				
	COOP VOF LEX (Green)				
ii) 1 co	re, 10sqmm Bare Conductor	Meter	110	50-	5,500
iii) 1 cor	e, 16 sqmm, CU/PVC/FLEX(Green).	Meter	120	184-	21,720/-
iv) 1 co	re, 95 sqmm, CU/PVC/STD(Green) 50 sqmm	Meter	25	350/-	8,7501-
6 EAR	THING SYSTEM	Meter	140	9961-	139,4401-
400000000000000000000000000000000000000	ing System. Supply, installation, testing and	1	1 SOLIS		
Earth driver wash earth 50mm to ear cable RCC earth Drawi the Enfor AC less system	ing System with 25mm dia 3 meters (10 feet) long copper rod, complete with clamps lugs, ers/bolts, connected with 2x70mmsq bare copper conductors to Earth connecting point including a dia G.I pipe/UPVC pipe class 'D/E' up to Earth ber, job includes cad-welding of copper conductor the electrode rod at one end and provision/ fixing of lugs at other end, including all accessories and inspection chamber, heavy duty G.I. Cover having symbol, etc., as per the Specifications and ngs and to the entire satisfaction and approval of ngineer. Earthing result should be less than 5 Ohm combiner, less than 1 Ohm for DC combiner and than 10 ohm for Structure/lighting protection in.	Job	6	538.E.	423,30
	ITINING PROTECTION SYSTEM				
rod wi rod dia mater drawir	y, Installation ,Testing & Commissioning of Air th Base, rod length 500 mm high from PV panels, ameter 15mm, thread size M16, conductor ital copper With all related accessories as pering & specification	Each.	10	4.308/	N30801
ii lightin with a specif	y, Installation ,Testing & Commissioning of g protection pole 12 ft long with RCC foundation I related accessories as per drawing & cation	Each	10	3,616/	90,00%
Supply	/, Installation ,Testing & Commissioning of test	Each	6	1/2/10	1500
iv CU/P\ Pipe w	Test Clamp shall be made of copper //, Installation & Testing of 1 core, 70 sqmm, /C/STD(Green) Earthing Cable, Including PVC //th related accessories.	Meter	200	7505/	121,000/
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heavy	and installation of following sizes 16 SWG simulations of following sizes 16 SWG simulations of following sizes 16 SWG data and sizes as per details given in the	The second liver with	MINISTRATION 10	1,231	12310/

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		drawings and specifications. Complete with all installation material such as angle iron support of size,MS round bar, elbows, Tee, nuts, bolts, washer, Hiltidrop-in anchour, etc, complete in all respect, as per the Specification and Drawings				
	9	MISC, CIVIL WORK				
	а	Providing, Laying in Position, RCC rain water disposal Channel size 3'-0"x2'-0" (average) with slope with RCC Perforated Cover 2" thick as per design & direction to collect & dispose rain water to a sump out side the station. Concrete min. Class B and MS steel Grade 60 Deformed.	Job	1	asid!	oficial
	b	Supply and installation of 150 mm dia RCC Pipe for DC/AC cable, including excavation, sand bedding, back-filling, manholes etc., complete in all respects, in the following sizes:	Meter	10	15HX	17,540/
	C	Construction of concrete manholes / cable chambers (600 mm x 600 mm x 900 mm deep) with heavy duty RCC covers with anti-rust paint , including all required sleeves for pulling under ground power cables laid in pipes.	Each	1	202091	20,209/
(	d	Dismantling & Re-fixing Existing Steel Shade at some designated place as in Position including providing Footing, foundation, CC flooring etc Complete as required & Removal /Cutting of trees etc	Job	1	18,86	118,876
10 St.	250	required & Removal /Cutting of trees etc TOTAL AMOUNT FOR ADAMJEE CAR PORT	JOB	1	113,810	118,81

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## CIVIL WORKS FOR CONTROL ROOMS & INVERTOR /PCU STATIONS

Sr		SO STATIONS				
No 1		Unit	Qty	RATE	AMOUN	
1	CONTROL ROOM	Referen		120000	ANIOUN	
	Design, Provide & Construct RCC Frame Structure Control	1/Gleiel	nce Specifi	cation		
2	Room Size 12'-0" x16'-0" for installation of Weather Station & Fuel Control System including all type of Masonry work with Aluminum Doors & windows & 12000 BTU AC. The rate include, all type of labour & material required. Max ht. of the Building 10'-0" from FFL. Non Skid Tiled floor and Plastic Emulsion on walls internal & Weather Shield on External walls as per direction of Engineer Incharge & approved design & drawing  INVERTOR ROOM	Sq M	17.84	NA	N/A	
	Design, Provide & Construct RCC Frame Structure Invertor Room Size 10'-0" x12'-0"ht. 10'-0" for installation of Grid Tied Invertors at  a) Bus Port & Car Port b) Adam jee Car Port -e) Auditorium Roof Port The rate including all type of Masonry work with Aluminum Doors & windows & 12000 BTU AC .The rate include, all type of labour & material required. Max ht. of the Building 10'-0" from FFL. Non Skid Tiled floor and Plastic Emulsion on walls internal & Weather Shield on External walls as per direction of Engineer Incharge & approved designs.	Sq M	33.54 22.36	31701	208,769	
12.52	Providing & supply of adjustable & moveable trolley type ladder with working Plate form for cleaning of SPV maximum working height 20'-0"	Each	1	1000	60,009	

\* Control room to be considered as Inverter room.

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#### FUEL SAVER CONTROLLER

ir Io	Product	Unit	Qty	RATE	AMOUNT
	Fuel Saver Controller		<b>的</b> 的方法是2	AT LINE SHOW S	
	Design, Supply, installation, testing and commission of SMA Or Equivalent Fuel Save Controller System Solution for the Integration of PV Power Plant into Electrical Net Work based on Gen Sets.				
	Fuel Save Controller should performs the following tasks:				
	Monitoring of the gensets' power and operating status				
	Monitoring of the load and grid status				
	Calculation of suitable values for the maximum power output of the PV inverters according to defined parameter settings and the curren status of gensets and load				
等 。	<ul> <li>Control and communication interface to P\ inverters</li> </ul>	/ Each	1	3	236 Sul
	Internal logging of all relevant system data			200	200
	Provision of relevant system data for local and remote monitoring			20	
	Emergency shutdown of the PV inverters in case of a system malfunction				
	The bidder shall provide the complete technical details	3			
	of the system .				
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## WEATHER STATION

Sr Vo	Product	Unit	Qty	RATE	AMOUN
SV.	WEATHER MONITORING STATION	S40000 C 500			
	Design, Supply, installation, testing and commission of Weather monitoring System along with all necessary equipment and software which should I be capable of monitoring the solar radiance, wind velocity, module cell temperature, ambient temperature, humidity, wind direction and rain fall level. All sensors must be of class-A. The performance monitoring system shall use the present weather information and compare the solar power generated with the typical power to be produced with respect to the present available solar irradiance. The deviation of power generation shall be embedded in the automatic report generation documents, any degradation or performance deviation shall be alerted to the user through email. Based on this, the users initiate the maintenance/cleaning of solar panel, trouble shooting of the solar power system, etc.  The weather information shall be recorded in the database continuously 24-hour basis and the same shall be viewed through the internet browser.  The weather data stored in the database server shall be retrieved and displayed in the user intranet browser in user friendly tabular and graphical format. The user shall select the date range to view the history of weather data with date and time stamping.  The automatic report generation feature in the server shall automatically generate the report based on the events or time duration and convert the same report in to PDF, word, excel, html and other formats and shall send to the specified e-mail ids as an attachment.  The row, column, content, user email-id, shall be specified during the configuration setting by the user.  The automatic report generation shall monitor the various user defined events continuously.	Each	1	17/8/5/94 · ·	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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### REMOTE MONITORING SYSTEM

No	Product	Unit	Qty	RATE	AMOUNT
	DATA MANGER with REMOTE MONITORING SYSTEM		augurus:	disease 1	
	Design, Supply, installation, testing and commission of Data Manger with Remote Monitoring System consists of the following parameter:  • Total energy generation of PV Plant • Instantaneous Power been generated by solar PV Plant • Performance ratio of PV plant. • Current load of client • Load profile v/s energy generation.  Data should be store on server for not more than 10 min time interval. Data must be access through internet via user friendly GUI.	Each	1	25.684	The state of the s

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#### NET METERING

No	NET METERING	Unit	Qty	RATE	AMOUNT
	Service of Grid Study & Net metering application process as per K.E approved criteria complete in all respects or directed by Engineer. This also include the services charges & fee for assessment of Grid Load service charges for Load Inspector etc. Only the cost of Challan shall be paid by IBA.	Each	1	200	22306

\* Fees for NEPRA 3 KE will be borne by IBA as the fees chalam's will be on IBA's name.

Dr s.m. avjed Zaidi.

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