**Scope of Work**

**Supply, Delivery, Installation, Test and Commissioning of off grid solar systems with the capacity of 1.4, 2.1, 4.2, 5.2 kWp and low-consumption ceiling fans and LED lamps to Hajjah, Hodeida, Taiz, Abyan and Lahj Governorates.**

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**United Nations Development Programme**

**July 2019**

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| **Background Information about the Project:**The three years (March 2019-February 2022) joint programme **“Supporting Resilient Livelihoods and Food Security in Yemen joint programme (ERRY II)”** financed by EU, will be implemented by FAO, ILO, UNDP and WFP in six vulnerable governorates: Hajjah, Hodeidah, Lahj, Abyan, Taiz and Sana’a.The overall objective of the programme is to contribute to reduced vulnerability and strengthened resilience capacity of crisis-affected communities in Yemen through creation of sustainable livelihoods and access to basic services. The Specific Objective (Outcome) of the programme: Crisis affected communities are better able to manage local risks and shocks for increased resilience and self-reliance. The joint programme expected to achieve the following results over the implementation timeframe:* Output 1. Community livelihoods, productive assets and food security are improved to strengthen resilience and self relianace;
* Output2. Vulnerable communities benefit from solar energy for sustainable livelihoods opportunities and enhanced social service delivery;
* Output 3: Communities and local authorities have enhanced capacities to respond to conflict and gender sensitive priorities needs

**Yemen Context:** Energy supply in Yemen is minimal nationwide in general. In rural areas, the increasing demand for energy and the limited availability of fuel is among the top challenges’ communities face. The total generation capacity of the Yemeni electricity system before the crisis was about 1.223 GW. The supply gap against demand estimated at 500 MW in 2013. Damage to the energy sector since the crisis has caused energy levels to drop more than 50 percent, which in turn has affected the health, education, employment, water, solid waste management, and private sectors, as well as vulnerable households, women and the poor. Rates of using fuelwood have increased rapidly, causing adverse environmental impacts.As per the socio-economic and rural energy gaps and needs assessments, the findings have indicated that, about 80 percent of households had been affected by interrupted or cessation of energy, affecting home-run businesses (tailoring, small stores, handloom textile, and handicrafts), as electricity plays a pivotal role in the development and profitability of these types of businesses. Delivery of social services has been impacted: 50 percent of health facilities lack reliable energy sources, which affects health service delivery, especially vaccinations. Also, 74 percent of education facilities lack energy sources. Women in most areas experience energy poverty differently and more severely than men. Without access to reliable energy sources, women and girls spend most of their day performing basic subsistence tasks which constrains them from accessing decent wage employment, educational opportunities and livelihood enhancing options, as well as limits social and political interaction outside the household. In contrast, access to reliable and sustainable energy can significantly enhance women’s empowerment by reducing labor burdens, improving their health, and providing them with opportunities for enterprise, income generation, and capacity building.The solar energy would focus on improving access to service delivery by promoting decentralization of solar services and facilities to generate income opportunities for livelihood improvement. The intervention would consolidate and build on the learnings from ERRY I. Solar energy would focus on a market-based approach to decentralize access to solar services in both rural and semi-urban areas. Community-based affordable solar and renewable solutions would be developed to provide income generation opportunities to affected individuals and households. Schools, health and WaSH facilities, irrigation, producers’ group and local businesses, markets, private sectors would be supported to increase service efficiency. Overall, the solar value chain would be supported and strengthen through women economic empowerment approach.Public service institutions such as school, health centers/facilities, local authority offices, safe spaces, market centers, and places would have the provision of access to solar energy. Combination of PV solar system and the microgrid would be implemented to support the above institutions to resume the critical facilities and functions. The institutions would be identified through a range of the criteria in close collaboration with the Ministry of Public Health, Ministry of Education, MOPIC, Local Authority, and relevant government agencies. The technical team would conduct the energy gap assessment which will fed to the community resilience planning (Local Governance and Social Cohesion Component). The intervention would adopt the good practices and lessons learned identified in ERRY I to improve the services in public institutions. The solar energy operational guideline has developed which covers sectors such as education, health, WASH, Agriculture, Jobs, and Employment. The guideline provides criteria of selecting institutions, the process of implementation, potential bottlenecks and risks, and mitigation guidance. The guideline also provides a solution for different structures within the sector such as education and health. The implementing partners would be trained on the good practices; lessons learned and operation guideline to create awareness and orient front line, staff. The intervention would build synergy with WFP and support the rehabilitated or constructed community or public assets with solar energy provision. The good practices have highlighted that the replacement of solar energy solution has enabled the public institutions to have monetary savings every month. The savings utilized in improving or upgrading work environment.Solar energy solutions for individuals and households would also be the focus of the interventions. Consider the lack of access to energy for displaced, returnees, refugees and host communities in the rural areas, solar energy solutions would not only improve access to energy but would also help support them in income generation activities. The experience of ERRY I highlights that the household with PV solar lantern was able to save $10/month and it helped in setting up microbusiness due to prolong access to energy. The access to PV solar lantern was also able to support the vulnerable households in reducing the protection and GBV risks, especially among IDPs living in open spaces. **Scope of Works:*** Supply, delivery, installation, testing, commissioning, operating, handing over and maintaining solar PV off grid systems.
* Supply of the complete systems, including all accessories and tools etc. as per technical specifications given below.
* The bidder must also provide a detailed description, datasheets, catalogues, drawing, performance international certificates and valid warranty certificates for all proposed components and goods with detailed specifications.
* The selected bidder should submit the Product/type test reports from accredited laboratories for proposed products. Product/type test reports should be submitted for solar PV panel, Inverters and batteries.
* Documentary evidence such as original manuals, catalogs, brochures etc.as a proof of product specifications under the compliance list should be submitted.
* The contracted supplier will be responsible for providing training sessions in the facility where the solar system will be installed in term of system operation, regular and preventive maintenance’s procedures and system management.
* The training sessions shall be conducted in site and include the following subjects as a minimum:
1. System operation in detailed steps
2. Inverter operation
3. System isolation
4. System monitoring
5. Fault diagnosis
6. Safety and emergency shutdown procedure
7. User manual and must be written in Simple language (local language) to be more understandable in targeted rural communities.
* Carry out all civil and electrical works for SPV compatible electrical systems.
* The bidder should install and provide full protection system against lightning strike to ensure that all system’s components are fully grounded all time, any equipment fails due to lightning strike will be replaced by the supplier under warranty service with no cost.
* Ensure each piece of electrical equipment & apparatus will be connected to the main earth busbar by means of branch/main connection of earth conductors.
* Ensure all electrical equipment, except those operating at extra low voltages will be provided with ground terminal.
* Erection and commissioning of the supplied systems on nominated sites and do any other work urgently required as per site conditions.
* Warranty period for the entire system shall be at least 3 years (as mentioned in BOQs), including replacement of components if needed.
* The bidder is responsible for arranging all accessories and measuring/testing instruments required to smoothly commission the system.
* Supply, delivery, installation, testing, commissioning, operating, handing over and maintaining of Low-consumption ceiling fans and LED tube lamps as per BOQs.
* Replace old Fans and Fluorescent lamps by new Low-Consumption Fans and LED lamps on the specified site and do any other work urgently required as per site conditions.
* The bidder is responsible for Integrating the new system with the new MDB/Existing MDB.
* Regarding actual work to be carried out at the site, bidder needs to execute the work in consultation with the UNDP engineer.
* Exact locations: will be provided for the selected bidder by project team.
* The quoted transportation cost shall cover the prices for transportation of all equipment within all installation’s locations within the District.
* Successful bidder is required to provide following documents when equipment is delivered:
1. A complete list of system components with associated manufacturers literature, specifications and warranties.
2. A complete copy of user manuals in Arabic.
3. Recommended annual maintenance schedule with maintenance instructions.
4. Submit detailed implementation plan after signing contract.
5. A functional block diagram, an electrical single line diagram and physical layout diagram for the total system (for each).
6. After contracting, all the components offered should have type tested and certified as per the relevant standards by an accredited laboratory accepted by the UNDP project office. Only the copies of relevant test reports need to be attached.
7. All technical details given in the offer should be supported with documentary evidences such as manufacturer’s catalogs, leaflets, test certificates, data sheets etc.
8. The bidder/selected party should ensure the performance of these systems with an average energy yield (for normal solar irradiation condition) of not less than 100 kWh/month/kWp installed capacity.

**Other requirements** The bidder should also comply with the following service requirements, warranty and after sales services;1. All the equipment/components are new, unused, and of the most recent or current models, free from defects and that they incorporate all recent improvements in design and materials.
2. The bidder or authorized local representative should provide all product upgrades/updates issued by product manufacturers.
3. Should be able to provide replacement items of all system component within 3 working days after the notice of malfunction during the warranty period.
4. The bidder/ authorized local representative must be able to attend to site problems on site within three working days with fair notice from customer.
5. An operation and troubleshooting training, and recommended maintenance schedule shall be handed over to the project team / in-house personnel at the installation/commissioning.
6. The bidder/ authorized local representative shall be able to offer a scheduled maintenance contract and, list of critical spare parts for trouble free operation of installed systems for minimum of five years.
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