



1. إحالة جميع بنود العطاء على شركة (أضواء البشير) وذلك حسب الجدول التالي:

N	Item	Specification	Unit	Qu.	سعر الوحدة بالدولار	ملاحظات
	Photovoltaic Works	Supply, install, test and commission the following PV system complete with all needed accessories and needed materials to complete the work successfully as per specification, drawings and engineers instruction The price shall include as the following : <ul style="list-style-type: none">The system should be surge protected and solid grounded.Electrical works and product should be a high quality from recognized brand and should be done according to specifications and engineer instructions, while the rate should be include Electrical AC and DC cables and wirings, junction boxes and common electric network are included in the cost price.The contractor shall be provided design, calculation sheet for design, shop drawing for all details, As built drawing ,and all requirement for the PLC Supervisor Engineer' or its representative.All requirements needed to finish the works according to the specification, conditions, and to the instructions of the PLC Supervisor Engineer', or its representative.The contractor should submit shop drawings (hard and soft copy) to the System. Warranty: All component of the system must be not less than 24 month warrantee				



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1	PV- Array module	<p>PV Modules – Total Power 13.5 KWp: Canadian or Equivalent Supply, install, connect and operate Poly Crystalline Photovoltaic Solar Modules, efficiency not less than 18.5% with all materials needed to have complete job ready for installing high quality PV modules with total arrays capacity to achieve 13.5 KWp. The unit rates include supply, install & connect the following:</p> <ul style="list-style-type: none">• Water proof PV combiner boxes IP65 for all connected strings including (DC double pole Fuses, DC double pole surge arrestors, bus bars, terminals, PVC ducts to be fixed under the PV modules, supports, clamps & labels suitable to the PV arrays loads.• Solar DC cables appropriately sized (EU made) to connect the PV solar modules together and to the combiner box and from combiner box to the inverter directly to have a complete operational circuit with all conduits, clamps, hot galvanized channel trays with covers along the DC cable routing and cable end terminations which shall be DC plug and socket connectors MC4. The allowable voltage drop for DC cables between PV Arrays and grid inverter less than 1%. The unit rates include solving all the obstacles that will face on Roof	PV	1	4170	الأرضف والمطابق



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2	Inverter /Charger	<p>Inverter / Charger – 5 KW: Axpert MKS II or Equivalent with parallel kit</p> <p>-Supply, install, connect and operate single phase Inverters with rated power 5KW. The inverters must be suited to the future extended also.</p> <p>-The Solar max power input rating should be equal or more than 4500W 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 5 KW compatible with the AC loads design. The inverters must include Graphic Display.</p> <p>Supply, install and connect all AC power cables appropriately : The unit rates include sized in accordance with the installation requirements and to connect the inverter with PV AC distribution board with all needed modification on Existing AC Panel of Building according to Engineer and other material such as conduits, clamps, hot galvanized trays and cable terminations end, the allowable voltage drop for AC cables between inverters and AC distribution board less than 3%.the allowable voltage drop for DC cables between inverters and PV distribution board less than 1%.</p> <p>• The contractor must submit manufacturer warranty for inverter as recommended by manufacturer. All works and materials must be according to the drawings, specifications and supervisor engineer instruction's and approval.</p>	Unit	3	726	الأرض والمطابق



N	Item	Specification	Unit	Qu.	سعر الوحدة بالولار	ملاحظات
3	Battery Bank	<p>The Battery Bank to be supplied shall be OPzV (Valve Regulated Tubular Plate GEL Batteries) batteries intended for solar applications, maintenance free and deep cycle. Taking into account the previous experiences and the lessons learned from them, only high quality batteries will be accepted, these batteries should be made by internationally recognized battery manufacturers such as Rolls, Fiamm, Sunlight, Hoppcke, BAE, DEKA, Trojan or similar.</p> <p>Batteries shall be configured into 48 V arrangements in all cases. The 48 V shall be achieved using 24 battery cells of 2V type in series. 6V, 9V, 12V or other cell tension battery kinds are not allowed. A maximum of 2 accumulator banks in parallel per installation will be accepted. All battery elements shall be provided fully charged.</p> <p>Interconnection cables and terminals must be provided with the batteries.</p> <p>Quantity, type, size and section shall be selected according to the proposed model of elements and its physical and electrical characteristics. Bidders must demonstrate the correct sizing of cabling with the proper documentation reflecting the calculations performed.</p> <p>The Batteries Bank shall provide 5 years or longer rated service life at an average Depth of discharge (DoD) of 50% as per IEC 61427:2005 and shall also</p>	No	1	7270	الأرض والمطابق

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		<p>be IEC-60896-21 compliant. Self-discharge shall not exceed 3% per month. At least 3 years of batteries shelf life when properly stored must be guaranteed. Compliance with standards shall be certified by an internationally recognized certification company such as TÜV, UL or similar Supply, install, connect and operate solar batteries, the price including all accessories, appropriate DC cables, hot dip galvanized profiles stand with shelves and dividers for holding batteries, Battery DC Box include MCCB with over current protection at 300A, busbars, Fuses, cable tray, and all other material needed to have a complete job ready according to drawings and the engineer's instruction and approvals.</p> <ul style="list-style-type: none">• Minimum Nominal capacity at 20°C and C10@ 1.8v/cell 37.44 kWh.• Minimum life cycles at 50% DOD and 20°C not less than 2500 Cycle.• Manufacture date Not older than 6 months at handover date of the installation.• Rack or cabinet, interconnection cables and terminals, paralleling bars and protectors.• The stand shall be original and easy replacement.			
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4	PV Mounting structure Unit	<p>PV Mounting structure Unit:</p> <p>Supply and install Module mounting structure from hot galvanized steel Profile (4x6x0.3) cm and (4x4x0.2) cm 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*0.25) m3 for each leg, The PV structure must covered with approved type of Epoxy painting, the structure includes bracing and hot galvanized angles/Profile for dividers. The contractor should submit shop drawings (hard and soft copy) to the mounting structures and the foundations, which must be designed structurally to be suitable to withstand all static loads that might occur according to the Site conditions. The mounting structure must be two strings of one layer of PV Panels .The price includes retesting Leakage of the roof insulation for the work area roof after completion of installation of PV system and making good of any damages to insulation membrane if occurred.</p>	LS	1	1357	أرض المطابق
5	DC Combiner Box	<p>PV Connection Box Specifications:</p> <p>Maximum input voltage 1000Vdc – Protection Degree IP65.</p> <p>DC Breaker should be DC double pole protection for input and output of the array.</p> <p>1000V DC double pole Surge arrestors. The price shall include DC protection & distribution Panel includes DC Breaker at charge controller input/output to finish the works according to the specification.</p>	LS	1	261	الأرض والمطابق

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6	Earthing System	Supply, install, test, and commission Copper electrodes, connectors, clamps, 50mm ² , 35mm ² strand Cu Cable to obtain resistance less than 2 Ohm for Separate DC & AC earthing system. The contractor should prove, measure the two separate grounding systems not more than 2 Ohm. Electrical Installation: Supply, install, test, connection with the internal AC grid and commission AC protected loads panel with all required AC bus bars AC cables, conduits. cable trays. protections including MCCB, MCB, RCD, SPD. ATS 40A 3ph, MTS digital KWh meters, digital multimeter in both AC in and load sides and all other material needed to have a complete job ready for protected load powering according to the engineers instructions and approval, the loads panel shall have 30% extra space for future extension. Type shall be Eton Or equivalent. including the following: - Solar MDB with AC in/out Circuit breakers for the inverter, overload on the load side and undervoltage protections in the AC in side. - AC surge arrester 40KA should be used in both AC in and load sides. -AC earthing system - DC double pole protection on the battery bank side The work shall include AC cable from existing MDB to system Input and from system output to the MDB - The items in general shall also include conduits, connection boxes, controls, wires, connectors, clamps, bolts, and connecting the cables to switchboards and main electric MDB for two buildings with required tools. -Ac acceptable cable loss is 3% and for DC only 1%. - The price include removing surplus ducts or wires or anything affected the work all as required from the point to corresponding DBs and switches, as engineer instructions.	LS	1	152	الأرضى والمطابق
7	AC Combiner Box		LS	1	878	الأرضى والمطابق

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- قرارات اللجنة:
- توصي لجنة العطاءات المركزية بالموافقة بالتربسية على شركة أضواء البشير كونه الأخص والمطابق في أغلب البنود والسعر الأنسب في إجمالي العطاء.
 - ضرورة التزام الشركة بشروط العطاء، وكذلك ما رود في الكتاب المرفق من الشركة (مرفق كتاب الشركة).

وأنهت اللجنة أعمالها بالتوقيع على المحضر ،



رئيساً
أحمد حسن الشنطي



عضواً
جبر حجازي



عضواً
أيمن الخالدي



عضواً
فاطمة حوص



عضواً مراقب
إيهاب الرئيس

الأمين العام للمجلس التشريعي
لجروت البلاك

