



Convent and Monastery Of The Missionary Sisters
Of The Holy Sacrament
Home Care Kfarmashoun

ABSTRACT

Tender documentation – Solar Integration Solution

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SCOPE OF WORKS

Objective:

The objective of these Terms of Reference is to guide a bidding exercise to identify suitable contractors to execute the works described below within Level of quality, budget and timeline. The general aim of the Project is to improve the implementation of green energy solution & technology in the home care at Kfarmashoun.

Nature of works and location:

This Project includes the integration and implantation of solar systems Electrical and mechanical (SWH) with a focus on energy photovoltaic and solar water heaters systems.

Increasing sustainability and energy efficiency to reduce fuel utilization and maintenance costs through the installation of PV systems, upgrading of the electrical system and replacing the electric water heaters into Solar water heaters (SWH) system

The Works will be implemented as per timeframe of 12 weeks max and they will be divided as follows:

- A. Civil Structural and Architectural Works.
- B. Mechanical Engineering Works
- C. Electrical Engineering Works

The scope of work for installing a photovoltaic (PV) system & SWH at Home care KFARMASHOUN typically includes the following:

Site evaluation: The contractor shall conduct an assessment of the site where the SWH & PV system will be installed to determine the location and details, layout, and orientation required for optimal performance.

System design: Based on the site evaluation, the contractor will submit a PV & SWH systems implementation program that meets the specific needs of the facility. This will include selecting the appropriate solar panels, inverters, tanks, pipes, pumps solar collectors for waters heat and other equipment required for both systems as per the below BOQ's.

Permitting: The contractor will obtain any necessary permits required for the installation of the Solar systems, including building permits, electrical permits, and utility interconnection agreements.

Equipment procurement: The contractor will purchase all of the necessary equipment required for the installation of the PV & SWH system.

Installation: The contractor will install the PV and water systems, including the solar panels, inverters, and mounting systems. This will also include the installation of any wiring, conduit, and other components required for the system. As well for mechanical SWH system drawing shall be submitted for the satisfaction of engineer and approval.

Commissioning: Once systems are installed, the contractor will commission both systems to ensure that it is operating correctly and efficiently.

Training: The contractor will provide training to the building owner or manager on how to operate and maintain the solar system PV and SWH.

Ongoing maintenance: The contractor may also offer ongoing maintenance services to ensure the PV system continues to operate efficiently over time.

The bidder's / contractor can provide a detailed scope of work that outlines all of the necessary steps for a successful installation and aftersales services.

Technical specifications for a photovoltaic (PV) installation typically include the following:
Contractor will be responsible to offer the following info with reference to below BOQ

PV module specifications: This includes the size, power output, and efficiency of the solar panels to be used in the installation.

Inverter specifications: This includes the type, size, and efficiency of the inverter required for the system, as well as any required transformers and filters.

Mounting system specifications: This includes the type and design of the mounting system required for the solar panels, as well as any hardware required for installation.

Electrical system specifications: This includes the size and type of wiring, conduit, and other components required for the electrical system, including any necessary grounding and surge protection.

Monitoring and control system specifications: This includes the type and design of the monitoring and control system required for the PV installation, including any software or hardware required for monitoring and performance optimization.

Battery storage specifications: this includes the type, size, and capacity of the battery bank required for the installation with specific warranty and cycles.

Interconnection specifications: This includes any requirements for interconnecting the PV system with the utility grid or other power sources, including any necessary switches, breakers, or other components.

Safety specifications: This includes any safety requirements for the installation, including requirements for grounding, fire protection, and personnel safety equipment.

Technical specifications for solar water heaters - SWH

Collector area: The collector area is the surface area of the solar panel that collects the sun's energy and heats the water. The larger the collector area, the hotter water the system can produce.

Storage tank capacity: The storage tank is where the heated water is stored until it is needed. The capacity of the tank will depend on the size of the household and the hot water demands.

Insulation: The storage tank and piping should be well insulated to prevent heat loss and maintain hot water temperatures.

Heat transfer fluid: The heat transfer fluid circulates through the solar collector and transfers heat to the water. The fluid should be non-toxic and able to withstand high temperatures.

Controller: The controller regulates the operation of the system, ensuring that the pump circulates the heat transfer fluid only when there is enough sunlight to heat the water.

Backup heating system: In case of extended periods of low sunlight or high hot water demand, a backup heating system can be used to provide additional hot water.

Mounting system: The mounting system secures the solar panels to the roof or ground and should be sturdy enough to withstand high winds and other weather conditions.

Certification: the systems shall be certified by recognized organizations, such as the Solar Rating and Certification Corporation (SRCC) or the International Association of Plumbing and Mechanical Officials (IAPMO), to ensure that the system meets industry standards.

ELIGIBILITY AND QUALIFICATION

Bidders shall provide all the information and documentation requested in this section with its Proposal. Failure to submit the information below will disqualify the Potential Bidder.

Mandatory Documents:

To proceed with the Technical Evaluation, Bidders shall submit the following mandatory original legal documents valid at the time of submission (No points – pre-qualifying criteria). **Failure to provide any of these documents shall disqualify the Bidder from further evaluation.**

The mandatory documents shall be issued no longer than 3 months except for Quittance of Social Security Fund that is issued on yearly basis.

- Power of attorney of the signatory.
- Certificate of registration of the Company issued by the Ministry of Finance
- Certificate of VAT registration, whether subject to VAT or not.
- Complete bidding documents initialed on all pages.
- Technical Proposal Submission.

Value added:

The Potential Bidder must provide sufficient information in their Proposal to demonstrate compliance with the requirements defined by engineer.

The forms listed below, shall be filled in by potential bidders and submitted with their proposals.

- Technical Proposal Submission BOQ PV & SWH
- Potential Bidder General Information
- Potential Bidder's Contact Details
- List of Proposed Key Personnel and CVs

Bidder's experience:

Bidders shall submit the list of similar completed projects (in type and value of works) within the past seven years, i.e.: PV and SWH medium scale In addition to *projects that are in hand along with financial values*.

The following compulsory details must be included for each project:

- Project details such as what was the project, which elements of works and services were performed by the Bidder
- Project value, at contract signature and at the project completion
- Time for completion, mentioning any delays from contract completion date
- Completion certificate (if project already completed)
- Name and valid contact details of Client and Supervision Consultant including phone numbers
- Pictures (before and after implementation of systems)
- Reference letters to be provided

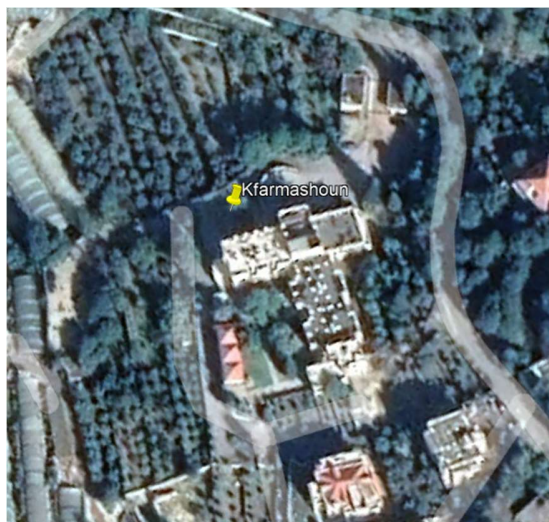
Resources and Equipment:

Technical Company Profile as per below table:

Key staff organigram showing organization of the proposed site and back-office staff + Available equipment & plant.

- *List of Proposed Key Personnel)*
- *List of measurement tools Equipment and software).*

Main Information



Site Info

| SITE INFO | | | |
|--|----------|----------|--------------------|
| Map data | | | Per year |
| Direct normal irradiation | DNI | 1758.3 | kWh/m ² |
| Global horizontal irradiation | GHI | 1768.4 | kWh/m ² |
| Diffuse horizontal irradiation | DIF | 675.5 | kWh/m ² |
| Global tilted irradiation at optimum angle | GTI opta | 1966.9 | kWh/m ² |
| Optimum tilt of PV modules | OPTA | 29 / 180 | ° |
| Air temperature | TEMP | 20.5 | °C |
| Terrain elevation | ELE | 323 | m |

Map

A map showing the location of Kfarmashoun with a blue pin. A scale bar indicates 500 m and 2000 ft. The map is credited to Leaflet and Esri.

Project:

Solar PV project and Complete solution for SWH (solar water heater) for Saint sacrament Couvent, Kfarmashoun – Mount of Lebanon JBEIL district, Lebanon

Location :

Latitude 34° 8'35.00"N - Longitude 35°40'44.42"E

Existing Power supply:

Diesel Generator 110KVA

EDL utility 3x 300A

DEMAND

Electrical Solar system

- A. Adding photovoltaic solar PV Hybrid solution to cover the demands of the building.
- B. Reconfiguration for electrical network for safe and eco management of energy.

Contractor shall supply separately 2 PV systems

1. For total loads of machinery and loads inside the Building average demand 75 to 100 Kwp.
2. Separate PV system as solar Pump for the existing 25 KW well pump.

civil works

- Preparation of earth system
- Preparation of Metal structure inverter housing and related safety works
- Fire rated doors for electrical rooms
- HVAC extraction for battery rooms.

Solar array installation

- Positioning of pre-cast ballast (concrete or other)
- Construction of array frame
- Mounting PV modules onto array frame
- Testing of PV modules
- Installation of electrical ducting
- Monitoring system installation

Testing and commissioning

- DC system commissioning
- AC system commissioning
- testing
- Certification of system
- Commissioning of remote monitoring system
- Completion / final acceptance
- Project handover

Notes:

The space for all necessary panels are available (See MEDIA form below), contractor can fit in Parking, Roof, and other location inside the facility with coordination of management of monastery. With ref. to attached pics guide for selected places and spaces.

Technical specs – Bills- PV

| Item | Description | Qty. | Unit | U. Prices | TOTAL prices |
|-----------|--|------|------|-----------|--------------|
| A1 | <u>Solar System for three phases Load - Monastery building</u> | | | | |
| 1 | Supply and install, a full solar power supply system for 3 phase for the monastery building and its facilities, including all needed works, accessories, wiring, and adjustments for the proper functioning of the system and to the satisfaction of the Engineer. | | | | |
| 2 | Solar Power Inverter meeting the following requirements: - Power rating of 75 kW to 100 kw - Integrated MPPT Functionality - Integrated input Noise Filter - Inverter efficiency: $\geq 95\%$ - AC Surge arrestor should protect the AC input side. - Operating Temperatures of 60 °C. - Minimum Protection class for inverter should be IP54 - Standards: EN 61800-1, EN 61800-3, EN 60204-1 or equivalent - Manufacturer Warranty: 3years minimum | 1 | LS | | \$ - |
| 3 | Supply, install and commission Solar PV Panels meeting the following requirements: - Module Type: Mono Crystalline - Module Power rating: ≥ 255 Wp - Efficiency: $\geq 20\%$ - 20 years 80% output guarantee - With bypass diode - IEC 61215, 61730, 62716 & 61701 - Minimum Cable Length: 1100mm -Tier1 Manufacturers certified Price to include all needed connections, fittings, wiring and safety | 100 | Kwp | | \$ - |
| 4 | A galvanized steel structure The steel frame needs to meet the load weight, and then PV panels and hold the wind load and shall resist to all weather condition holding the total loads of panels A load calculation shall be submitted for the satisfaction of the engineer . | 1 | LS | | \$ - |

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| | | | | | |
|----|---|---|------|-----------------------|------|
| 5 | Supply, and install deep cycle tubular batteries for power storage (Manufacturer Warranty: 2 years). Price to include all needed accessories, and wiring, to connect to the inverter and make the system operational. OR Lithium autonomy batteries to maintain the stability of the system and to provide energy emergency for night's loads . Autonomy 50 Kwh - 75kwh | 1 | LS | | \$ - |
| 6 | Supply and apply earth system rods and cabling to connect all equipment's and panels including the steel frames. The value of earth shall not exceed 10 ohms' values. For solar connections | 1 | LS | | \$ - |
| 7 | Perform needed works to update the existing electrical panel to integrate the newly installed system, to run on solar/EDL all phase equipment. Price to include all needed accessories, wiring, and circuit breakers. | 1 | Unit | | \$ - |
| | | | | TOTAL - A1 | \$ - |
| A2 | <u>Solar Pump System for existing well pump - Monastery building</u> | | | | |
| | Supply and install, a full solar pump supply system for the existing well pump of the monastery building, including all needed works, accessories, wiring, and adjustments for the proper functioning of the system and to the satisfaction of the Engineer. | | | | |
| 8 | Solar pump drive meeting the following requirements: - Power rating of 35 kW with reactor. - Integrated MPPT Functionality - Integrated Noise Filter - Inverter efficiency: $\geq 95\%$ - AC Surge arrestor should protect the DC & AC input side. - Operating Temperatures of 60 °C. - Minimum Protection class for inverter should be IP54 - Standards: EN 61800-1, EN 61800-3, EN 60204-1 or equivalent - Manufacturer Warranty: 3years minimum | 1 | LS | | \$ - |

| | | | | | |
|----|--|----|------|--|------|
| 9 | Supply, install and commission Solar PV Panels meeting the following requirements: - Module Type: Mono Crystalline - Module Power rating: ≥ 525 Wp - Efficiency: $\geq 20\%$ - 20 years 80% output guarantee - With bypass diode - IEC 61215, 61730, 62716 & 61701 - Minimum Cable Length: 1100mm -Tier1 Manufacturers certified Price to include all needed connections, fittings, wiring and safety | 40 | Kwp | | \$ - |
| 10 | A galvanized steel structure with concrete Pads The steel frame needs to meet the load weight, and then PV panels and hold the wind load Also shall resist to all weather condition holding the total loads of panels A load calculation shall be submitted for the satisfaction of the engineer . | 1 | LS | | \$ - |
| 11 | Supply and apply earth system rods and cabling to connect all equipment's and panels including the steel frames. The value of earth shall not exceed 10 ohms' values. For solar connections | 1 | LS | | \$ - |
| 12 | Perform needed works to update the existing electrical panels to integrate the newly installed system, to operate Remotely the pump On-Off Price to include all needed accessories, wiring, and circuit breakers. | 1 | Unit | | \$ - |
| 13 | As-built drawings and submittals | 1 | LS | | \$ - |

| | |
|--------------|------|
| TOTAL | |
| - A2 | \$ - |

| | |
|--------------------------------|--|
| TOTAL A1 + TOTAL A2 | |
|--------------------------------|--|

CIVIL & HVAC WORKS

| Item | Description | Qty | Unit | U. Prices | TOTAL prices |
|------|--|-----|------|-----------|--------------|
| 14 | Metallic door for selected electrical rooms | 2 | Pcs | | \$ - |
| 15 | Extractor for battery room + ducts Pipes + fire stop fillers and timers and related electrical panel | 1 | LS | | \$ - |

| | |
|-----------------|---------------|
| TOTAL A3 | \$0.00 |
|-----------------|---------------|

Mechanical solar system – SWH

- A. Adding Solar Water Heater SWH to satisfy the needs of hot water all floor levels and basement. The required quantities are 8000 Liters of heated water from solar for all the building including all general services and kitchen.
- B. Removal existing old water heater tanks and adjustment for the Piping network to match the new SWH installation.

Benefits and objectives

There are several benefits to installing a solar water heating system:

- Reduced energy costs: Solar water heating systems use free energy from the sun to heat water, which can lead to significant savings on energy bills.
- Environmental benefits: Solar water heating systems produce clean energy and reduce greenhouse gas emissions, helping to mitigate climate change.
- Reliability: Solar water heating systems are low maintenance and have a long lifespan, with some systems lasting up to 15 years or more.
- Energy independence: By generating their own hot water, homeowners can become less reliant on energy companies and reduce their vulnerability to energy price increases and diesel bills.
- Increased property value: Installing a solar water heating system can increase the value of the property and modern system generation.
- Incentives and rebates: Monastery may receive incentives and rebates.

Installing a solar water heating system can be a wise investment for monastery since they are looking to reduce their energy costs, minimize their environmental impact.

Technical specs SWH – Bills

| Item | Description | Unit | Qty | Unit Price | Total (USD) |
|------|---|------|-----|------------|-------------|
| | <u>SOLAR WATER HEATING SYSTEM - SWH</u> | | | | |
| A | Dismantling Of existing water heater tanks and inactive pipes & accessories | No. | 22 | | |
| B | Supply and install the following flat plate solar panels complete with pipe connections, di-electric connection, manometers, pressure and temperature relief valve with indirect discharge, safety thermostat, isolation valves , electrical connections to control panel, including metal anti corrosion supporting structure and all necessary accessories as specified and as shown on drawings. | | | | |
| | Flat plate solar panel (Blue Titanium)Collectors With Tempered Glass wit (110 to 130 m2) net capture area each to cover 8000 Liters of heated water | LS | 1 | | |
| C | Supply and installation of solar circulating pump, including isolating valves, check valve, strainer, pressure gages, electric motor, support, base, thermometers with electrical connections and all necessary accessories, | LS | 1 | | |
| F | Supply and installation of 300 Liters Pressurized Hot Water Tank Double Heat Exchanger, With Porcelain Internal Coating, complete with base, air vents, isolating valve, pressure relief valve, pressure gauge and all necessary accessories, all as specified and shown on drawings. 5years warranty | | | | |
| | Kitchen | No. | 1 | | |
| | Ground floor | No. | 5 | | |
| | First floor | No. | 10 | | |
| | Second floor | No. | 10 | | |
| G | Supply and installation of solar controller including all necessary sensors and accessories for proper operation, and all conduits, wiring and electrical connection all as specified | LS | 1 | | |
| H | Supply and installation of automatic air vent valves complete with coke valve, isolating ball valve. To be installed where needed for a proper heating system operation. | | | | |
| | Automatic air vent, 15mm diameter (1/2"). | LS | 1 | | |
| I | Supply and installation Booster Pump Horizontal Multistage Centrifugal Electric Pumps (Stainless Steel 304 including Variable Frequency Driver, Pressure Tank ,Accessories, Valves, Check Valves, Double union, Strainer Valve. | No | 2 | | |

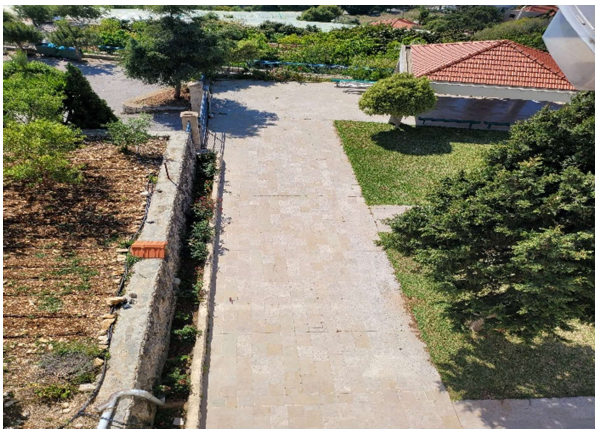
| | | | | | |
|---|--|----|---|--|--|
| | <u>SOLAR PIPING</u> | | | | |
| | Supply and installation of medium grade Seamless Black steel for solar water pipes according to DIN 2440, epoxy painted, with closed cell polyolefin insulation thickness 20mm and weather resistant coating as specified, including all fittings, brackets, flanges, hangers with all accessories all as specified and shown on drawings. | | | | |
| J | Pipe | LS | 1 | | |
| K | Ditto | LS | 1 | | |
| L | Glycol solution for the solar system | LS | 1 | | |
| | | | | | |

| | |
|-----------------|--|
| TOTAL A4 | |
|-----------------|--|

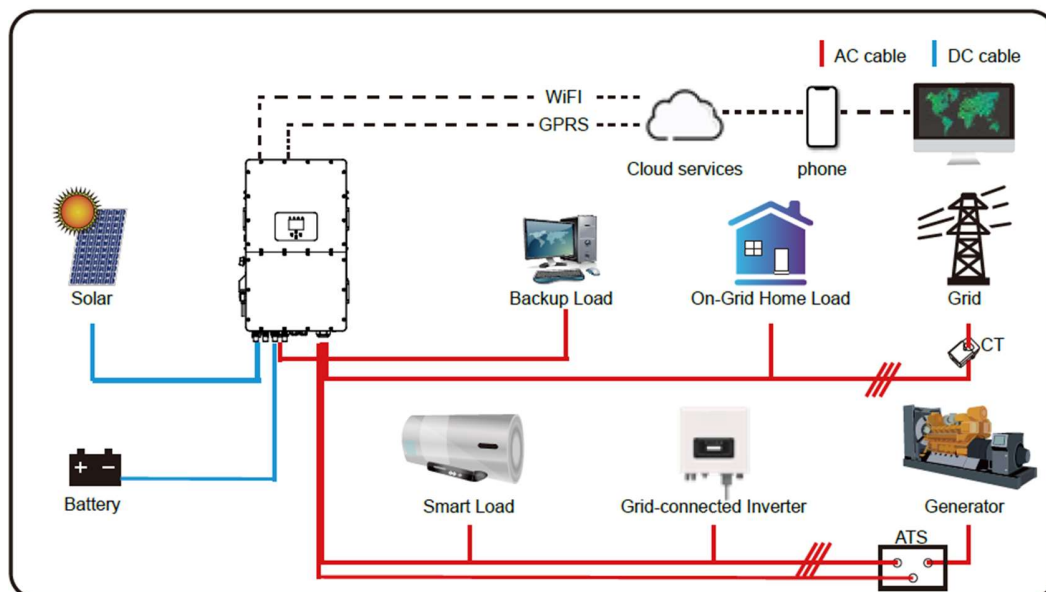
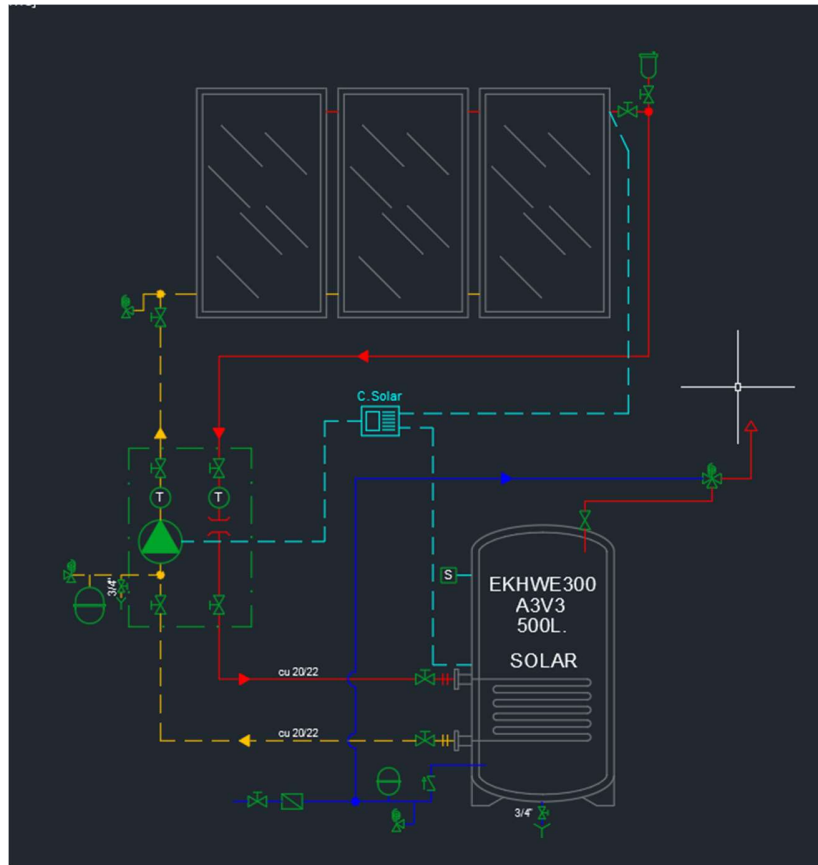
MEDIA



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Drawings illustration



Evaluation process and method

- A. Technical Proposals will be evaluated by the evaluation team. The evaluation will be restricted to the contents of the Technical Proposals and the reference checks.
- B. Engineers will first evaluate the completeness and responsiveness of Proposals in relation to:
 - Submission of all documents and information requested above.
 - Proposals that fail to comply with the above will be disqualified and will not be given further consideration.

Engineers will then evaluate the technical merits of each Technical Proposal using the rating system in **Table** below.

- A. A maximum of **70 points** will be assigned to the Technical Proposals. Technical Proposals receiving **50 points** or higher will be considered technically responsive. Non-technically compliant and non-responsive Proposals will not be given further consideration.
- B. Engineer will evaluate the Financial Proposals of those RFPs the bids that pass the technical evaluation. The total number of points allocated for the Financial Proposal is **30 points**. The maximum number of points will be allocated to the Proposal with the lowest price. All other Price Proposals shall receive points in inverse proportion to the lowest price.

The recommendation for the award of each lot will be based on the best value for money principle. The Proposal obtaining the highest cumulative score (Technical + Financial) will be recommended for the award.

Evaluation Criteria

| CRITERIA | MAXIMUM POINTS |
|---|-----------------|
| Technical Evaluation | 70 |
| 1. Bidder's experience A list of similar completed projects (in type and value of works) within the past seven 5 years, i.e.: school rehabilitation or construction. In addition to projects that are in hand along with their financial value | (Max 35) |
| 2. Resources and Equipment <ul style="list-style-type: none"> – Technical Company Profile: Key staff organigram; Available equipment & plant, CVs of each proposed staff. – Proposed Sub-Contractors. | (Max 20) |
| 5. BOQ's <ul style="list-style-type: none"> – A detailed priced Bill of quantities and clear proposition of materials and specs hat planned to implement for this project. – Technical drawing solutions and return on energy suggestion | (Max 15) |
| Financial Evaluation | 30 |
| 6. Price | |
| TOTAL MARK (Technical + Financial points) | 100 |