



## Annex A- Terms of Reference and Technical Specifications

PROVISION OF SERVICES FOR THE UPGRADE OF TWO (2) SOLAR POWER SYSTEMS  
FOR UNHCR OPERATION AT ARIDA AND KASAB BORDERS IN TARTOUS AND LATAKIA  
RESPECTIVELY - SYRIA.

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### 1. Objective:

Enhance the photovoltaic systems at health entry points in Arida and Kasab borders by replacing certain components and implementing necessary upgrades to ensure optimal performance.

#### Locations:

Location 1: Arida Tartous border point- Tartous -Syria.

Location 2: Kasab border point – Latakia – Syria.

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### 2. General Terms:

- The bidder should have experience in the implementation, and maintenance of photovoltaic power projects and should present proving documents.
- The bidder must provide certificates of origin and manufacture certificates for the imported equipment, proving quality and manufacturing year, along with equipment catalogues.
- The bidder shall perform the installation, wiring, and operation and ensure the proper functioning of the equipment.
- The bidder shall install and operate the equipment entirely and test it for **15 days** to ensure its efficiency.
- The technical specifications listed in these TORs are the minimum required, but the bidder may provide better alternatives.
- The bidder must submit a detailed drawing showing the wiring method, mentioning the cable measurements and breakers, that will be used, along with the location of each one, to connect and protect the kit.
- The implementation period **must not exceed two weeks** from the contract signing date.
- The warranty period must be **at least one year for the inverter and four years for the batteries**, starting from the project handover date. Additionally, the bidder commits to a **one-year Warranty Period / Performance Guarantee** and agrees to maintain or replace any project component in case of malfunction due to manufacturing defects.



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### Technical requirement:

#### 1. Inverter 6.2 kW to accommodate the existing 10 solar panels:

Replace the current inverter by provision and installation of a **6.2 kW inverter** to accommodate the existing **10 solar panels**. The inverter specs are:

- Rated Power Minimum: 6200 Watt.
- Dual outputs, for smart load management.
- **Zero (0ms) transfer time** to protect mission-critical loads such as servers and ATMs.
- High PV input voltage range.
- Detachable LCD control module with multiple communications.
- Built-in Wi-Fi for mobile monitoring.
- Configurable AC/Solar input priority via LCD setting.
- Reserved communication port for BMS (RS485 or CAN-BUS).
- AC Charger: 120A.

#### 2. lithium battery 300 Ah / 15 KW - Nominal Voltage: 48v:

Replace the current batteries by provision and installation of a **300Ah** lithium battery. The battery specs are.

- Type: Lithium LiFePO4 - 16 New Cells Great A
- Nominal Voltage: 48v
- Rated capacity: 300Ah / 15 KW
- Display: LCD
- BMS Connection Interface: RS485/CAN-BUS
- Operating temperature: Charge: 0~ + 50°C/Discharge: - 20~ + 55°C
- Cycles : ≥6000
- Should be built-in WIFI or Bluetooth



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### 3. Create Ventilation Opening:

Implementing a ventilation opening in the aluminium door of the battery and inverter room by using Alum grill to ensure adequate ventilation and improve system efficiency, the dimension should be aligned not be less than 50x60cm. All required materials and accessories should be used to complete the work neatly. The installation method must be approved by UNHCR before proceeding.

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### 4. Cable 50 mm<sup>2</sup>:

Supplying and installing cables between the battery and inverter with a cross-section of 50 mm<sup>2</sup> with the connections, cable heads, fixing materials, protection plastic ducts and everything needed to complete the work neatly according to UNHCR instructions.

- The cables should be manufactured according to international standards (IEC6033-IEC60227-IEC60724-VDE0271/3.96), and the manufacturer should be among the best manufacturers in this field or an equivalent in the local market.
- The quality of the cables and their cross sections should be compatible with the currents transmitted through them and the high temperatures that might be at the site. All cables and connection wires should be made from copper, insulated, and from the best brands.
- The contractor must provide all high-quality wires, cables, conductors, and breakers required to connect and protect the system.

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### 5. Wire 6 mm<sup>2</sup>:

Supplying and installing wires between the electrical panel and the inverter's second output with a cross-section of 6 mm<sup>2</sup> with the connections, cable heads, fixing materials, protection plastic ducts and everything needed to complete the work neatly according to UNHCR instructions.

- The wires should be manufactured according to international standards (IEC6033-IEC60227-IEC60724-VDE0271/3.96), and the manufacturer should be among the best manufacturers in this field or an equivalent in the local market.
- The quality of the wires and their cross sections should be compatible with the currents transmitted through them and the high temperatures that might be at the site. All cables and connection wires should be made from copper, insulated, and from the best brands.
- The connection should be wired inside appropriate flexible tubes or ducts to protect them from external stress according to UNHCR instructions. The contractor must provide all high-quality wires, cables, conductors, and breakers required to connect and protect the system. The work also includes all necessary arrangements for connections inside the electrical panel, with all that is needed to complete the work neatly.



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**6. Rearranging the connections of the solar panels:**

Connecting the two existing solar panels on the building's roof, which are not yet connected to the system, with the other eight solar panels that are already connected. This includes all necessary work to ensure a neat completion and optimal performance of the system, such as high-quality cabling/wiring, accessories, tools, and materials.

**7. Install digital Voltage and Current Protector:**

Supplying and installing digital Voltage and Current Protector (Digital Adjustable Automatic Reconnect Over and Under Voltage Protection) of high quality available in the local market with all needed high-quality materials, conductors and accessories.

**Bill of quantities**

#	Item	Unit	Quantity	
			Arida	Kasab
1	<u>Inverter 6.2 kW to accommodate the existing 10 solar panels</u>	Item	1	1
2	<u>lithium battery 300 Ah / 15 KW - Nominal Voltage: 48v</u>	Item	1	1
3	<u>Create Ventilation Opening</u>	lumpsum	1	1
4	<u>Cable 50 mm<sup>2</sup></u>	linear meter	5	5
5	<u>Wire 6 mm<sup>2</sup></u>	linear meter	35	35
6	<u>Rearranging the connections of the solar panels</u>	lumpsum	1	1
7	<u>Install digital Voltage and Current Protector</u>	Item	1	1

Thank You