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**KINGDOM OF SAUDI ARABIA
THE SAUDI FUND FOR DEVELOPMENT (SFD)**

ITB -2017- 171

Bill of Quantities

Project name: Reconstruction, Furniture and Equipping of Three Schools

**Photovoltaic Solar System for Holly Family School and the Greek Orthodox
Patriarchate School
PAL10- 00099288**

Funded By :
Kingdom of Saudi Arabia
Through The Saudi Fund For Development (SFD)

Implemented By
United Nations Relief And Works Agency (UNRWA)
Through the United Nations Development Programme (UNDP/PAPP)

(Bill of Quantities)

1 .The contractor must provide a detailed cost breakdown for each item.

2.The contractor must provide Technical descriptions for each proposed item and sufficient detail to allow UNDP to determine compliance of Bid with specifications as per Schedule of Requirements and Technical Specifications of this RFQ. The contractor shall indicate all makes proposed and must attach relevant manufacturer Catalogue/data.

3.The contractor shall submit the Manufacture testing certificate, country of origion, certified characteristics, test performance curves, spare parts regular (as recommended by manufacturer , maintenance manuals and manufacturers warranty for each components of the system for 5 years.

4. All prices/rates quoted must be exclusive of all taxes, since the United Nations, including its subsidiary organs, is exempt from taxes.

5. In addition to the hard copy, if possible please provide also the information on diskette (IBM compatible).

5. Inspection Team

The contractor Shall facilitate the attendance of Engineers from the supervision team and the Recipient to check the materials of the PV Solar equipments before delivering to Site.

6. On site training

Upon completion of the installation, the contractor shall organize an on site training program involving nominated employer's staff. Such a program shall be carried out during the commissioning phase. The cost of the training shall be deemed to have been included in the tendered rates.

7.Contractors Documents

The contractor's documents must include all construction documentation required for the works. They must include all site information, structural and civil drawings, electrical services drawings at suitable scales showing final design calculations, symbols list, site plan, and single line diagrams for distribution boards, solar switchboards, and control systems.

8.Operation and Maintenance Manuals

The contractor must submit two hard copies on standard sized sheets and two electronic copy in-PDF format of the as built drawings including the wiring diagrams and PV single line diagrams, DC and AC wiring sizing calculations including cross sectional area of the wires used and voltage drop calculations, rating of all fuses and circuit breakers, operation and maintenance manuals for each different site. The manuals must contain PV system description and catalogues of all PV system components. They shall also contain maintenance schedules, commissioning data, PV system test certificates, a step by step startup and shut down procedure for the entire PV system, and description of the type and operation control of the inverter and charge controller.

The contractor will maintain monthly visits during the maintenance period to carry out the necessary maintenance processes needed and respond promptly to any emergency needed to keep the system performance intact and perfect.



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ITB -2017- 171

Lot 01: Photovoltaic Solar System for the Holly Family School

Bill of Quantities

Photovoltaic Solar System for Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
Bill No (1)					
Photovoltaic Solar System works					
	<p>General:</p> <ul style="list-style-type: none"> The system is designed to cover the Essential loads in Holly Family School The system will be grid interactive connected with battery backup system, 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 batteries when PV generates more than the loads, the batteries can be charged from Grid if PV output is not enough for loads and batteries. Contractor shall submit shop drawings for all architectural, 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 and battery backup systems connections and cables, wires cross section for all the system to be approved by the Engineer before executing the work. Contractor shall submit the catalogs of each component showing the requested specifications stated at the bill of quantity. The contractor shall submit the Manufacture testing certificate, country of origin, certified characteristics, test performance curves, spare parts regular (as recommended by manufacturer , maintenance manuals and manufacturers warranty for each components of the system. As-built drawings shall be submitted after handing over the work. All junction boxes and DBs will be lockable type. Upon completion of the installation, the contractor shall organize an on site training program involving nominated employer's staff. Such a program shall be carried out during the commissioning phase. The cost of the training shall be deemed to have been included in the tendered rates. 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. All the following items include supply, install, commission and operate of the complete PV solar system. The contractor must provide Bank Maintenance Guarantee for period 2 years for all components of the solar syatem. 				
1	<p>PV Modules – 30 Kw:</p> <p>Supply, install, connect and operate Mono Crystalline or Polycrystalline Photovoltaic Solar Modules with all material needed to have complete job ready for installing high quality PV modules with total arrays capacity to achieve 30 KWp. The item Includes supply, install &connect the following:</p> <ul style="list-style-type: none"> PVC ducts with clamps, accessories , supports &labels suitable to be installed under the PV arrays. Solar DC cables appropriately sized to connect the PV solar cells together and to the inverter directly to have a complete operational circuit with all conduits, clamps , trays and cable end terminations which shall be DC plug and socket connectors . The DC cables must be sized in accordance with the installation requirements applicable on site, the allowable voltage drop for DC cables between PV Arrays and inverter less than 1% . Hot galvanized cable trays appropriately sized, Ventilated or Perforated type with cover for outdoor use to protect the DC cables from the PV cells to the battery room and inside the room, complete with all needed clamps, accessories, screws, labels to complete the job. The price includes all 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. Contractor must submit manufacturer warranty for solar panel for a period not less than 20 years. Contractor must submit all the required certificates for each PV solar panel from. <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	KWp	30		

Photovoltaic Solar System for Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
2	<p>Inverters – 30 KW: Supply, install, connect and operate 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. (Type is SMA or equivalent). The DC max power input rating should be equal or more than 30 KW of the PV modules capacity at standard test condition. The inverter unit shall be suitable for indoor and outdoor installations with IP65. The inverter AC nominal power output rating must be equal or greater than 30 KW compatible with the AC loads design. The inverter must include the safety concepts such as (triple protection with optiprotect, electronic strings fuses, self-learning string failure detection, DC surge arrester type 2) to ensure max availability. Total inverter capacity must be divided at least 2 inverters. The price includes :</p> <ul style="list-style-type: none"> • Supply, install and connect (monitoring and controlling unit) for all PV solar system installed especially compatible with the inverters, with all needed accessories, interface modules & data cables and all connections needed to complete and connect the monitoring system to internet. • Supply ,install and connect all DC cables appropriately sized in accordance with the installation requirements and to connect the inverters with PV system designed with all conduits, clamps, trays and cable terminations end which shall be DC plug and socket connectors to have a complete job, the allowable voltage drop for DC cables between inverters and PV system not less than 1%. • Inverters shall allow an adjustable power factor minimum AC output power with all necessary electrical cables, earthing system, Conduits, trays and all other materials and workmanship needed to connect with the main distribution panel according to the engineer's instruction and approval and have a complete job. • The contractor must submit manufacturer warranty for each inverter for a period not less than 5 years. <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	Unit	1		
3	<p>Battery Inverter – 6 KW: Supply, install, connect and operate Battery Inverter compatible with on grid inverters with total rated power 6 Kw with all necessary interface modules and connections for masters & slaves , electrical cables and data communication unit, router with Ethernet connection, connectable in parallel and modularly extendable. (Type is SMA or equivalent). The Battery Inverter must include the following concepts such as (Ac and DC coupling, High efficiency, intelligent battery management for maximum battery life, charge level calculation, extreme overload capability, and battery temperature sensing and battery current measurements). The price includes: • Supply, install and connect Remote Control Units (RC Unit) for the installed battery inverters with all data & communication cables and connection needed to complete the job. • Supply, install and connect: DC cables appropriately sized in accordance with the installation requirements to connect the battery inverters with DC battery fuses box. AC electrical cables to connect the battery inverters with the main distribution panel(AC Out). the works includes all conduits, clamps, trays and cable terminations end and workmanship needed to have a complete job, • The allowable voltage drop for DC cables between battery inverter and batteries less than 1%.</p> <ul style="list-style-type: none"> • The contractor must submit manufacturer warranty for each battery inverter for a period not less than 5 years. <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	No	3		

Photovoltaic Solar System for Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
4	<p><u>Battery Bank :</u> Supply, install, connect and operate VRLA tubular design deep cycle batteries, the total demand energy is 160 KWh, @ C10 , 1.8V per cell. The battery bank voltage is 48 Vdc. (Type is BAE or equivalent). The batteries must provide high-quality and achieving superior performance, the manufacturing date must be new and not more than 6 months, suitable for every type of applications especially for solar renewable energy, designed Service Life 10 years with low internal resistance, designed to be deeply discharged. The Battery should provide benefits of being maintenance free, case flame retardant & non-hazardous. The price Includes supply, install & connect Battery temp. sensor (BTS) and the following:</p> <ul style="list-style-type: none"> • All necessary DC cables between the batteries together and to the battery fuse box to have a complete operational circuit with all bus bars, conduits, clamps, stainless steel bolts, washers and cable end terminations and all needed materials to complete the job. All DC cables must be sized in accordance with the installation requirements applicable on site ,the allowable voltage drop must be less than 1%. • Battery Banks rack from the same manufacturer of the batteries with dividers and all needed accessories to finish the job. the rack must be enough to carry all the weight of the required batteries for the system. • Contractor must submit all the required certificates for all Battery Banks . <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	KWh	160		
5	<p><u>PV Mounting structure:</u> Supply and install Module mounting structure from hot galvanized steel profile foundation OR Aluminium profile structures suitable to the dimension of selected PV modules and PV numbers, the mounting provides a fixed inclination of the modules 30 degree with vertical supports, plates, screws and casting concrete foundations B250 (0.3*0.3*0.3) m3 for each leg, the structure profile includes bracing and double hot galvanized angles for dividers. The mounting structures and the foundations must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) that might occur according to the Site conditions. The mounting structure components are bonded together to guaranty potential equalization.</p> <p>All works and materials must be according to drawings, specifications and supervisor instructions and approval.</p>	L.S	1		
6	<p><u>Battery Fuse Box:</u> Supply, install, connect and operate battery DC fuse box (500*375*225 mm) as an external DC distributor to protect the battery connections of the inverters . The box must be water proof protection with IP65, simple wall mounting, suitable connections for three battery inverters and up to six DC connections inlet on the battery side, the item includes (2 LTL 250/400A , 6 fuses 250A , cable glands, with all necessary DC cables from the battery bank and to the fuse box and from the fuse box to the battery inverters to have a complete operational circuit with all conduits, clamps, stainless steel bolts, washers and cable end terminations needed to fix, all DC cables must be sized in accordance with the installation requirements applicable on site ,the allowable voltage drop must be less than 1%.</p> <ul style="list-style-type: none"> • The contractor must submit manufacturer warranty for each battery fuse box for a period not less than 3 years. (Type is Brand Name or equivalent). <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	No	1		

Photovoltaic Solar System for Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
7	<u>AC Air Condition:</u> Supply , install, test and commission air conditioning Inverter type Split Unit, composed of outdoor unit. filled with environment friendly refrigerant such as (R410, R407c,...) and COP not less than 3.5, Condensing unit shall be complete with Inverter compressor/s & air cooled condenser with fan, Well supported on hot galvanized steel base on the roof, indoor unit with plasma filter as indicated on drawings to be tight installed completed with all necessary supports, hangers, drain pipes from indoor unit to the nearest floor drain, (PVC Ø 1"), copper pipes , sleeves, thermostat , Remote control and including Isolation Switch MOELLER and all required electrical power cables from SDB to the unit according to drawings and engineers approval. CAPACITY:(18000 BTU/HR). (Type is ELECTRA or equivalent) .	No	1		
8	<u>Earthing System For Battery Banks:</u> Supply,install,connect and operate complete independent earthing system for Battery Banks system, must be separated of the main earthing system to obtain 2 ohm max resistance. the item includes (2 copper electrodes 15mm2 driven into ground, manholes with iron cover, earth joints, clamps, ducts , conduits and 50 mm2 flexible earthing copper wires and cables from the Negative bus bar in the battery fuse box to the electrode to complete the system as specifications and supervisor engineer instruction's and approval.	Unit	1		
9	<u>Earthing for PV Solar System:</u> Supply,install,connect and operate complete independent earthing system for PV solar system, must be separated of the main earthing system to obtain 2 ohm max resistance. the item includes (2 copper electrodes 15mm2 driven into ground, manholes with iron cover, earth joints, clamps, ducts , conduits and 25 mm2 flexible earthing copper wires and cables from the PV system components to the electrode to complete the system as specifications and supervisor engineer instruction's and approval.	Unit	2		
Total Of Bill (1) - US\$					

Electrical Works for Palestinian Energy Authority - Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$	Total Amount US \$
Bill No (2) Electrical Works					
	General: <ul style="list-style-type: none"> The items in general shall also include conduits, connection boxes, controls, wires, connectors, clamps, bolts, and connecting the cables to switchboards and common electric network are included in the unit price. Contractor shall submit shop drawings for all electrical works to be approved by the Engineer before executing the work. As-built drawings shall be submitted after handing over the work. All the electrical works shall be executed according to Standards, drawings, specifications and supervisor engineer instructions. Dismantling & Removing old materials such as (fluorescent light fixture, glops, mcb's, bus bars Etc) and move to school stores as per engineer instructions. All installation shall be in accordance with : <ul style="list-style-type: none"> The drawings , specifications and instructions and demands of the engineer. The electricity law and electrical code requirements of the BRITISH Standards. The contractor should refer to the drawings , specifications and other Contract Documents . The prices will be deemed to include for the full cost as described in all Documents. 				
1	SOLAR POWER MAIN DISTRIBUTION BOARD (MDBPV)				
1.1	Supply and install additional main distribution panel (PVMDB) beside the existing MDB of the same height and depth of existing MDB with all works and fittings needed to get job ready according to instructions. The width of additional compartment must be enough & suitable dimensions for easy assemble and maintenance for all its components with 30% free space for future extending, the additional panel made of galvanized steel sheet and frame 2mm thick, painted with anti-static primer paint and 2coats of final polyester paint as required by the engineer. The panel should be factory assembled c/w pvc coated cu bus bars of adequate sizes and all other accessories and civil works that may needed to complete the job and hand over in operable conditions trenches, power and control wires, terminals bus bars neutral bus bar, earthing bus bar ducts, supports, labels and numbers and all necessary accessories to complete the work. According to Standards, drawings, specifications and supervisor engineer instructions. (Type is MOELLER or equivalent). The proposed additional Panel (PVMDB) & the existing MDB includes supply & install the following components.	L.S	1		
1.2	Mulded Case Circuit Breaker MCCB 3X63A/NZMB-63A. (Type is Moeller or equivalent).	No.	4		
1.3	Miniature Circuit Breaker MCB 3X63A. (Type is Moeller or equivalent).	No.	2		
1.4	Miniature Circuit Breaker MCB 3X40A. (Type is Moeller or equivalent).	No.	1		
1.5	Miniature Circuit Breaker MCB 3X32A. (Type is Moeller or equivalent).	No.	1		
1.6	Miniature Circuit Breaker MCB 3X25A. (Type is Moeller or equivalent).	No.	1		
1.7	Supply and install Miniature Circuit Breaker MCB 3X16A. (Type is Moeller or equivalent).	No.	6		
1.8	Supply & Install Digital multimeter complete with needed C.Ts (100/5A) and with needed protection MCB 3x6A and all needed works and wirings to get jop ready according to instructions.	Set	1		
1.9	Supply & Install Manual Transfere Switch (MTS) 100A- 400V Type Socomec complete or approved equivalent with all needed fittings and accessories to get job ready according to specifications and supervisor engineer instructions .	No.	1		
1.10	Supply, install and commission Automatic Transfer Switch (ATS) 3 phase system. The ATS consist of two 4 poles contactores 125A @AC3 (DILMP125) complete with (Mechanical & elctrical Interlock) all needed ACU control fittings such timers , relays, undervolatge...etc , or approved equivalent as per drawings with all needed fittings and accessories to get job ready according to specifications and supervisor engineer instructions . (Type is Moeller or equivalent).	Unit	1		
1.11	Surge protection device of 40KA short circuit capacity to secure the over all AC system (data and power) against lightnings and surges strikes, including connecting the device to earthing system and all needed accessories. Type Moeller or equivalent .(Optional Item)	No.	1		
1.12	Supply and install Signal indication lamp R S T with resistance 220V,with LTL fuse3x36/6A	No.	2		

Electrical Works for Palestinian Energy Authority - Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$	Total Amount US \$
2	EXITING MDB				
2.1	3-Phase Digital KWH Bidirectional Meter: Supply,install,connect and operate a New 3-phase digital KWH Bidirectional meter 200/5A,with all needed fittings and any other material needed to have a complete job as per drawing according to GEDCO specifications & regulations. ,The KWh meter has monitoring LCD with all needed data & interface cables, current transformers 200/5A to connect with the Monitoring System . The price includes dismantling and removing the existing metering units (3 ph KWH, KVAR & 1ph Kwh meters). All works and materials must be according to the drawings, catalogues, GEDCO specifications and supervisor engineer instruction's and approval.	Unit	2		
2.2	3-Phase Digital KWH Meter: Supply,install,connect and operate 3-phase digital KWH meter, with all CT's and any other material needed to have a complete job ,The KWh meter has monitoring LCD with all needed data & interface cables to connect with the Monitoring System .All works and materials must be according to the drawings, catalogues, specifications and supervisor engineer instruction's and approval.	No	3		
2.3	Supply And Install 3ph. Failure,loss of phase, under voltage ,over voltage and phase sequence relay(LRST), adjustable type with four poles contactor 4*100A Moeller and all needed protection devices ,control devices and accessories type Foxtam or approved equivalent according to as per drawing & supervisor engineer instructions	Unit	1		
3	DISTRIBUTION BOARDS				
3.1	Rearrange all exiting distribution boards to separate essential loads and connected to new S-DB in each floor, the item includes PVC pipes, duct,civil works and rearranging C.Bs ,wires, busbar and handing over clean. The price includes supply and install new wires, busbar, terminals and all needed fitting if required to complete the work as per specifications and supervisor engineer instruction's.	L.S	1		
4	SUB DISTRIBUTION BOARD DBG-Exiting (Ground Floor)				
4.1	Rearrange exiting distribution boards in ground floor to separate essential loads and connected to DBG-Solar , the item includes PVC pipes, duct,civil works,Dismantle and re-installing MCCB , rearranging C.Bs ,wires, busbar and all fitting in DBG-Exiting. The price includes supply and install new wires, busbar, terminals and all needed fitting if required to complete the work as per specifications and supervisor engineer instruction's.(Optional)	No.	1		
5	SUB DISTRIBUTION BOARD DBG-Solar (Ground Floor)				
5.1	Supply install and connect the following items in the exiting distribution boards (DBG-Solar), the price includes new busbar, PVC pipes , ducts, terminals, wires and all needed fitting as per specifications and supervisor engineer instruction's.				
5.2	Supply and install Miniature Circuit Breaker MCB 3X25A. (Type is Moeller or equivalent).	No.	1		
5.3	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Moeller or equivalent).	No.	1		
5.4	Supply and install Miniature Circuit Breaker MCB 1X16A. (Type is Moeller or equivalent).	No.	10		
5.5	Supply and install Miniature Circuit Breaker MCB 1X10A. (Type is Moeller or equivalent).	No.	15		

Electrical Works for Palestinian Energy Authority - Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$	Total Amount US \$
6	SUB DISTRIBUTION BOARD DBF-Solar (First Floor)				
6.1	Supply and install electrical switch board with 30% free space, the frame work is made of galvanized steel sheets 2mm thickness, painted by antistatic and insulation paint.The item includes busbars, wiring, insulations, plastic ducts, terminal blocks and all necessary civil works ,equipments for installation and operation as per drawings, specifications and engineer instructions. (Type is MOELLER or equivalent) The panel size must achieve at least 30% free space and the size of panel will be determined after shop drawings and that all internal components were agreed upon. The panel shall include but not limited to the followings:	No.	1		
6.2	Supply and install Miniature Circuit Breaker MCB 3X25A. (Type is Moeller or equivalent).	No.	1		
6.3	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Moeller or equivalent).	No.	1		
6.4	Supply and install Miniature Circuit Breaker MCB 1X16A. (Type is Moeller or equivalent).	No.	3		
6.5	Supply and install Miniature Circuit Breaker MCB 1X10A. (Type is Moeller or equivalent).	No.	12		
7	SUB DISTRIBUTION BOARD DBS-Solar (Second Floor)				
7.1	Supply and install electrical switch board with 30% free space, the frame work is made of galvanized steel sheets 2mm thickness, painted by antistatic and insulation paint.The item includes busbars, wiring, insulations, plastic ducts, terminal blocks and all necessary civil works ,equipments for installation and operation as per drawings, specifications and engineer instructions. (Type is MOELLER or equivalent) The panel size must achieve at least 30% free space and the size of panel will be determined after shop drawings and that all internal components were agreed upon. The panel shall include but not limited to the followings:	No.	1		
7.2	Supply and install Miniature Circuit Breaker MCB 3X25A. (Type is Moeller or equivalent).	No.	1		
7.3	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Moeller or equivalent).	No.	1		
7.4	Supply and install Miniature Circuit Breaker MCB 1X16A. (Type is Moeller or equivalent).	No.	3		
7.5	Supply and install Miniature Circuit Breaker MCB 1X10A. (Type is Moeller or equivalent).	No.	12		
8	SUB DISTRIBUTION BOARD DBTH-Solar (Third Floor)				
8.1	Supply and install electrical switch board with 30% free space, the frame work is made of galvanized steel sheets 2mm thickness, painted by antistatic and insulation paint.The item includes busbars, wiring, insulations, plastic ducts, terminal blocks and all necessary civil works ,equipments for installation and operation as per drawings, specifications and engineer instructions. (Type is MOELLER or equivalent) The panel size must achieve at least 30% free space and the size of panel will be determined after shop drawings and that all internal components were agreed upon. The panel shall include but not limited to the followings:	No.	1		
8.2	Supply and install Miniature Circuit Breaker MCB 3X40A. (Type is Moeller or equivalent).	No.	1		
8.3	Supply and install Miniature Circuit Breaker MCB 3X25A. (Type is Moeller or equivalent).	No.	3		
8.4	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Moeller or equivalent).	No.	1		
8.5	Supply and install Miniature Circuit Breaker MCB 1X20A. (Type is Moeller or equivalent).	No.	4		
8.6	Supply and install Miniature Circuit Breaker MCB 1X16A. (Type is Moeller or equivalent).	No.	4		
8.7	Supply and install Miniature Circuit Breaker MCB 1X10A. (Type is Moeller or equivalent).	No.	12		
9	DISTRIBUTION BOARD DBC-Solar (Computer Lab.)				
9.1	Supply and install electrical switch board with 30% free space, the frame work is made of galvanized steel sheets 2mm thickness, painted by antistatic and insulation paint.The item includes busbars, wiring, insulations, plastic ducts, terminal blocks and all necessary civil works ,equipments for installation and operation as per drawings, specifications and engineer instructions. (Type is MOELLER or equivalent) The panel size must achieve at least 30% free space and the size of panel will be determined after shop drawings and that all internal components were agreed upon. The panel shall include but not limited to the followings:	No.	1		
9.2	Supply and install Miniature Circuit Breaker MCB 3X32A. (Type is Moeller or equivalent).	No.	1		
9.3	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Moeller or equivalent).	No.	1		
9.4	Supply and install Miniature Circuit Breaker MCB 1X16A. (Type is Moeller or equivalent).	No.	10		
10	DISTRIBUTION BOARD DB21-Solar (First Floor)				
10.1	Supply and install blastic board 24 C.B.The item includes busbars, wiring, insulations, plastic ducts, terminal blocks and all necessary civil works ,equipments for installation and operation as per drawings, specifications and engineer instructions.	No.	1		
10.2	Supply and install Miniature Circuit Breaker MCB 3X16A. (Type is Moeller or equivalent).	No.	1		
10.3	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Moeller or equivalent).	No.	1		
10.4	Supply and install Miniature Circuit Breaker MCB 1X16A. (Type is Moeller or equivalent).	No.	2		
10.5	Supply and install Miniature Circuit Breaker MCB 1X10A. (Type is Moeller or equivalent).	No.	3		

Electrical Works for Palestinian Energy Authority - Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$	Total Amount US \$
11	DISTRIBUTION BOARD DBH-Solar (Third Floor)				
11.1	Supply and install electrical switch board with 30% free space, the frame work is made of galvanized steel sheets 2mm thickness, painted by antistatic and insulation paint. The item includes busbars, wiring, insulations, plastic ducts, terminal blocks and all necessary civil works equipments for installation and operation as per drawings, specifications and engineer instructions. (Type is MOELLER or equivalent) The panel size must achieve at least 30% free space and the size of panel will be determined after shop drawings and that all internal components were agreed upon. The panel shall include but not limited to the followings:	No.	1		
11.2	Supply and install Miniature Circuit Breaker MCB 3X25A. (Type is Moeller or equivalent).	No.	1		
11.3	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Moeller or equivalent).	No.	1		
11.4	Supply and install Miniature Circuit Breaker MCB 1X16A. (Type is Moeller or equivalent).	No.	5		
11.5	Supply and install Miniature Circuit Breaker MCB 1X10A. (Type is Moeller or equivalent).	No.	10		
12	SOLAR PV DISTRIBUTION BOARD (PVDB)				
12.1	Supply, install and commission solar PV Distribution Board (PVDB) with 30% free space, the panel made of galvanized steel sheet and frame 2mm thick, painted with anti-static primer paint and 2coats of final polyester paint. As required by the engineer. The panel should be factory assembled pvc coated cu bus bars of adequate sizes and all other accessories and civil works that may needed to complete the job and hand over in operable conditions trenches, power and control wires, terminals bus bars neutral bus bar, earthing bus bar ducts, supports, labels and numbers and all necessary accessories to complete the work. According to Standards, drawings, specifications and supervisor engineer instructions. (Type is MOELLER or equivalent). The panel size must achieve at least 30% free space and the size of panel will be determined after shop drawings and that all internal components were agreed upon. The panel shall include but not limited to the followings:	NO.	1		
12.2	Molded Case Circuit Breaker NZMB1-A32	NO.	2		
12.3	Molded Case Circuit Breaker NZMB1-A40	NO.	1		
12.4	Miniature Circuit Breaker MCB 2X32A. (Type is Eaton FAZC32/2 or equivalent).	NO.	3		
12.5	Miniature Circuit Breaker MCB 3X32A. (Type is Eaton FAZC32/3 or equivalent).	NO.	1		
12.6	Miniature Circuit Breaker MCB 3X40A. (Type is Eaton FAZC40/3 or equivalent).	NO.	1		
12.7	Supply and install Signal indication lamp R S T with resistance 220V, with LTL fuse 3x36/6A	Set	1		
12.8	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Eaton or equivalent).	NO	1		
13	CABLES AND CODUTES				
	supplying, connecting, and termination of the following XLPE CU cables with all required electrical and civil works, needed different sizes of ducts or pipes for internal cables, Angles, 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:				
13.1	XLPE cable 5x16 mm2	Mtr.	80		
13.2	XLPE cable 5x6 mm2	Mtr.	50		
13.3	XLPE cable 5x4 mm2	Mtr.	250		
13.4	XLPE cable 3x4 mm2	Mtr.	30		
13.5	Supply and install galvanized steel cable guard channel 200x100x 2 mm (Base & cover) complete with all needed fixing accessory, clamps, angles and any other needed works to get job ready according to specification and according engineer instruction	Mtr.	40		
13.6	supply and install Concrete manhole (60cm clear diameter), with 8T cover.capacity heavy duty Checkered plate cover, Steel handles and all needed accessories, as detailed on the drawing and instructions of D.O.W.	No.	1		

Electrical Works for Palestinian Energy Authority - Holly Family School

Item No.	Description	Unit	Quantity	Unit Rate US \$	Total Amount US \$
14	MISCELLANEOUS				
14.1	Supply, install, connect and test AC LED tube lamp T8, 120 cm, 16W, Cap-Base G13,160-260 Volt, more than 40000H life time, with 0.95 PF at least,Efficacy more than 100 Lm/W ,european made . The price include dismantling the existing flourecent lamps ,ballasts ,condensers and rewiring to be compatible with instant Start and allows fixture to maintain original complianc. All works and materials shall be according to standards and specifications and the approval of the supervisor engineer. All the dismantle flourecent lamps, starter, chock coil shall be handed over to the School (Type is PHILIPS or equivalent)	NO.	700		
14.2	Supply, install, connect and test Ac LED lamp 10-12 W, Flux more than 800 Lumen, Color temperature 3000-4500, Power factor > 95%.(Type is NISKO or equivalent).	NO.	100		
14.3	Supply, install connect and, testing single socket outlet 16A, 220v, 2p+E for flush or surface mounting, complete with PVC conduits, J.bboxes, wiring, and all necessary accessories. (Type is Gewiss-Chourus or equivalent)	No.	2		
14.4	Supply, install connect and, testing internal complete computer sockets (single) with RJ45 cat 6 female connectors,cover, Oiginal Italian Gewiss (RJ45 Data Socket Cat6 (Product Code: GW20684)), connect it to the patch panel in the nearest Rack with FTP cables cat 6 teldor as shown in the network drawings, all sockets must be tested and labled(cables, sockets).(Type is Gewiss-Chourus or equivalent).	No.	1		
14.5	Supply, install and commission lionization smoke detector, the detectors shall be twin-chamber with latching electronic circuitry, two wire connectionall with all neccessery accessories needed to complete the job, pull boxes special wires and all necessary accessories (Type is TELEFIRE or equivalent) Note: All detectors and Alarm bells must be connected with the Existing Fire Alarm Panel.	No.	1		
14.6	Carefully Dismantle and Reinstall in new location for the existing main fire alarm controlling panel according to supervision eng instructions with all needed programming,wirings, fittings and any other needed works and materials to get jop ready.	No.	1		
14.7	Supply and Install cable hot galvanized cable tray 10X15 cm complete with all needed civil works and fittings cables according to supervisor engineer instructions. Type is OBO or equivelant.	Mtr.	70		
Total Of Bill (2) - US\$					

Summary of Lot 01: Photovoltaic Solar System for the Holly Family School

Bill No.	Description	Total (Us \$)
1	Total of Bill (1): PV Works Holy Family School	
2	Total of Bill (2) : Electrical works Holy Family School	
	Total of Lot 01: Holy Family School	
	VAT(0%)	
	TOTAL	



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**KINGDOM OF SAUDI ARABIA
THE SAUDI FUND FOR DEVELOPMENT (SFD)**

ITB -2017- 171

Lot 02: Photovoltaic Solar System for the Greek Orthodox Patriarchate School

Bill of Quantities

Photovoltaic Solar System for Greek Orthodox Patriarchate School					
Item No.	Description	Unit	Quantity	Unit price (\$)	Total Amount US \$
Bill No (1)					
Photovoltaic Solar System works					
	<p>General:</p> <ul style="list-style-type: none"> The system is designed to cover the Essential loads in Greek Orthodox Patriarchate School The system will be grid interactive connected with battery backup system, 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 batteries when PV generates more than the loads, the batteries can be charged from Grid if PV output is not enough for loads and batteries. Contractor shall submit shop drawings for all architectural, 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 and battery backup systems connections and cables, wires cross section for all the system to be approved by the Engineer before executing the work. Contractor shall submit the catalogs of each component showing the requested specifications stated at the bill of quantity. The contractor shall submit the Manufacture testing certificate, country of origin, certified characteristics, test performance curves, spare parts regular (as recommended by manufacturer , maintenance manuals and manufacturers warranty for each components of the system. As-built drawings shall be submitted after handing over the work. All junction boxes and DBs will be lockable type. Upon completion of the installation, the contractor shall organize an on site training program involving nominated employer's staff. Such a program shall be carried out during the commissioning phase. The cost of the training shall be deemed to have been included in the tendered rates. 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. All the following items include supply, install, commission and operate of the complete PV solar system. The contractor must provide Bank Maintenance Guarantee for period 2 years for all components 				
1	<p>PV Modules – 30 Kw:</p> <p>Supply, install, connect and operate Mono Crystalline or Polycrystalline Photovoltaic Solar Modules with all material needed to have complete job ready for installing high quality PV modules with total arrays capacity to achieve 30 Kw. The item Includes supply, install & connect the following:</p> <ul style="list-style-type: none"> PVC ducts with clamps, accessories , supports & labels suitable to be installed under the PV arrays. Solar DC cables appropriately sized to connect the PV solar cells together and to the inverter directly to have a complete operational circuit with all conduits, clamps , trays and cable end terminations which shall be DC plug and socket connectors . The DC cables must be sized in accordance with the installation requirements applicable on site, the allowable voltage drop for DC cables between PV Arrays and inverter less than 1%. Hot galvanized cable trays appropriately sized, Ventilated or Perforated type with cover for outdoor use to protect the DC cables from the PV cells to the battery room and inside the room, complete with all needed clamps, accessories, screws, labels to complete the job. The price includes all 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. Contractor must submit manufacturer warranty for solar panel for a period not less than 20 years. Contractor must submit all the required certificates for each PV solar panel from. <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	KWp	30		
2	<p>Inverters – 30 KW:</p> <p>Supply, install, connect and operate 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. (Type is SMA or equivalent).</p> <p>The DC max power input rating should be equal or more than 30 KW of the PV modules capacity at standard test condition. The inverter unit shall be suitable for indoor and outdoor installations with IP65.</p> <p>The inverter AC nominal power output rating must be equal or greater than 30 KW compatible with the AC loads design. The inverter must include the safety concepts such as (triple protection with optiprotect, electronic strings fuses, self-learning string failure detection, DC surge arrestor type 2) to ensure max availability. Total inverter capacity must be divided at least 2 inverters. The price includes :</p> <ul style="list-style-type: none"> Supply, install and connect (monitoring and controlling unit) for all PV solar system installed especially compatible with the inverters, with all needed accessories, interface modules & data cables and all connections needed to complete and connect the monitoring system to internet. Supply ,install and connect all DC cables appropriately sized in accordance with the installation requirements and to connect the inverters with PV system designed with all conduits, clamps, trays and cable terminations end which shall be DC plug and socket connectors to have a complete job, the allowable voltage drop for DC cables between inverters and PV system not less than 1%. Inverters shall allow an adjustable power factor minimum AC output power with all necessary electrical cables, earthing system, Conduits, trays and all other materials and workmanship needed to connect with the main distribution panel according to the engineer's instruction and approval and have a complete job. The contractor must submit manufacturer warranty for each inverter for a period not less than 5 years. <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	Unit	1		

Photovoltaic Solar System for Greek Orthodox Patriarchate School

Item No.	Description	Unit	Quantity	Unit price (\$)	Total Amount US \$
3	<p><u>Battery Inverter – 6 KW:</u> Supply, install, connect and operate Battery Inverter compatible with on grid inverters with total rated power 6 Kw with all necessary interface modules and connections for masters & slaves , electrical cables and data communication unit, router with Ethernet connection, connectable in parallel and modularly extendable. (Type is SMA or equivalent). The Battery Inverter must include the following concepts such as (Ac and DC coupling, High efficiency, intelligent battery management for maximum battery life, charge level calculation, extreme overload capability, and battery temperature sensing and battery current measurements). The price includes: • Supply, install and connect Remote Control Units (RC Unit) for the installed battery inverters with all data & communication cables and connection needed to complete the job. • Supply, install and connect: DC cables appropriately sized in accordance with the installation requirements to connect the battery inverters with DC battery fuses box. AC electrical cables to connect the battery inverters with the main distribution panel(AC Out). the works includes all conduits, clamps, trays and cable terminations end and workmanship needed to have a complete job, • The allowable voltage drop for DC cables between battery inverter and batteries less than 1%. • The contractor must submit manufacturer warranty for each battery inverter for a period not less than 5 years. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	No	3		
4	<p><u>Battery Bank :</u> Supply, install, connect and operate VRLA tubular design deep cycle batteries, the total demand energy is 120 KWh, @ C10 , 1.8V per cell. The battery bank voltage is 48 Vdc (Type is BAE or equivalent)t The batteries must provide high-quality and achieving superior performance, the manufacturing date must be new and not more than 6 months, suitable for every type of applications especially for solar renewable energy, designed Service Life 10 years with low internal resistance, designed to be deeply discharged. The Battery should provide benefits of being maintenance free, case flame retardant & non-hazardous. The price Includes supply, install &connect Battery temp. sensor (BTS) and the following: • All necessary DC cables between the batteries together and to the battery fuse box to have a complete operational circuit with all bus bars, conduits, clamps, stainless steel bolts, washers and cable end terminations and all needed materials to complete the job. All DC cables must be sized in accordance with the installation requirements applicable on site ,the allowable voltage drop must be less than 1%. • Battery Banks rack from the same manufacturer of the batteries with dividers and all needed accessories to finish the job. the rack must be enough to carry all the weight of the required batteries for the system. • . Contractor must submit all the required certificates for all Battery Banks • All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	KWh	120		
5	<p><u>PV Mounting structure:</u> Supply and install Module mounting structure from hot galvanized steel profile foundation suitable to the dimension of selected PV modules and PV numbers, the mounting provides a fixed inclination of the modules 30 degree with vertical supports, plates, screws and casting concrete foundations B250 (0.3*0.3*0.3) m3 for each leg, the structure profile includes bracing and double hot galvanized angles for dividers. The mounting structures and the foundations must be designed structurally to be suitable to withstand all static loads (weight of modules, wind loads etc) that might occur according to the Site conditions. The mounting structure components are bonded together to guaranty potential equalization. All works and materials must be according to drawings, specifications and supervisor instructions and approval.</p>	L.S	1		

Photovoltaic Solar System for Greek Orthodox Patriarchate School					
Item No.	Description	Unit	Quantity	Unit price (\$)	Total Amount US \$
6	<p><u>Battery Fuse Box:</u> Supply, install, connect and operate battery DC fuse box (500*375*225 mm) as an external DC distributor to protect the battery connections of the inverters . The box must be water proof protection with IP65, simple wall mounting, suitable connections for three battery inverters and up to six DC connections inlet on the battery side, the item includes (2 LTL 250/400A , 6 fuses 250A , cable glands, with all necessary DC cables from the battery bank and to the fuse box and from the fuse box to the battery inverters to have a complete operational circuit with all conduits, clamps, stainless steel bolts, washers and cable end terminations needed to fix, all DC cables must be sized in accordance with the installation requirements applicable on site ,the allowable voltage drop must be less than 1%.</p> <p>• The contractor must submit manufacturer warranty for each battery fuse box for a period not less than 3 years. (Type is Brand Name or equivalent).</p> <p>All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	No	1		
7	<p><u>AC Air Condition:</u> Supply , install, test and commission air conditioning Inverter type Split Unit, composed of outdoor unit. filled with environment friendly refrigerant such as (R410, R407c...) and COP not less than 3.5,Condensing unit shall be complete with Inverter compressor/s & air cooled condenser with fan, Well supported on hot galvanized steel base on the roof, indoor unit with plasma filter as indicated on drawings to be tights installed completed with all necessary supports, hangers, drain pipes from indoor unit to the nearest floor drain, (PVC Ø 1"), copper pipes , sleeves, thermostat , Remote control and including Isolation Switch MOELLER and all required electrical power cables from SDB to the unit according to drawings and engineers approval. CAPACITY:(18000 BTU/HR). (Type is ELECTRA or equivalent) .</p>	No	1		
8	<p><u>Earthing System For Battery Banks:</u> Supply,install,connect and operate complete independent earthing system for Battery Banks system, must be separated of the main earthing system to obtain 2 ohm max resistance. the item includes (2 copper electrodes 15mm2 driven into ground, manholes with iron cover, earth joints, clamps, ducts , conduits and 50 mm2 flexible earthing copper wires and cables from the Negative bus bar in the battery fuse box to the electrode to complete the system as specifications and supervisor engineer instruction's and approval.</p>	Unit	1		
9	<p><u>Earthing for PV Solar System:</u> Supply,install,connect and operate complete independent earthing system for PV solar system, must be separated of the main earthing system to obtain 2 ohm max resistance. the item includes (2 copper electrodes 15mm2 driven into ground, manholes with iron cover, earth joints, clamps, ducts , conduits and 25 mm2 flexible earthing copper wires and cables from the PV system components to the electrode to complete the system as specifications and supervisor engineer instruction's and approval.</p>	Unit	2		
Total Of Bill (1) - US\$					

Electrical Works for - Greek Orthodox Patriarchate School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
Bill No (2) Electrical Works					
	General: <ul style="list-style-type: none"> • The items in general shall also include conduits, connection boxes, controls, wires, connectors, clamps, bolts, and connecting the cables to switchboards and common electric network are included in the unit price. • Contractor shall submit shop drawings for all electrical works to be approved by the Engineer before executing the work. • As-built drawings shall be submitted after handing over the work. • All the electrical works shall be executed according to Standards, drawings, specifications and supervisor engineer instructions. <p>All installation shall be in accordance with :</p> <ul style="list-style-type: none"> • The drawings , specifications and instructions and demands of the engineer. • The electricity law and electrical code requirements of the BRITISH Standards. • The contractor should refer to the drawings , specifications and other Contract Documents . • The prices will be deemed to include for the full cost as described in all Documents. 				
1	MAIN DISTRIBUTION BOARD (MDB)				
1.1	<p>*Supply, install and commission Main Distribution Board (MDB) as shown as drawings the dimensions of MDB must be enough & suitable for easy assemble and maintenance with 30% free space for future extending, the panel should be made of galvanized steel sheet with 2mm thickness, painted with anti-static primer paint and 2coats of final polyester paint . As required by the engineer. The panel should be factory assembled c/w pvc coated cu bus bars of adequate sizes and all other accessories and civil works that may needed to complete the job and hand over in operable conditions trenches, power and control wires, terminals bus bars neutral bus bar, earthing bus bar ducts, supports, labels and numbers and all necessary accessories to complete the work including dismantling the existing panels and all required civil works. According to Standards, drawings, specifications and supervisor engineer instructions. (Type is Eaton or equivalent).</p> <p>The panel size must achieve at least 30% free space and the size of panel will be determined after shop drawings and that all internal components were agreed upon. <u>The panel shall include supply and install but not limited to the followings components with all needed fittings,wirings,accessories and any other materials to get job ready according to pecifications and supervisor engineer instructions</u> .</p>	Unit	1		
1.2	Bidirectional Digital Energy KWH meter 3x60A complete with 3x100/5A CT. with all needed fittings and accessories to get jop ready. Approved Type By GEDCO.	No.	1		
1.3	Supply &Install indication lamp complete with all needed LTL 32/6A with fuses protection.	No.	9		
1.4	Supply &Install Digital multimeter complete with needed C.Ts, protection MCB 3x6A and all needed works and wirings to get jop ready according to instructions .	No.	3		
1.5	Supply &Install three poles M.C.C.B 3x63A. 400V Type Eaton NZM. or approved equivalent with external hand and all needed fittings and accessories .	No.	5		
1.6	Ditto, but M.C.C.B 3x40A. 400V Type Eaton NZM. or approved equivalent with external hand .	No.	3		
1.7	Ditto, but M.C.B 3x25A. 400V Type Eaton 5. or approved equivalent	No.	10		

Electrical Works for - Greek Orthodox Patriarchate School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
1.8	Supply, install and commission Automatic Transfer Switch (ATS) 3 phase system. The ATS consist of two 4 poles contactores 125A @AC3 (DILMP125) complete with (Mechanical & electrical Interlock) all needed ACU control fittings such timers , relays, undervoltage...etc , or approved equivalent as per drawings with all needed fittings and accessories to get job ready according to specifications and supervisor engineer instructions . (Type is Eaton or equivalent).	Unit	2		
1.9	Supply &Install Manual Transfere Switch (MTS) 100A- 400V Type Socomec complete or approved equivalent with all needed fittings and accessories to get job ready according to specifications and supervisor engineer instructions .	No.	1		
1.10	Supply And Install 3ph. Failur,loss of phase, under voltage ,over voltage and phase sequence relay(LRST), udjastable type with four poles contactor 4*100A and all needed protection devices ,control devices and accessories type Fochtam or approved equivalent according to as per drawing & supervisor engineer instructions	Set	1		
1.11	LTL 3x125A fuseable circuit breaker. Type Eaton or approved equivalent.	No.	1		
1.12	Surge protection device of 40KA short circuit capacity to secure the over all AC system (data and power) against lightnings and surges strikes, including connecting the device to earthing system and all needed accessories. Type Eaton or equivalent .	No.	1		
1.13	Supply &Install 3ph. Digital KWHM 3x100A complete with all needed fittings, wires and accessories to get jop ready.	NO.	2		
2	SOLAR PV DISTRIBUTION BOARD (PVDB)				
2.1	Supply, install and commission solar PV Distribution Board (PVDB) with 30% free space, the panel made of galvanized steel sheet and frame 2mm thick, painted with anti-static primer paint and 2coats of final polyester paint . As required by the engineer. The panel should be factory assembled pvc coated cu bus bars of adequate sizes and all other accessories and civil works that may needed to complete the job and hand over in operable conditions trenches, power and control wires, terminals bus bars neutral bus bar, earthing bus bar ducts, supports, labels and numbers and all necessary accessories to complete the work. According to Standards, drawings, specifications and supervisor engineer instructions. (Type is MOELLER or equivalent). The panel size must achieve at least 30% free space and the size of panel will be determined after shop drawings and that all internal components were agreed upon. The panel shall include but not limited to the followings:	NO.	1		
2.2	Molded Case Circuit Breaker NZMB1-A32	NO.	2		
2.3	Molded Case Circuit Breaker NZMB1-A40	NO.	1		
2.4	Miniature Circuit Breaker MCB 2X32A. (Type is Eaton FAZC32/2 or equivalent).	NO.	3		
2.5	Miniature Circuit Breaker MCB 3X32A. (Type is Eaton FAZC32/3 or equivalent).	NO.	1		
2.6	Miniature Circuit Breaker MCB 3X40A. (Type is Eaton FAZC40/3 or equivalent).	NO.	1		
2.7	Supply and install Signal indication lamp R S T with resistance 220V,with LTL fuse3x36/6A	Set	1		
2.8	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Eaton or equivalent).	NO	1		

Electrical Works for - Greek Orthodox Patriarchate School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
3	Distribuion Boards DB-B				
3.1	Supply, install solar power sub-distribution board consists of lockable board frames with 30% free space at least 40X60 cm including 2m Galv. steel sheets with anti-static paint, bus bars for incoming cables, neutral and earthing terminal with all necessary accessories and material to hand over clean and tested in operating conditions. (Type is Eaton or equivalent).	NO.	1		
3.2	Miniature Circuit Breaker MCB 3X25A. (Type is Eaton FAZC32/3 or equivalent).		1		
3.3	Miniature Circuit Breaker MCB 3X20A. (Type is Eaton or equivalent).		1		
3.4	Miniature Circuit Breaker MCB 3X16A. (Type is Eaton or equivalent).		1		
3.5	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Eaton or equivalent).		1		
3.6	Miniature Circuit Breaker MCB 1X16A. (Type is Eaton or equivalent).		9		
3.7	Miniature Circuit Breaker MCB 1X10A. (Type is Eaton or equivalent).		3		
	Distribuion Boards SDB-B				
3.8	Supply, install solar power sub-distribution board consists of lockable board frames with 30% free space at least 40X60 cm including 2m Galv. steel sheets with anti-static paint, bus bars for incoming cables, neutral and earthing terminal with all necessary accessories and material to hand over clean and tested in operating conditions. (Type is Eaton or equivalent).	NO.	1		
3.9	Miniature Circuit Breaker MCB 3X25A. (Type is Eaton FAZC32/3 or equivalent).		1		
3.10	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Eaton or equivalent).		1		
3.11	Miniature Circuit Breaker MCB 1X10A. (Type is Eaton or equivalent).		3		
	Distribuion Boards SDB-LAB				
3.12	Supply, install solar power sub-distribution board consists of lockable board frames with 30% free space at least 40X60 cm including 2m Galv. steel sheets with anti-static paint, bus bars for incoming cables, neutral and earthing terminal with all necessary accessories and material to hand over clean and tested in operating conditions. (Type is Eaton or equivalent).	NO.	1		
3.13	Miniature Circuit Breaker MCB 3X25A. (Type is Eaton FAZC32/3 or equivalent).		1		
3.14	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Eaton or equivalent).		1		
3.15	Miniature Circuit Breaker MCB 1X16A. (Type is Eaton or equivalent).		6		
3.16	Miniature Circuit Breaker MCB 1X10A. (Type is Eaton or equivalent).		1		
	Distribuion Boards SDB-G				
3.17	Supply, install solar power sub-distribution board consists of lockable board frames with 30% free space at least 40X60 cm including 2m Galv. steel sheets with anti-static paint, bus bars for incoming cables, neutral and earthing terminal with all necessary accessories and material to hand over clean and tested in operating conditions. (Type is Eaton or equivalent).	NO.	1		
3.18	Miniature Circuit Breaker MCB 3X25A. (Type is Eaton FAZC32/3 or equivalent).		1		
3.19	Miniature Circuit Breaker MCB 3X16A. (Type is Eaton or equivalent).		2		
3.20	Ditto but residual current circuit breaker RCB 4X40/0.03A. (Type is Eaton or equivalent).		2		
3.21	Miniature Circuit Breaker MCB 1X16A. (Type is Eaton or equivalent).		4		
3.22	Miniature Circuit Breaker MCB 1X10A. (Type is Eaton or equivalent).		10		

Electrical Works for - Greek Orthodox Patriarchate School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
4	CABLES AND CODUITES				
	supplying, connecting, and termination of the following XLPE CU cables with all required electrical and civil works. The price includes dismantling and re install the existing cables and laying under ground PVC piping system, manholes, excavation, warning tapes, backfilling and all required civil works to finish the work, also includes laying pvc ducts, cable trays different sizes in the building according specifications and demands of the supervising engineer, to connect cables terminals from source to destination. According to drawings, specifications , instructions,and demands of the supervising engineer. as follow: Note : The Contractor must submit shop drawing for cable routing to get approval before starting work.				
4.1	XLPE multi core Cu cable (5x16 mm2)	L.M.	70		
3.2	XLPE multi core Cu cable 5x10 mm2	L.M.	70		
3.3	XLPE multi core Cu cable 5x6 mm2	L.M.	200		
4.4	Flexible Cu wire 1*6mm2	R.M.	50		
5	MISCELLANEOUS				
5.1	Supply, install, connect and test AC LED tube lamp T8, 120 cm, 16W, Cap-Base G13,160-260 Volt, more than 40000H life time, with 0.95 PF at least,Efficacy more than 100 Lm/W ,european made . The price include dismantling the existing flourecent lamps ,ballasts ,condensers and rewiring to be compatible with instant Start and allows fixture to maintain original complianc. All works and materials shall be according to standards and specifications and the approval of the supervisor engineer. All the dismantle flourecent lamps, starter, chock coil shall be handed over to the School (Type is PHILIPS or equivalent)	NO.	350		
5.2	Supply, install, connect and test Ac LED lamp 16W, Flux more than 1000 Lumen, Color temperature 3000-4500, Power factor > 95%.(Type is NISKO or equivalent).	NO.	40		
5.3	Supply, install connect and, testing single socket outlet 16A, 220v, 2p+E for flush or surface mounting, complete with PVC conduits, J.bboxes, wiring, and all necessary accessories. (Type is Gewiss-Chourus or equivalent)	No.	2		
5.4	Supply, install connect and, testing internal complete computer sockets (single) with RJ45 cat 6 female connectors,cover, Oiginal Italian Gewiss (RJ45 Data Socket Cat6 (Product Code: GW20684)), connect it to the patch panel in the nearst Rack with STP cables cat 6 teldor as shown in the network drawings, all sockets must be tested and labled(cables, sockets).(Type is Gewiss-Chourus or equivalent). Note 1: cable must has one meter extra length inside the Rack Note 2: cable must be labeled at both ends Note 3: 60 cm from FFL Note 4: high quality sticky plastic labled must be on the sokcet cover Note 5: item includes 2,5m CAT 6 original patch	No.	1		
5.5	Supply, install and commission lionization smoke detector, the detectors shall be twin-chamber with latching electronic circuitry, two wire connectionall with all neccessery accessories needed to complete the job, pull boxes special wires and all necessary accessories (Type is TELEFIRE or equivalent) Note: All detectors and Alarm bells must be connected with the Existing Fire Alarm Panel.	No.	1		

Electrical Works for - Greek Orthodox Patriarchate School

Item No.	Description	Unit	Quantity	Unit Rate US \$ (Numbers)	Total Amount US \$
6	Electricity Subscription:				
6.1	Enlargement of the existing power electricity subscription from 3x100A to 3x400A with tacking in consideration Removing the old existing WH meter, and rearrange the panel , this work includes: GEDCO's subscription fees, contribution fees and other documentations. according to GDECO regulation with complete needed fees	L.S	1		
6.2	Upgrading electricity network including supply and install external Electricity Network including lattice steel poles, 400 KVA power distribution transformer, overhead network wires, M.V Switch, steel work, concrete works B250, excavations and backfilling, all civil works, grounding, L.V fuse box with cables, copper cables & wires, bolts, clamps, concrete works and With all needed civil works and any other needed materials and workmanship to complete the job according to the attached GDECO technical and financila study and drawings specifications and the engineer's instructions. The contractor has to coordinate and implement this networks with GEDCO Co.	L.S	1		
	Total Of Bill (2) - US\$				

Summary of Lot 02: Photovoltaic Solar System for the Greek Orthodox Patriarchate School

Bill No.	Description	Total (Us \$)
1	Total of Bill (1): PV Works Greek Orthodox Patriarchate School	
2	Total of Bill (2): Electrical works Greek Orthodox Patriarchate School	
	Total of Lot 02: Greek Orthodox Patriarchate School	
	VAT(0%)	
	TOTAL	

Summary

Bill No.	Description	Total (Us \$)
1	Total of Lot 01: Holy Family School	
2	Total of Lot 02: Greek Orthodox Patriarchate School	
	Total Works	
	VAT(0%)	
	TOTAL	

Total in numbers

Total in letters

Name of the contractor

Authorized signature

Signature and Sealing.....

Title

Telephone.....

Fax

Mobile