

## Annex A: Scope of Work (SOW) & BOQ

### **Design, Supply and Installation of 30 KW Hybrid solar PV system for Basirma PHCC -IRAQ**

- The project of Design, Supply, and Installation of 30 KW Hybrid solar PV system for Basirma PHCC is to provide the PHCC with backup power supply during the working time and cover the shortage of electricity.
- The selected company will be responsible for designing a PV solar system (30 KW) with all details and submit it to the UNHCR technical unit for approval before starting the work.
- Before starting the work, the contractor is responsible for submitting all certificate of origin.
- The work includes fixing an aluminium structure fit for 78 PV panels at the roof of the PHCC and installing three hybrid inverters (10 kW each) inside the PHCC connected with the mainboard outside.
- Also re-arrange all wiring inside the PHCC to make sure that we have two feeder lines: one for the critical load connected with the PV solar system and the other for the normal load.
- The aluminium structure, PV panels and inverter must be earthed.
- All PV cables at the roof or standard cables outside the PHCC must be covered by cable tray, PVC pipes or flex pipe.
- UNHCR engineers and or third-party will inspect the quality of the work implemented by the contractor. The work must be within engineering specifications/standards and time limit.

#### **Schedule of Requirement**

| No | Item/s to be Supplied  | Description/<br>Specifications<br>of Goods | Related<br>Services | Contract Duration<br>(Calendar days)  |
|----|--|--|---------------------|---|
| 1  | Design, Supply and Installation of 30 KW Hybrid solar PV system for Basirma PHCC, Erbil. | As per BOQ                                 | As per BOQ          | 39 months<br>( 3 months<br>implementation + 36-<br>months guarantee /<br>defect liability period) |

Further to the Schedule of Requirements in the preceding table, bidders are requested to take note of the following additional requirements, conditions, and related services about the fulfilment of the requirements:

1. All electrical and mechanical components for this project must have a three-year warranty and Guarantee. The original factory must endorse this warranty.
2. The specification of the materials and the implemented works should comply with IRAQI General Technical Specifications (IGTS) and the instructions of the supervisor Engineer.
3. All materials must be NEW from the best type, and samples should be provided for all materials to be used in the project before using them to get approval from the supervisor Engineer.
4. All imported materials should be supported by providing certificate of origin and Certifications (CE, ROHS, FCC, BV, BSCI, ISO.....etc.).
5. The contractor is responsible for fixing any damages or defects happened during the implementation.
6. The site must be cleaned from all debris after finishing all the works.

|                                   |   |
|-----------------------------------|---|
| Delivery Terms of the Project     | Basirma, ERBIL IRAQ.  |
| Exact Address                     | Basirma, ERBIL IRAQ.  |
| Testing Requirements              | All materials must be tested in IRAQ according to Construction Works Specification by NCCL (1981 edition) or having a certificate from a reliable entity like (Intertek, SGS ...etc.) prove that the product complies with the requested specification.   |
| Technical Support Requirements    | As per the BOQ.   |
| Duration of Contract              | <b>39 months</b> (3 months implementation + 36 months guarantee/defect liability period)  |
| Payment Terms                     | <p>Payment to the Contractor shall be made as follows:</p> <ol style="list-style-type: none"> <li>1<sup>st</sup> payment (30%) after delivering the materials on site.</li> <li>2<sup>nd</sup> Payment (60%) after completing the total scop of the works for the project based on the contract.</li> <li>Final payment (10%) retention payment to be released as follows: <ol style="list-style-type: none"> <li>1) 5% to be released after the expiration of the first 12 months period of the defect liability period.</li> <li>2) 2.5% after the expiration of the second 12 months period of the defect liability period.</li> <li>3) The remaining 2.5 % after the expiration of the third 12 months period of the defect liability period and completion.</li> </ol> </li> </ol> |
| Conditions for Release of Payment | For interim payments:   |
|                                   | <ol style="list-style-type: none"> <li>1) Approved Requests for Inspections from the supervision engineer.</li> <li>2) Approved detailed quantity sheets (take-off sheets) from the supervision engineer.</li> <li>3) Approval from UNHCR's Representative on the whole process.</li> </ol>   |

### BILL OF QUANTITIES (BOQs)

| No.      | Item Description  | Unit | Quantity |
|----------|---|------|----------|
| <b>1</b> | <b>Hybrid PV Solar System of 30 KW . Full package Hybrid system with Battery Back-up able to connect to the National grid and Emergency Genset. All the material should be from the first quality European/USA Brands (Certificate of Origin will be required) with three years Warranty period.</b>  |      |          |
| 1.1      | Solar Panels, Mono Crystalline or Polycrystalline PV Solar Modules 410 W, 144 cells (6x24), Half Cut Technology, PID Free Certificate, Min 20% Efficiency, internationally certified by TUV Rheinland to ISO, BS and UV standards (10 Years product Warranty & 25 Years performance Warranty) with Certificate of Origin (COO).   | No   | 78       |
| 1.2      | PV panel connection box (DC Combiner) with DC Fuse Box, Earthing & Protection System.   | Set  | 1        |
| 1.3      | Aluminum Structure/Tower, Module Support Structure Foundation mounted type Or Rammed Steel Beam for Solar Panels of required high (according to the site requirements and supervisor Engineer instructions) for mounting the solar panels. (Or Roof Type) with a minimum of 10 years warranty.  | Set  | 1        |
| 1.4      | Hybrid Inverter, 30KW (3*10 KW or Equivalent), Minimum PV Array 11 KWp each, Minimum 96% Efficiency, Integrated MPPT, Charge Controller (80A), Transformerless, Pure Sign Wave, Online Monitoring System, Surge Protection & Protection System with all other fittings, accessories, and required works. Ambient Temperature -20 to +65 °C, IP 65 (USA, Japan & Western Europe Origin)- Min 3 Years Warranty. | Set  | 3        |
| 1.5      | Battery Back-up, OPzV Type tubular Gel Battery, min 1500 Ah, 2V, with minimum 1500 Deep Discharge Cycles & and 7000+ Cycles at 50% DOD. Including All required Battery Racks, DC Fuse Box and Accessories. (USA, Japan & Western Europe Origin)- Min 3 Years Warranty.  | Set  | 24       |
| 1.6      | AC Switchgear for connecting the Inverter to the building SDB with All required types & sizes of Electrical Cables with all connections between Solar Panels, Inverter, National Grid and Terminal Electrical Boxes. 4, 2 cores DC, Copper Earth Cables with all required accessories.  | Set  | 1        |
| 1.7      | AC Control Board for control switching system between Solar System, National Grid and Generator with preset priority. It should include rewiring and separating the existing installation to Emergency Load (feed just by Solar) and None Emergency Load (feed by National Grid & Generator).   | Set  | 1        |
| 1.8      | Installation, Test, Commissioning of the solar system. The work includes training of the end user team on the operation and maintenance of the solar system.  | L.S  | 1        |
| <b>2</b> | <b>Civil &amp; Mechanical Works</b>   |      |          |
| 2.1      | Roof Preparation, cutting, filling and preparation concrete blocks/ or rammed beams. Cable Trenches and cable pipes and accessories for Installation of PV Structure, necessary cable ducts and access ladders).  | L.S  | 1        |

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|-----|---|-----|---|
| 2.2 | Design, supply material and installation of proper Solar Panel Automatic Washing/Flushing System, Booster Pumps with Pipe networks by using composite PPR (UV & Thermal resistance) PN 16 Bars & Dia, roof water tank of Min. 3000 liters storage capacity and then to the solar panels with all required fittings, gate & non-return valves, electronic automatic control system, and plumbing works. The designed system should cover all the panel surface and enough power for washing the panels). | L.S | 1 |
|-----|---|-----|---|