ANNEX II

TECHNICAL OFFER

To be completed by the tenderer

Please provide the following information

Specifications required	Specifications offered
Photovoltaic modules	
PV modules must be composed of silicon cells in mono-or poly-crystalline (technical documentation to be provided).	
PV modules must be certified for a conformity with IEC standards.	
All PV modules must be of the same type (same peak power, same technology, and same manufacturer).	
Each module must be clearly and permanently labelled with an indication of the following: the manufacturer's name or model number, the serial number, the maximum system voltage, peak power (Wp, tolerance +/-), current and voltage at the maximum power point 5MPP), open-circuit voltage and short-circuit current.	
The PV module must be equipped with waterproof connection box IP54 (or higher standard).	
The connections in the PV module junction box must clearly indicate the positive and negative poles preferably by using the red and black conventional colours.	
Each PV module must be protected from the overloads, over-	

voltage, and reverse polarity by protection systems.	
PV modules must be mounted in or on an aluminium or stainless steel to guarantee the physical resistance of the structure.	
Warranty on the PV modules: minimum of ten years on the performance and components.	
Batteries	
Batteries will be Lithium-Ion batteries (technical documentation to be provided).	
Manufacturing standard: EN/IEC/ISO 9001/9002.	
Charge compliant with standard IEC 896-1	
Guarantees performances: 6 years	
Assembly and installation: Each battery will be engraved with the manufacturing date and all the batteries will be transported and will be delivered pre-loaded to 100%.	
Charger regulator (CR)	
The regulator necessary for the charge of the batteries is correctly dimensioned with a power reserve of at least 25% and of MPPT technology (Maximum Power Point Tracker).	
Regulator has to be compatible with the type of battery choses in order to provide for an optimum life of cycle.	
Indicators (of the type of LED) indicating at least the state of charge the battery, overload and short-circuit.	
The case of the charge regulator will be of the type IP 54	

waterproof to prevent the entry of insects, dust and be corrosion resistant.	
Minimum lifetime 2 years.	
Inverter	
Total protection will be provided against reverse polarity, over-voltage, and short circuit and over temperature. The inverter has to be provided with an internal input breaker.	
The inverter will be well dimensioned with a reserve of power of at least 25% in relation of 25 kWp system.	
Self-consumption less than 2%	
In conformity with the standard EC CIS ISO.	
Must clearly be labelled with at least the following information: the manufacturer's name and the model, serial number, voltage and current , battery charge condition, connection and polarity points.	
Minimum lifetime 2 years.	
Batteries enclosure, charge regulators and inverters enclosures	
The batteries, regulator, and inverter should be installed in ventilated cabinets and padlocked. The design will prevent entry of water, small animals, insects, and dust. They must avoid the risk of short-circuit and of electrocution.	
A clearly readable warning label will warn eh user of the dangers of the risk of electric shocks. This label will be in English.	
Batteries will being independent cabinet. Regulators and	

inverters can be in common cabinet.	
Cabinets will be of industrial standard ISO 9001/9002.	
Equipment must be easily accessible for the control and maintenance technicians.	
Protection and cabling	
The general protection system will be of Earth separate neutral type (TN-Ph).	
The cables going from the photovoltaic panels to the connection boxes, the connection boxes towards the regulator then to the batteries and finally to the inverter must be distinguished, including: sections will be calculated to minimize the voltage losses (acceptable voltage losses less than 3%), cables are flexible and resistant to UV and atmospheric conditions and The size and the length of the cables have thus carefully to be choses to reduce as much as possible the voltage losses.	
Design of the solar photovoltaic system	
Make a design of the solar photovoltaic system proposed for the “ECHO” office	
Supply and installation of PV solar equipment	
Please explain here the way you plan to supply and install the PV solar equipment	
Technical support and after sales services	
Please indicate here the technical support and after sales services you offer	

Time for delivery expected	
Please indicate here the time for delivery expected	
Staff training	
The company will provide the training of the staff ECHO in Maiduguri (at least three people).	
The training will cover all the operations which have to be carried out as part of normal use and routine maintenance by the recipient, including the concepts which are necessary to detect the existence of a problem which should be pointed out to the maintenance company.	
Training will be done before the provisional acceptance; it will include hands on training.	
The company will develop in English, a procedure handbook illustrated with pictures or drawings.	
Maintenance	
The corrective maintenance consists of assisting in the preparation of the report to the manufacturer and if the replacement of the defective part is required by the warranty, the installation of spare parts sent by the manufacturer and which can be replaced by the customer without invalidating the warranty Upon a call from the customer indicating an operating anomaly or failure, the service provider will send a technician to troubleshoot the equipment as quickly as possible and the interventions will be taken in place within maximum 2 (two) working days after the ECHO's request.	