



**United Nations Office for Project Services  
(UNOPS)**

**Yemen Emergency Electricity Access Project  
(YEEAP)**

**Component 1: Financing for Off-Grid Solar**

**Sub-Component 1.2: Restoring Electricity Supply to Critical Service Facilities**

**Supply and Installation of Small-Scale Solar PV Systems 3 health centers in  
Hajjah governorate.**

**Level 2 Environmental and Social Management Plan**

**August 26, 2021**

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## 1. Summary Sheet

Yemen Emergency Electricity Access Project (YEEAP), Component 1 Financing for Off-Grid Solar, Sub-Component 1.2: Restoring Electricity Supply to Critical Service Facilities.

|   |   |
|---|---|
| <b>Sub-Project Name</b>                       | Supply and Installation of Small-Scale Solar PV Systems 3 Health Centers in Hajjah Governorate. |
| <b>Sub-Project Location</b>                   | Hajjah Governorate  |
| <b>Implementing Partner</b>                   | Implemented by UNOPS  |
| <b>Is OP 4.01 applicable?</b>                 | Yes   |
| <b>Is the Subproject eligible (Yes/No)?</b>   | Yes   |
| <b>Risk level (1 to 4)</b>                    | 2   |
| <b>Field Visit (Yes/No; include date)</b>     | Yes, in July 2021   |
| <b>Was consultation carried out? (Yes/No)</b> | Yes, in August 2021   |
| <b>Observations/Comments</b>                  | Indicated below   |
| <b>Signature of ESSO</b>                      |   |
| <b>Date</b>                                   |   |

## 2. Sub-Project Description

### 2.1 Nature and scope of activities

UNOPS will Supply and install Small-Scale Solar PV Systems 3 health centers in Hajjah governorate. UNOPS will use contractors to install solar PV systems. This will require a work team of less than 10 persons approximately for 5 days in each facility.

The solar PV systems will be owned and operated by the administration of the targeted facilities, and the systems will be located on the top-roof of these facilities. In addition, guards and staff (male and female) from these facilities will be trained in solar systems operation and maintenance.

#### **Design Requirements and Guidelines:**

The contractor is responsible to carry out the detailed design works for the PV solar systems in the 3 different locations specified as per the following requirements:

- **Technical Assessment Report:** Preparation of this report should be in consultation with stakeholders and should serve to identify user needs, requirements and quality expectations. Relevant codes, standards, and minimum requirements must be clearly identified, and all site surveys, structural integrity check, testing the existing network and wiring and collection of additional data as necessary, environmental and risk assessments should be also considered

in preparation of the technical assessment report. This report should include the following information for each facility:

1. Site information based on site investigations and surveys, which should include but not limited to:
    - a. As built schematic diagram for the Main Distribution board and its location within the facility.
    - b. As built drawing for the top roof where the PV systems is proposed to be installed, includes area, existing utilities etc.
    - c. Structural integrity checks for the top roof.
    - d. Verification of the total connected load for each facility.
  2. Proposed codes and standards to be used in the design. Any other national or international requirements.
- **Detailed Design for each Site:** Once the technical assessment report is approved by UNOPS, the contractor will be requested to develop the detailed design of the PV solar systems for the three facilities. The following documents are required to be developed and submitted to UNOPS approval:
    1. PV System layouts and drawings including Single Line Diagram (SLD), Cable routing layout for DC & AC, earthing system, and Junction Box(s) and combiner box(s).
    2. Cable selection schedule and voltage drop calculations.
    3. Mounting Structure system (layout, fixation and analysis).
    4. Structural calculation report for the design of the mounting structure.
    5. Schematic diagram for the proposed new Main Distribution Board (MDB).
    6. Outdoor LED Lighting fixtures layout.
  - **Technical Specifications and Schedules:** Along with the design documents, the contractor shall provide the catalogues / data sheet of the selected PV systems equipment with detailed technical specifications for the proposed system and components. All relevant standards, manuals, and guides should be cited, as these will be used as the basis for quality assurance, control and payment for completed works.
  - **The BOQ Schedule:** This document should provide a breakdown of the construction prices in the contract. It should include all relevant applicable work activities and quantities, description of work, material, methods of QA/ QC measurement, and basis of pricing the construction items in this tender.

The full final design package will be submitted to UNOP for review and approval. The conclusion of the design review process will be marked by the issuance of the Certificate of Design Review Compliance. This certificate is required prior to proceeding to construction stage.

Design Liability shall rest with the Contractor. Design reviewer's liability shall be limited to evaluating the compliance of the design against the requirements set out in the TOR and shall not include any liability for the design itself, which shall remain with the Contractor.

### Design Guidelines:

- Modules used will be standard 72 cells modules with minimum capacity of 360 Wp;
- Standard maintenance GEL OPzV batteries will be used in the project, no more than 3 strings shall be paralleled;
- Battery Bank shall be designed at 50% DOD;
- 2 days of autonomy should be considered in designing the storage system;
- Round trip efficiency for the battery is assumed to be 0.85;
- Design losses for the PV modules including but not limited to temperature, inverter inefficiency, charge controller inefficiency, dust and others should be 40 %;
- The battery storage capacity should be calculated based on below formula;

$$\text{Storage Capacity (Ah)} = \frac{\text{Load} \left( \frac{\text{Wh}}{\text{Day}} \right) \times \text{Autonomy Days (2 Days)}}{\text{Round Trip Eff. (0.85)} \times \text{DoD (0.5)} \times \text{Battery Voltage (2V)}}$$

- The modules capacity should be calculated based on below formula;

$$\text{Modules Capacity (kWp)} = \frac{\text{Load} \left( \frac{\text{kWh}}{\text{Day}} \right) \times (\text{Safety Factor})}{\text{Irradiance (3.8)} \times \text{System inefficiency (1 - 0.4)}}$$

### Performance Criteria for accepting Design, Technical Standards and Specifications.

The design should be developed considering the following requirements, and PV systems have to be specified with the following minimum technical specifications:

#### PV Modules

- The PV array(s) should be constructed with the minimum shading effect;
- It should be comprising of either mono-crystalline or polycrystalline;
- Module capacity with minimum 360 Wp.
- The module type must conform with CE and IEC 61215, IEC 61730, IEC 61701 or equivalent standards;
- Module conversion efficiency should be equal to or greater than 17.5 % under STC;
- The PV manufacturer should be approved as tier-1;
- The PV module shall perform satisfactorily in humidity up to 100% with temperature between – 40 °C to +85 °C;
- The rated output power of any supplied module shall have tolerance of 0-5 W;
- The module shall be provided with a junction box with IP67;
- The supplied module DC voltage should be not less than 600 VDC;
- The modules shall have individual serial numbers in addition to nameplate;
- The product warranty should be at least 10 years.

#### Mounting Structure

- Structural material shall be corrosion resistant and electrolytic compatible with the materials used in the module frame;
- Fasteners, nuts and bolts should be made of stainless steel, while all clamps used shall be earthing clamps;

- Galvanizing should meet ASTM A-123 hot dipped galvanizing or equivalent if steel frame is used, Aluminum frame structure with adequate strength can also be used;
- Structure shall be supplied complete with all required accessories to be compatible for allowing easy installation at the rooftop site;
- The structures shall be designed to allow easy replacement of any module;
- The structure shall be designed for simple electrical installation; therefore, onsite welding will not be acceptable at any point;
- Detailed drawings and calculations shall be provided prior to material supply and fabrication for UNOPS approval, such drawings shall include, but not limited to:
  - Determination of true south at the site;
  - Array tilt angle with permitted tolerance;
  - Details with drawings for fixing the modules;
  - Structure installation details and drawings;
  - Electrical grounding (earthling);
  - Safety precautions to be taken.
- The system workshop warranty should be at least 5 years.

### **Solar Inverter/Charger**

- The off-grid inverter shall produce pure sine wave form with provision for battery charger, and it can be configured individually or in parallel;
- Output voltage shall be single phase, 230 V ac  $\pm 10\%$ ;
- Output frequency shall be 50 Hz;
- Total Harmonic Distortion shall be less than 3%;
- Designed for indoor enclosure IP 20;
- Maximum efficiency should be not less than 94 % at full load;
- Inverters to be certified to meet at least CE and UL marking and complaint with IEC 62109;
- The device should be integrated with LED indicators and LCD display;
- The device shall be mounted to a non-flammable support (wall) designed to the inverter load;
- The inverter shall include low voltage disconnect feature;
- The inverter/ charger shall allow adjustment of battery voltage and charging current;
- The inverter shall be vertically mounted, the electrical connections and cable glands shall be oriented down;
- The inverter/ charger must not be situated directly above the battery or in a cabinet with it;
- The device shall allow connection to grid and/or backup generator(s);
- The charging function of the inverter/charger shall include battery charging functionality;
- Protections required: AC overload and load short circuit, overvoltage, overheating and battery reverse polarity;
- The inverter shall allow internet connection for remote monitoring;
- Cable to each inverter shall be protected by a fusible disconnect or circuit breaker;
- Product warranty shall be 5 years.

### **Storage Battery(s)**

- Batteries shall be Gel type OPzV 2V cell, the rating shall be calculated @ 10 Hr discharge rate;
- Battery cyclic life shall be at least 2500 cycles at 50% depth of discharge (DOD), batteries shall be tested in accordance with IEC 61427 standard;

- Reliable performance at high operating temperatures of up to 50° C;
- The battery bank shall consist of no more than 3 strings in parallel;
- Battery bank voltage shall be 48 volts;
- Wires connected to batteries shall utilize appropriately sized and rated lugs or terminals and proper hardware; batteries shall be installed in a secured, well-ventilated powerhouse, or in an outdoor rated enclosure.
- One brand can be used for the entire project;
- The operating temperature for the battery shall be -20°C to +55 °C;
- Product warranty shall be 2 years; warranty certificates shall be provided by the manufacturer.

### **Charge Controller**

- Maximum Power Point Tracking (MPPT) type;
- PV charging efficiency at least 92%;
- Controller must utilize passive cooling (not fans);
- Should allow parallel operation, i.e more than one unit can be connected in parallel;
- Controllers to be certified to meet at least one of the following standards: CE or UL 1741 Marking, IEC 62509 or IEC 62093;
- The device should have LED or LCD display;
- Product warranty shall be 5 years.

### **DC Junction Box**

- The DC junction box to be provided for termination of connecting cables. The DCJB shall be made of metal and suitable for outdoor installation;
- All wires/cables must be terminated through cable lugs;
- DC breakers and fuses shall be used, 2 spare inputs shall be considered and built in SPD.
- 

### **Data Logging and Monitoring System**

- The contractor shall provide necessary hardware and software to measure and/or record energy parameters such as output voltage, consumed current, output frequency, power and energy);
- Could be either built in or external device;
- The system should be capable to operate through GSM, contractor should provide all accessories needed such as sim card and modules;
- The main function of such a system is to monitor and record energy data and system parameters on a predetermined interval basis. Such data can be accessed remotely; the contractor should provide a required interface to the plant to access such data.

### **Cables and Wires**

- All cables shall be marked properly according to approved design so that cable can be easily traced and identified;
- All outdoor exposed wiring to be protected from UV radiation and physical damage, all cabling above ground should be suitably mounted inside cable trays with proper covers, while underground cables should be housed inside PVC conduit with 50 % clearance;
- DC cable: Should be TUV certified with double insulating material and jacket, made of copper, stranded type, the insulation is also flame retardant;
- PV array to battery circuit(s) to be sized for maximum 3% voltage drop at rated array power (Imp);

- AC cable: Armored cables in conduit shall be used for underground installations, while XLPE cables shall be used for indoor for indoor/outdoor installation;
- AC cables shall be sized for maximum 3% voltage drop at maximum load;
- Cable ends connections are to be made through suitable lugs or terminals, crimped properly and with use of cable glands.

### **Battery Box**

- The battery box should be made of powder coated steel;
- Suitable for outdoor installation with IP 65;
- Constructed with a lockable front door;
- Passive cooling ventilation.

### **Distribution enclosure with MCB breakers**

- The distribution board should allow flexibility to connect MCCB, MCB, RCCB, RCD or direct cable;
- Internal connection should be through busbars, the busbar rating should be at least 200 A;
- Single phase, 220 V;
- Ingress protection must be at least IP41;
- Enclosure material should be galvanized steel sheets;
- Fault level: at least 35 kA;
- Minimum Number of ways is 24;
- Main breaker rating is 63 A for schools and 100 A for health centers, the main breaker should be RCBO type;
- The sub breakers rating should be as follows: 18 X 16 A MCB type, 4 X 40 A MCB type;
- High quality breakers preferably ABB or Schneider;
- Warranty: at least two years.

### **LED Light**

- LED type: Bulb LED light;
- Power: 12 W;
- Lamp luminous efficacy: not less than 90 lm/W;
- Cap type & base: bayonet bulbs- B22d-BC/ E27;
- Color temperatures (CCT): 5000 K to 6500 K;
- Input Voltage and frequency: 220V, 50 Hz;
- Working Lifetime (Hour): at least 10,000 h;
- Operation temperature rang: up to 50°C;
- Certification: All related certificates shall be provided such CE, RoHS;
- Warranty: at least two years.

### **LED Outdoor Light**

- LED outdoor light shall withstand all the weather and working conditions and corrosive environment;
- LED light 30 W outdoor light;
- Lamp luminous efficacy: not less than 100 lm/w;
- Voltage rating: 220 VAC,  $\pm 15\%$ , 50 Hz  $\pm 2\%$ ;

- Working life time: not less than 30,000;
- The color temperature range: 5000K – 6500K;
- The LED lamps outdoor designed with IP 65 protection;
- Operating Temperature range: up to 60°C;
- Certification: All related certificates shall be provided such CE, RoHS;
- Wall Mounted type;
- Warranty: at least two years.

### **Fire Extinguisher**

- A portable fire extinguisher shall be provided, 2 extinguishers for each facility should be supplied one to be located near to the battery box and the other one located near the inverter unit;
- Powder extinguishers; 6 kg capacity;
- Made of high strength steel cylinders with a red epoxy polyester paint finish;

### **Earthing and Lightning System**

- Each array structure of the PV modules should be grounded properly;
- lightning arrester should be provided;
- All metal casing/shielding of the system and its components should be thoroughly grounded;
- Earth resistance should be tested in presence of the UNOPS representative by calibrated earth tester, the earth resistance should not be more than 5 Ohm.

### **Construction Works**

- Once the design of the 24 facilities is concluded, approved by UNOPS, the contractor will be requested to build the system in accordance with TOR, specifications and approved design;
- Contractor shall implement its standard quality assurance / quality control plan for construction activities on the project sites;
- The contractor shall supply all labor, tools, machinery, equipment and equipment transportation for all work;
- The contractor shall keep the site clean and orderly throughout the duration of construction;
- The contractor shall provide permanent equipment marking, labelling and signage for the project;
- The contractor shall fully comply with all applicable notification, safety and work rules when working with UNOPS;
- The contractor shall prepare a commissioning report and carry out all needed test procedures of commissioning. The commissioning process should be witnessed and approved by UNOPS. Such testing should include the following tests as minimum:
  - Cable insulation and continuity test: such tests should be carried before commencing installation;
  - System earthing test, earth resistance should be tested in presence of the UNOPS representative by calibrated earth tester, the earth resistance should not be more than 5 Ohm.

- Battery testing should include the following:
    - Ensure that batteries are fully charged by measuring the terminal voltage, if not batteries should be charged before carrying out testing and commissioning;
    - Battery Inspection and Cleaning: A visual inspection should be done to assess the general condition of the system's batteries. Check for any electrolyte leak, cracks in the batteries, or corrosion at the terminals or connectors;
    - Terminals and connections: ensure that all terminal and connections are tight, and making sure that the same cross section is used for jumpers, measure the negative and positive pole cable length to ensure that it is equal.
  - Module testing which includes the following:
    - Checking the cleanness of surface (glass) area of the module as it should be free of any dirt and dust;
    - PV modules Visual Inspection: A visual inspection of the modules should be done to check for defects in the modules such as cracks, chips, de-lamination, fogged glazing, and discoloration, this should be done for the front glass and back sheet;
    - PV modules connector and cable Inspection: Check the sealing gels of the junction box to ensure it have no crack or crevice;
    - Ensure that all modules have been tested before shipping by double checking the flash reports;
    - DC voltage measurement: This can be done either on the modules level or on combiner box level;
  - Inverter and Charge Controller
    - Ensuring that all components are free of dust, if not, a dry cloth should be used to wipe away any accumulated dirt/dust;
    - A visual inspection should be done to ensure that all the indicators such as LED lights are working and a check on the tightening of the bolts both DC and AC;
    - Charging: The charge controller should indicate that the system is charging when the sun is up, the charging current should be measured for each string/ array;
    - If such measurement were taken at noon time, the charging current should be close to the maximum current;
    - Discharging: checking that the battery is discharging when connected to the load;
    - Inverter: Checking the voltage and current in the inverter, measuring the output voltage and frequency;
  - Wiring: Connections and Electrical Panels: Wiring installations should be checked for any cracks, breaks or deterioration in the insulation/conduits, inspect connections for any corrosion and/or burning. Switches should not spark when turned on or off;
  - Combiner Boxes and fuses Box: must check strings fuses using a multimeter (continuity test on each fuse) to insure no blown fuse exist, check the tightening of the bolts of the fuse holders should be checked as per manufacturer manual, visual check of the cables and fuse holders;
  - AC Panels: After switching off loads and inverters, check the functionality of the RCDs and RCBOs by bushing test button and noticing the breaker open, check the tightening of all cables bolts as per manufacturer manual, visual check of all cables and breakers
- The Contractor shall provide three (3) hard copy sets and one soft copy of the final Project as-built documentation.
-

## **Training Program**

- The training program shall include but not limited to the following elements and activities:
  - 1- System safety and Operation:
    - System description including system features, components and their functions, system software and interface;
    - Running PV system safely;
    - System operating procedures;
    - System operating characteristics;
    - System limitations;
    - On-site system operation.
  - 2- System Maintenance:
    - System and components and simple troubleshooting;
    - On-site inspection and operation and maintenance
    - Schedule of maintenance, safety checks and procedures
    - Types of alarms and notifications;
  - 3- Energy Efficiency:
    - Contractor should provide basic training to all staff on energy efficiency best practices and energy efficient alternatives;
    - Customized basic energy management session for each site to all users on which appliances they can run using the solar system;
- Printed leaflet should be available in Arabic presenting system on/off operation, simple troubleshooting and basic maintenance;
- Contractor is encouraged to assign a local focal to notify in case of any failure.

## **System Warranty Operation and Maintenance**

- The contractor shall provide necessary equipment and components to run the system safely for Two years including replacement of components when needed
- Contractor shall also carry out periodic monthly preventive maintenance visits, scope and nature of such visits shall be consulted and agreed with UNOPS engineer, but it shall include the following as minimum:
  - - **Battery System:**
      - Inspection and Cleaning: A visual inspection should be done to assess the general condition of the system's batteries. Check for any electrolyte leak, cracks in the batteries, or corrosion at the terminals or connectors;
      - Terminals and connections: ensure that all terminals and connections are tight.
    - **PV Modules**
      - Checking the cleanness of surface (glass) area of the module
      - Visual Inspection: A visual inspection of the modules should be done to check for defects such as cracks, chips, delamination, fogged glazing, and discoloration.
      - PV modules Connector and Cable Inspection: Check the sealing gels of the junction box to ensure it have no crack or crevice;
      - DC voltage measurement: This can be done either on the modules level or on combiner box level.

- Charge Controller/ Inverter
    - Ensuring that all components are free of dust, if not, a dry cloth should be used to wipe away any accumulated dirt/dust;
    - A visual inspection should be done to ensure that all the indicators such as LED lights are working and a check on the tightening of the bolts both DC and AC;
    - Charging: The charge controller should indicate that the system is charging when the sun is up, the charging current should be measured for each string/ array;
    - Discharging: checking that the battery is discharging when connected to the load;
    - Inverter: Checking the voltage and current balancing in the inverter, measuring the output voltage and frequency.
  - Wiring, Connections and Electrical Panels: Wiring installations should be checked for any cracks, breaks or deterioration in the insulation/conduits, inspect connections for any corrosion and/or burning. Switches should not spark when turned on or off;
  - Combiner Boxes and fuses Box: must check strings fuses using a multimeter (continuity test on each fuse) to insure no blown fuse exist, check the tightening of the bolts of the fuse holders should be checked as per manufacturer manual, visual check of the cables and fuse holders;
  - AC Panels: After switching off loads and inverters, check the functionality of the RCDs and RCBOs by bushing the test button and noticing the breaker open, check the tightening of all cable bolts as per manufacturer manual, visual check of all cables and breakers.
- The bidder shall assign a service technical personnel (local focal point) to:
- Provide satisfactory and uninterrupted services during the maintenance including providing spare parts to run the system without interruption, and the bidder is required to response within 2 days of intimation of fault;
  - Carry out system maintenance and troubleshooting;
  - Carry out preventive maintenance protocols and procedures;
  - System software and firmware update when needed;
  - Keeping records and activity logs.
- The bidder shall provide necessary labels highlighting warranty details and phone numbers to call in case of problems.

### **Project Sign Boards**

- Supply, installation, and maintenance of project signboard (3 X 2 m), the displayed information shall be consulted with UNOPS engineers.

### **Danger Labels and Signage**

- Contractor is entitled to provide outdoor, sun proof danger signage where necessary including but not limited to: battery box, charge controller, solar inverter, and DCJB;
- Size and test of the signage may be finalized in consultation with UNOPS engineers.

The below table shows solar systems capacities:

| # | NAME                          | Type                  | GOVERNORATE | DISTRICT | LOCATION OF PV SYSTEM | CAPACITY [KWP] |
|---|-------------------------------|-----------------------|-------------|----------|-----------------------|----------------|
| 1 | Magraba Health Center         | <b>Health Centers</b> | Hajjah      | Magraba  | Rooftop               | 7.2            |
| 2 | A'ahem (Kushar) Health Center |                       | Hajjah      | Kusher   | Rooftop               | 12.96          |
| 3 | Hoqah Health Center           |                       | Hajjah      | Wesha'ah | Rooftop               | 7.2            |

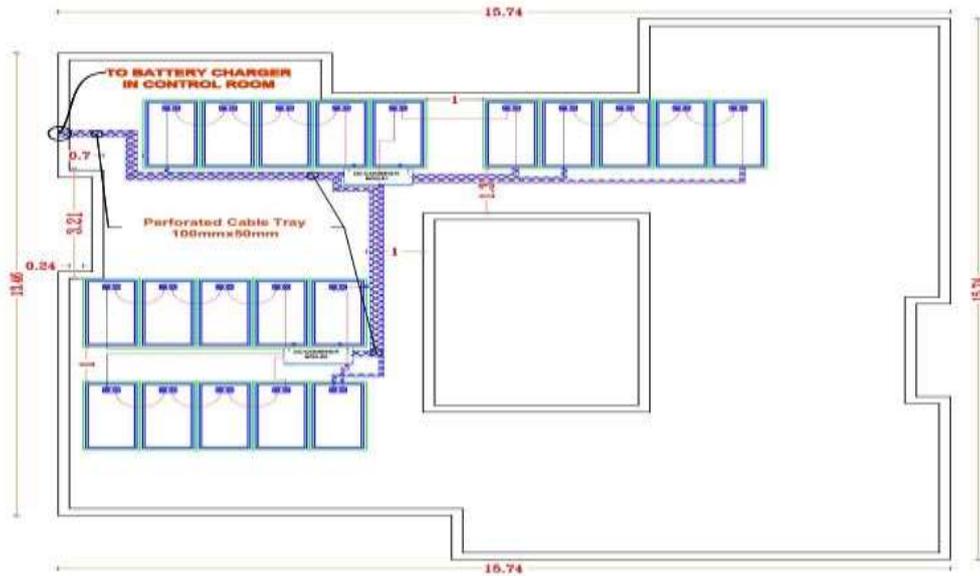
## Location

The targeted facilities are located in Hajjah Governorate .as explained in the above table:

## 2.2 Photos from field visits inspecting existing situation of target facilities' requirements as mentioned in the above table and layouts, drawings to show services provided by each facility

### 2.2.1 Magraba Health Center

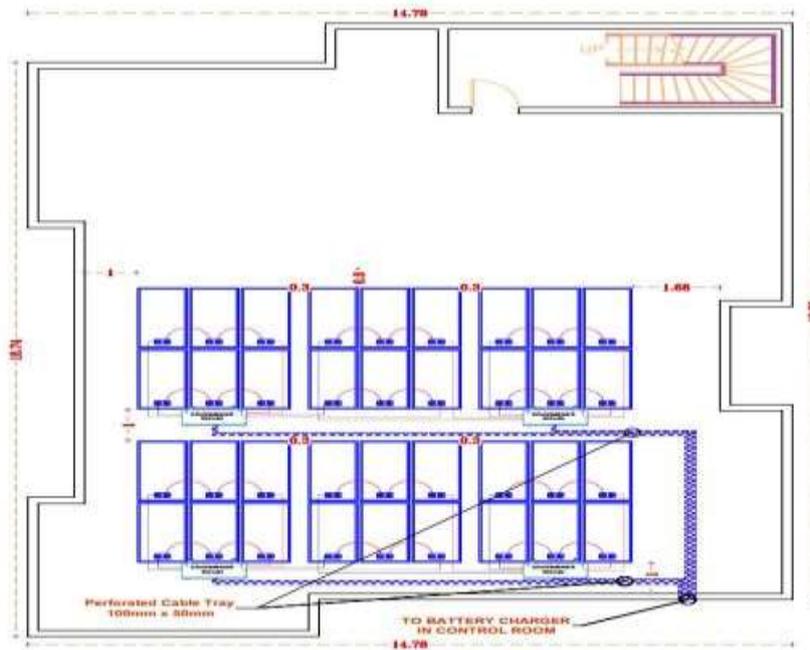
#### ROOFTOP FLOOR PLAN DETAILS



Building Roof

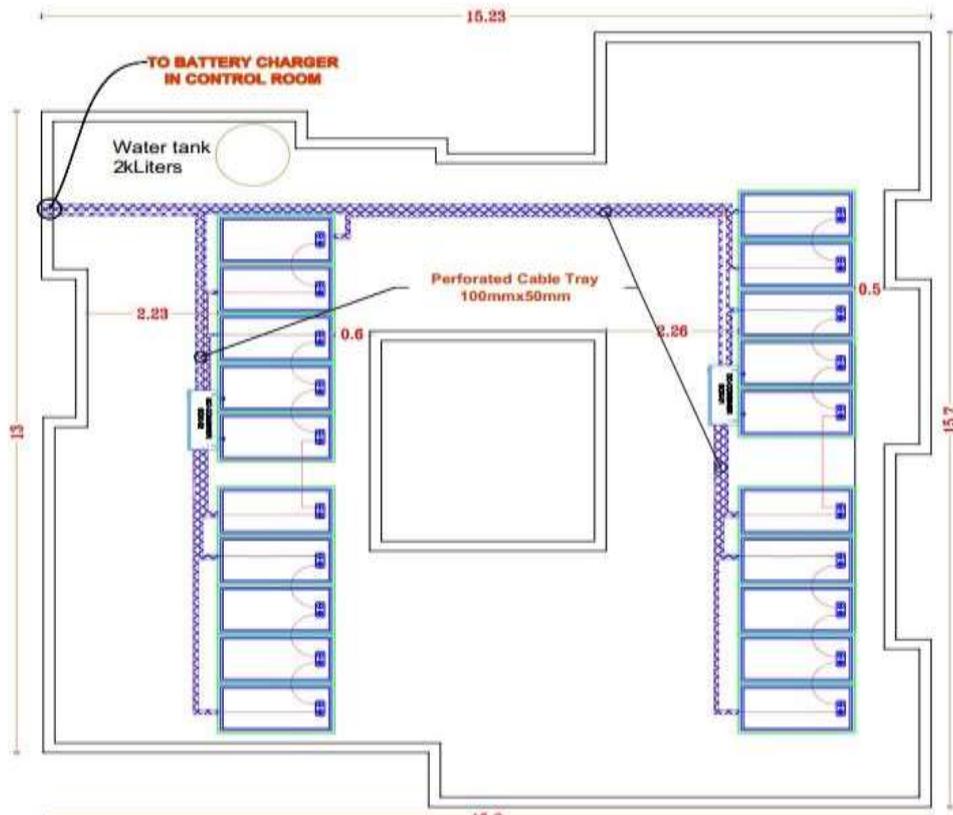
2.2.2 A'ahem (Kushar) Health Center

- ROOFTOP FLOOR PLAN DETAILS



Building Roof

2.2.3 'Hoqah Health Center  
- ROOFTOP FLOOR PLAN DETAILS



### Consultation

Consultation was carried out during August 2021 by UNOPS Engineers and Female Social Facilitator and phone calls and online interviews were conducted with **173** people (**124** males and **49** females).

#### Topics of consultations are to:

- Inform local communities about the activities to be undertaken, the sub-project timetable and work plan;
- Document and address the local communities' concerns, expectations and feedback;
- Ensure the participation of subproject beneficiaries both females and males;
- Discuss the positive impacts that the subproject will provide.
- Discuss the sub-project possible negative impacts and proposed mitigation measures to avoid potential impacts.
- Raise the awareness of the protection measures from Covid-19 Pandemic

#### Consultation Findings and Feedback

The consultation process takes the form of phone calls with local staff and facilities members both males and females in separate sessions and feedback was collected by questionnaire. The phone call interviews started with a brief explanation of the nature and objectives of the subproject and potential impact and proposed mitigation measures.

The interviewed people have expressed their willingness to cooperate to make the implementation of the solar PV system subproject successful and have emphasized on the benefits of the solar systems in supplying their facilities with a sustainable power source that will result in significant cost savings. Female staff of the targeted health facilities have emphasized on the benefits of solar systems in increasing the facilities service capacity and quality, especially for childhood and motherhood health care, vaccination, immunization, and obstetrical services and cholera response services.

The interviewed teachers, administrative staff and consulted students both males and females and parents they emphasized on the solar systems benefits of increasing schools teaching capacity, especially for better presentation of information through operating the computer laboratories and powering teaching facilities and operating school radio. Moreover, they have indicated that the solar systems will support social activities during summer including non-curricular activities.

#### GRM

UNOPS has established Grievance Redress Mechanism (GRM) for Yemen Emergency Electricity Access Project (YEEAP) to enable beneficiaries to communicate their concerns regarding the project activities. More specifically, the GRM details the procedures that communities and individuals, who believe they are adversely affected by the project or a specific sub-project, can use to submit their complaints, as well as the procedures used by UNOPS and its local partners to systematically register, track, investigate and promptly resolve complaints.

Accordingly, hard copies of the translated forms of GRM (which attached in Annex 1) were sent to the interviewed people and informed them that the GRM contact information will be posted at the sub-project sites to ensure any grievance can be addressed in an amicable manner. Resolving complaints at community level is always encouraged to address the problem that a person may have during implementation and/or operational phase.

Hotline number: 01 - 504914 / 15 WhatsApp & SMS: 739888388 Email: GRM.yemen@unops.org

Focal point: Marwa Obaid

### 3. Environmental and Social Screening

#### 3.1 Applicability

The ESMF applies because the subproject is likely to have direct or indirect environmental or social impacts.

#### 3.2 Eligibility (Negative List)

The subproject is eligible for support because it does not have any of the attributes in the negative list.

|   | Yes | No |
|---|-----|----|
| Category A attributes, such as:   |     |    |
| • Activities with significant adverse impacts that are sensitive, diverse, or unprecedented, or that affect an area broader than the sites or facilities subject to physical works  |     | X  |
| • Major resettlement  |     | X  |
| • Greenfield projects   |     | X  |
| Solid Waste   |     |    |
| • Support disposal site   |     | X  |
| Irrigation  |     |    |
| • Activity support expansion of existing irrigation and drainage schemes.   |     | X  |
| Income Generating Activities  |     |    |
| • Activities involving the use of fuelwood, including trees and bush.   |     | X  |
| • Activities involving the production or use of hazardous substances or explosives  |     | X  |
| Labor   |     |    |
| • Activities with a high risk of significant adverse impacts related to labor influx, child or forced labor.  |     | X  |
| Natural Habitats  |     |    |
| • Activities with impacts to natural habitat should be excluded, particularly impacts to critical natural habitats, sensitive areas, high biodiversity values, and protected areas. |     | X  |
| Pesticides  |     |    |
| • Activities indirectly support the use of pesticides that fall in WHO classes IA, IB, or II.   |     | X  |
| Physical Cultural Resources   |     |    |
| Damage to cultural property, including but not limited to activities that affect:   |     |    |
| • Archaeological and historical sites   |     | X  |
| • Religious monuments, structures and cemeteries  |     | X  |
| Involuntary Resettlement  |     |    |
| • Activities requiring the involuntary taking of private land and relocation of PAPs  |     | X  |
| • Activities that require the relocation of encroachers or squatters  |     | X  |
| Dams  |     |    |
| • The subproject might be affected by the operation of an existing dam.   |     | X  |

### 3.3 Environmental and Social Screening Form

The subproject does not cause any impact stated in Section F, Expropriation and Social Disturbance:

The solar PV systems will either substitute (in case of schools) or complement (in case of health centers) the current heavy use of diesel generators by facilities' administration.

The solar systems are environment-friendly, whose PV Panels and equipment will be installed within the same facilities and do not cause disturbance. Environmental and social clauses for contractors and Environment, Health and Safety Clauses and OHS requirements as well as Health and Safety prevention measures from COVID-19 will be included in the contracts and tender documents.

|  |  | Yes | No |
|--|--|-----|----|
| <b>A. Zoning and Land Use Planning</b>                 |  |     |    |
| 1.   | Will the subproject affect land use zoning and planning or conflict with prevalent land use patterns?  |     | X  |
| 2.   | Will the subproject involve significant land disturbance or site clearance?  |     | X  |
| 3.   | Will the subproject land be subject to potential encroachment by urban or industrial use or located in an area intended for urban or industrial development?                         |     | X  |
| <b>B. Utilities and Facilities</b>                     |  |     |    |
| 4.   | Will the subproject require the setting up of ancillary production facilities?   |     | X  |
| 5.   | Will the subproject require significant levels of accommodation or service amenities to support the workforce during construction (e.g., contractor will need more than 20 workers)? |     | X  |
| <b>C Water and Soil Contamination</b>                  |  |     |    |
| 6.   | Will the subproject require large amounts of raw materials or construction materials?  |     | X  |
| 7.   | Will the subproject generate large amounts of residual wastes, construction material waste or cause soil erosion?  |     | X  |
| 8.   | Will the subproject result in potential soil or water contamination (e.g., from oil, grease and fuel from equipment yards)?  |     | X  |
| 9.   | Will the subproject lead to contamination of ground and surface waters by herbicides for vegetation control and chemicals (e.g., calcium chloride) for dust control?                 |     | X  |
| 10.  | Will the subproject lead to an increase in suspended sediments in streams affected by road cut erosion, decline in water quality and increased sedimentation downstream?             |     | X  |
| 11.  | Will the subproject involve the use of chemicals or solvents?  |     | X  |
| 12.  | Will the subproject lead to the destruction of vegetation and soil in the right-of-way, borrow pits, waste dumps, and equipment yards?   |     | X  |
| 13.  | Will the subproject lead to the creation of stagnant water bodies in borrow pits, quarries, etc., encouraging for mosquito breeding and other disease vectors?                       |     | X  |
| <b>D. Noise and Air Pollution Hazardous Substances</b> |  |     |    |
| 14.  | Will the subproject increase the levels of harmful air emissions?  |     | X  |
| 15.  | Will the subproject increase ambient noise levels?   |     | X  |

|   |   |   |
|---|---|---|
| 16. Will the subproject involve the storage, handling or transport of hazardous substances?   |   | X |
| <b>E. Destruction/Disruption of Land and Vegetation</b>   |   |   |
| 17. Will the subproject lead to unplanned use of the infrastructure being developed?  |   | X |
| 18. Will the subproject lead to long-term or semi-permanent destruction of soils in cleared areas not suited for agriculture?           |   | X |
| 19. Will the subproject lead to the interruption of subsoil and overland drainage patterns (in areas of cuts and fills)?                |   | X |
| 20. Will the subproject lead to landslides, slumps, slips and other mass movements in road cuts?  |   | X |
| 21. Will the subproject lead to erosion of lands below the roadbed receiving concentrated outflow carried by covered or open drains?    |   | X |
| 22. Will the subproject lead to long-term or semi-permanent destruction of soils in cleared areas not suited for agriculture?           |   | X |
| 23. Will the subproject lead to health hazards and interference of plant growth adjacent to roads by dust raised and blown by vehicles? |   | X |
| <b>F. Expropriation and Social Disturbance</b>  |   |   |
| 24. Will the subproject impact internally displaced persons (IDP) negatively?   |   | X |
| 25. Will the subproject lead to induced settlements by workers and others causing social and economic disruption?                       |   | X |
| 26. Will the subproject lead to environmental and social disturbance by construction camps?   |   | X |
| 27. Will the subproject cause economic displacement?  |   | X |
| 28. Will the subproject temporarily displaces squatters, economically or physically, or other informal groups?                          |   | X |
| 29. Will the subproject cause a loss in productive assets or income source?   |   | X |
| 30. Will the subproject restrict access to resources?   |   | X |
| 31. Will the subproject affect the livelihoods or vulnerable people, such as persons with disabilities, widows or the elderly?          |   | X |
| 32. Will the subproject create social conflict over the distribution of benefits or resources?  |   | X |
| 33. Will the subproject have potential impact on workers safety?  | X |   |

### 3.4 Risk Level and Mitigation Instruments

The subproject is assigned Risk Level 2 and thus does not require a separate ESIA and ESMP, as detailed in the Environmental and Social Management Framework.

UNOPS will ensure that:

- The Environmental and Social Clauses including OHS (disclosed as part of the ESMF) will be applied in a proportional manner to all contractors, to fully avoid or mitigate environmental, occupational and social impacts that might arise from their activities such as safety.
- The supply and installation of PV solar system equipment will be compliant with environmental, health and safety standards and specifications including electricity safety, weather resistance, and UL standards.

- Safe installation of solar systems and solid fixation of PV mounting structures in safe sites.
- The facilities' administration, guard and/or technician will receive proper training on the safe operation and maintenance of the solar PV systems.

UNOPS will also require that contractors:

- Inspect existing facilities and apply all safety measures to reduce the risk of any injury to the workers during installation or the users during operation, subject to written approval by the UNOPS engineer provided before implementation of work.
- Conduct Risk assessment for solar system installation, evaluate the risk, and put the appropriate safety measures in place and submitted for review and approval.
- Full implementation of permit to work system to ensure all tasks are well prepared and obtain all necessary safety mitigation and prevention measures.
- Provide safety training to all workers including working at height, electrical safety and permit to work.
- Provide the required safety equipment
- Provide fully insulated installation tools, instruments and equipment.
- Provide the necessary insulated PPE and provide appropriate training on the use, serviceability and integrity of the necessary PPE.
- Ensure proper use of ladders and scaffolds by trained employees, use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines.
- Follow the fall prevention and protection measures by:
  - Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area.
  - Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall and a fall protection plan should be in place which includes the following aspects:
    - Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any height if the risk includes falling through an opening in a work surface.
    - Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds.
- Follow the slip prevention measures in the same elevation by:
  - Use of slip retardant footwear and locating electrical cords, cables and ropes in common areas and marked corridors to prevent risk of slips and fall associated with uncontrolled use of electrical cords and cables on the ground.
  - Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces.

UNOPS will require suppliers to implement extra measures during COVID 19 Pandemic, including the following prevention measures to protect workers and will depend on emphasizing basic infection prevention measures and all contractors/suppliers should implement good hygiene and infection control practices, including but not limited to:

- Promote frequent and thorough hand washing, including by providing workers, customers, and worksite visitors with a place to wash their hands. If soap and running water are not immediately available, provide alcohol-based hand rubs containing at least 60% alcohol.
- Encourage workers to stay home if they are sick.
- Encourage respiratory etiquette, including covering coughs and sneezes.

- Provide customers and the public with tissues and trash receptacles.
- Employers should explore whether they can establish policies and practices, such as flexible worksites (e.g., telecommuting) and flexible work hours (e.g., staggered shifts), to increase the physical distance among employees and between employees and others if state and local health authorities recommend the use of social distancing strategies.
- Discourage workers from using other workers' phones, desks, offices, or other work tools and equipment, when possible.
- Maintain regular housekeeping practices, including routine cleaning and disinfecting of surfaces, equipment, and other elements of the work environment. When choosing cleaning chemicals, employers should follow the manufacturer's instructions for use of all cleaning and disinfection products (e.g., concentration, application method and contact time, PPE).
- Workers should wear masks, gloves and goggles at all time in the sites.

#### **4. Environmental and Social Clauses for Contractor**

Most environmental and social impacts of subprojects result from activities directly under the control of installers/contractors and will be mitigated directly by the same /installers/contractors. For Level 2 subprojects, which might represent most subprojects, the ESMP will consist solely of measures implemented by contractors. Therefore, ensuring that installers/contractors effectively mitigate construction related impacts is the core of the Project's mitigation strategy. Therefore, UNOPS will ensure that the environmental and social management of construction activities are mandatory parts of construction works contracts.

UNOPS and its local partners will incorporate standardized environmental and social clauses in tender documentation and contract documents, so that potential bidders are aware of environmental and social performance requirements expected from them, are able to reflect that in their bids, and are required to implement the clauses for the duration of the contract. UNOPS and its local partners will enforce compliance by contractors with these clauses.

The clauses cover four issues:

- Environment, Health and Safety (EHS)
- Environmental and social monitoring by contractor
- Environmental and social liabilities
- Grievance mechanism for workers

UNOPS will include these clauses in all subproject ESMPs. Subproject ESMPs will also specify any training required for contractors to understand and satisfactorily meet the Project's environmental and social requirements.

##### **Environment, Health and Safety**

Clauses for contractors that address environment, health and safety concerns are presented in Annex 2.

##### **Environmental and Social Monitoring by Contractors**

UNOPS will require that contractors monitor, keep records and report on the following environmental and social issues for the subproject. The application of this requirement will be proportionate to the activities and to the size of the contract, in manner acceptable to the World Bank:

- Safety: hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
- Environmental incidents and near misses: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
- Major works: those undertaken and completed, progress against project schedule, and key work fronts (work areas).
- E&S requirements: noncompliance incidents with permits and national law (legal noncompliance), project commitments, or other E&S requirements.
- E&S inspections and audits: by contractor, engineer, or others, including authorities—to include date, inspector or auditor name, sites visited and records reviewed, major findings, and actions taken.
- Workers: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age with evidence that no child labour is involved, and skill level (unskilled, skilled, supervisory, professional, management).
- Training on E&S issues: including dates, number of trainees, and topics.
- Footprint management: details of any work outside boundaries or major off-site impacts

caused by ongoing construction—to include date, location, impacts, and actions taken.

- External stakeholder engagement: highlights, including formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
- Details of any security risks: details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
- Worker grievances: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.
- External stakeholder grievances: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken. Grievances listed should include those received since the preceding report and those that were unresolved at the time of that report. Grievance data should be gender-disaggregated.
- Major changes to contractor’s environmental and social practices.
- Deficiency and performance management: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken. These should continue to be reported until UNOPS determines the issue is resolved satisfactorily.

### **Environmental and Social Liabilities of Contractors**

Contractors will be legally and financially accountable for any environmental or social damage or prejudice caused by their staff, and thus are expected to put in place controls and procedures to manage their environmental and social performance. A breakdown for the cost of noncompliance for each mitigation measure will be enclosed in bidding documents. These will include:

- Mitigation measures to be included in the contract will be specified in the subproject ESMP
- Deductions for environmental noncompliance will be added as a clause in the Bill of Quantities (BOQ) section
- Environmental penalties shall be calculated and deducted in each submitted invoice
- Any impact that is not properly mitigated will be the object of an environmental/social notice by UNOPS
- For minor infringements and social complaints, an incident which causes temporary but reversible damage, the contractor will be given a notice to remedy the problem and restore the environment. No further actions will be taken if the Project engineer confirms that restoration is done satisfactorily.
- For social notices, the Project engineer will alert the contractor to remedy the social impact and to follow the issue until solved. If the contractor does not comply with the remediation request, work will be stopped and considered under no excused delay
- If the contractor hasn’t remedied the environmental impact during the allotted time, the Project engineer will stop the work and give the contractor a notification indicating a financial penalty according to the non-complied mitigation measure that was specified in the bidding document.
- No further actions will be required if the Project engineer sees that restoration is done satisfactorily. Otherwise, if Contractor hasn’t remedied the situation within one day any additional days of stopping work will be considered no excused delay
- Environmental notifications issued by the Project engineer might include one or more environmental penalty
- In the event of repeated noncompliance totaling 5% of the contract value, the Project Engineer will bring the environmental and social notices and the deduction history to UNOPS procurement in order to take legal action.

#### **a. Grievance Mechanism for Workers**

Contractors will put in place a Grievance Mechanism for their workers that is proportionate to their workforce, according to the following principles:

- **Provision of information.** All workers should be informed about the grievance mechanism at the time they are hired, and details about how it operates should be easily available, for example, included in worker documentation or on notice boards.
  - **Transparency of the process.** Workers must know to whom they can turn in the event of a grievance and the support and sources of advice that are available to them. All line and senior managers must be familiar with their organization's grievance procedure.
  - **Keeping it up to date.** The process should be regularly reviewed and kept up to date, for example, by referencing any new statutory guidelines, changes in contracts or representation.
  - **Confidentiality.** The process should ensure that a complaint is dealt with confidentiality. While procedures may specify that complaints should first be made to the workers' line manager, there should also be the option of raising a grievance first with an alternative manager, for example, a human resource (personnel) manager.
  - **Non-retribution.** Procedures should guarantee that any worker raising a complaint will not be subject to any reprisal.
  - **Reasonable timescales.** Procedures should allow for time to investigate grievances fully but should aim for swift resolutions. The longer a grievance is allowed to continue, the harder it can be for both sides to get back to normal afterwards. Time limits should be set for each stage of the process, for example, a maximum time between a grievance being raised and the setting up of a meeting to investigate it.
  - **Right of appeal.** A worker should have the right to appeal to UNOPS or national courts if he or she is not happy with the initial finding.
  - **Right to be accompanied.** In any meetings or hearings, the worker should have the right to be accompanied by a colleague, friend, or union representative.
  - **Keeping records.** Written records should be kept at all stages. The initial complaint should be in writing if possible, along with the response, notes of any meetings and the findings and the reasons for the findings.
  - **Relationship with collective agreements.** Grievance procedures should be consistent with any collective agreements.
- Relationship with regulation.** Grievance processes should be compliant with the national employment code.

**Annex 1: GRM Complaint and Suggestion Form**

نموذج الشكاوى والحلول

الاسم (مقدم الشكاوى) \_\_\_\_\_  
رقم الهوية \_\_\_\_\_  
بيانات الاتصال \_\_\_\_\_  
رقم هوية الأشخاص المتأثرون بالمشروع (PAPs) \_\_\_\_\_  
المنطقة / المجتمع (هاتف / خلوي) \_\_\_\_\_

نوع الشكاوى أو الدعوى:

التاريخ \_\_\_\_\_  
الأفراد الذين تم الاتصال بهم \_\_\_\_\_  
ملخص النقاش \_\_\_\_\_

التوقيع \_\_\_\_\_ التاريخ \_\_\_\_\_

التوقيع (مقدم الشكاوى): \_\_\_\_\_  
اسم الشخص الذي قدم الشكاوى \_\_\_\_\_ (في حال كان مختلف عن مقدم الشكاوى)  
المركز أو العلاقة بمقدم الشكاوى \_\_\_\_\_

المراجعة / الحل  
تاريخ جلسة المصالحة \_\_\_\_\_  
هل كان مقدم الشكاوى موجود \_\_\_\_\_  
هل تم التحقق من الشكاوى في الميدان / في الموقع؟  
نتائج التحقيق في الميدان: \_\_\_\_\_  
نعم لا  
نعم لا

ملخص مناقشة جلسة المصالحة

القضايا

هل تم الوصول إلى الاتفاق حول القضايا؟  
في حال التوصل إلى الاتفاق، اكتب تفاصيل الاتفاق أدناه:  
في حال لم يتم الاتفاق اكتب نقاط الاختلاف أدناه:  
نعم لا

التوقيع (الشخص الذي أجرى المصالحة): \_\_\_\_\_  
التوقيع (مقدم الشكاوى) \_\_\_\_\_التوقيع: \_\_\_\_\_  
راصد / مراقب محايد

التاريخ:

## Annex 2: Environment, Health and Safety (EHS) Clauses for Contractors

### **Purpose**

The purpose of the environment, health and safety (EHS) clauses for contractors is to define minimum standards of construction practice acceptable to UNOPS. The clauses will be concluded in the bidding documents and contracts.

### **Contractor Environmental and Social Management Plan**

Prior to starting construction, each contractor must prepare and submit a Contractor Environmental and Social Management Plan (CESMP) to the UNOPS supervision engineer for acceptance.

The CESMP will provide a detailed explanation of how the contractor will comply with the project the EHS clauses for contractors and demonstrate that sufficient funds are budgeted for that purpose and sufficient capacity is in place to oversee, monitor and report on CESMP performance.

The CESMP must include specific mitigation measures based on the subproject ESMP, the final design, the proposed work method statements, and the nature of the project site. The CESMP should include management plans that cover the following issues:

### **Gender based Violence**

Contractors must address the risk of gender-based violence, through:

1. Mandatory and repeated training and awareness raising for the workforce about refraining from unacceptable conduct toward local community members, specifically women;
2. Informing workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted;
3. Introducing a Worker Code of Conduct as part of the employment contract, and including sanctions for non-compliance (e.g., termination)
4. Adopting a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence.

### **Child Labor**

Contractors must not employ workers below the age of 18.

### **Labor influx**

Where contractors and labor come from outside the local area, contractors will need to maintain labor relations with local communities through labor codes of conduct.

### **Roads**

In order to carry out the rehabilitation works, it may be necessary to close or divert certain specified roads, either permanently or temporarily during the construction period. The contractor should arrange diversions for providing alternative routes for transport and/or pedestrians.

After breaking up, closing or otherwise interfering with any street or footpath to which the public has access, the Contractor shall make such arrangements as may be reasonably necessary so as to cause as little interference with the traffic in that street or footpath during construction of the rehabilitation works as shall be reasonably practicable.

Wherever the rehabilitation works interfere with existing public or private roads or other ways over which there is a public or private right of way for any traffic, the Contractor shall construct diversion ways wherever possible.

### **Movement of Trucks and Construction Machinery**

The Contractor moving solid or liquid construction materials and waste shall take strict measures to minimize littering of roads by ensuring that vehicles are licensed and loaded in such a manner as to prevent falling off or spilling of construction materials and by sheeting the sides and tops of all vehicles carrying mud, sand, other materials and debris. Construction materials should be brought from registered sources in the area and debris should be transferred to assigned places in the landfill with documented confirmation.

### **Traffic Safety Measures**

The Contractor shall provide, erect and maintain such traffic signs, road markings, barriers and traffic control signals and such other measures as may be necessary for ensuring traffic safety around the rehabilitation site.

The Contractor shall not commence any work that affects the public motor roads and highways until all traffic safety measures necessitated by the work are fully operational.

### **Access across the Construction Site and to Frontages**

In carrying out the rehabilitation works, the Contractor shall take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of the adjacent properties, and to the public generally. The Contractor shall maintain any existing right of way across the whole or part of the rehabilitation site and public and private access to adjoining frontages in a safe condition and to a standard not less than that pertaining at the commencement of the contract. If required, the Contractor shall provide acceptable alternative means of passage or access to the satisfaction of the persons affected.

### **Noise and Dust Control**

The Contractor shall take all practicable measures to minimize nuisance from noise, vibration and dust caused by heavy vehicles and construction machinery. This includes:

- respecting normal working hours in or close to residential areas
- maintaining equipment in a good working order to minimize extraneous noise from mechanical vibration, creaking and squeaking, as well as emissions or fumes from the machinery
- shutting down equipment when it is not directly in use
- using operational noise mufflers
- Provide a water tanker, and spray water when required to minimize the impact of dust
- limiting the speed of vehicles used for construction

### **Waste Disposal**

The Contractor must agree with the municipality about arrangements for construction waste disposal. The municipality shall designate a dumping site or landfill for the disposal of solid waste.

The contractor will take measures to avoid soil and groundwater contamination by liquid waste.

### **Protection of the Existing Installations**

The Contractor shall properly safeguard all buildings, structures, works, services or installations from harm, disturbance or deterioration during the concession period. The Contractor shall take all necessary measures required for the support and protection of all buildings, structures, pipes, cables, sewers and other apparatus during the concession period, and to repair any damage that occurs in coordination with Municipality and concerned authorities.

### **Protection of Trees and Other Vegetation**

The Contractor shall avoid loss of trees and damage to other vegetation wherever possible. Adverse effects on green cover within or in the vicinity of the rehabilitation site shall be minimized. The contractor will restore vegetative cover, where feasible.

### **Physical Cultural Resources**

The contractor will train construction crews and supervisors to spot potential archaeological finds. In the event of a potential find, the contractor will inform the implementing partner who will in turn liaise with the archaeological department at the Ministry of Culture, or a local university for quick assessment and action.

### **Clearance of Rehabilitation Site on Completion**

The Contractor shall clear up all working areas both within and outside the rehabilitation site and accesses as work proceeds and when no longer required for the carrying out of the Rehabilitation works. All surplus soil and materials, sheds, offices and temporary fencing shall be removed, post holes filled and the surface of the ground restored as near as practicable to its original condition.

### **Worker Health and Safety**

To avoid work related accidents and injuries, the contractor will:

- Inspect existing facilities and apply all safety measures to reduce the risk of any injury to the workers during installation or the users during operation, subject to written approval by the UNOPS engineer provided before implementation of work.
- Conduct Risk assessment for solar system installation, evaluate the risk, and put the appropriate safety measures in place and submitted for review and approval.
- Full implementation of permit to work system to ensure all tasks are well prepared and obtain all necessary safety mitigation and prevention measures.
- Provide safety training to all workers including working at height, electrical safety and permit to work.
- Provide the required safety equipment.
- Provide fully insulated installation tools, instruments and equipment.
- Provide the necessary PPE and provide appropriate training in use, serviceability and integrity of the necessary PPE and proper use of ladders and scaffolds by trained employees, use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines.
- Provide the necessary insulated PPE and provide appropriate training on the use, serviceability and integrity of the necessary PPE.
- Ensure proper use of ladders and scaffolds by trained employees, use of fall prevention devices, including safety belt and lanyard travel limiting devices to prevent access to fall hazard area, or fall protection devices such as full body harnesses used in conjunction with shock absorbing lanyards or self-retracting inertial fall arrest devices attached to fixed anchor point or horizontal life-lines.
- Provide workers in high noise areas with earplugs or earmuffs
- Ensure availability of first aid box
- Provide employees with access to toilets and potable drinking water
- Train workers regarding the handling of hazardous materials
- Store hazardous materials as per the statutory provisions of Manufactures, Storage and Import of Hazardous Chemicals Rules (1989), under the Environment (Protection) Act, 1986.

- Follow the fall prevention and protection measures by:
  - Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area.
  - Inclusion of rescue and/or recovery plans, and equipment to respond to workers after an arrested fall and a fall protection plan should be in place which includes the following aspects:
  - Training and use of temporary fall prevention devices, such as rails or other barriers able to support a weight of 200 pounds, when working at heights equal or greater than two meters or at any height if the risk includes falling through an opening in a work surface.
  - Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds.
- Follow the slip prevention measures in the same elevation by:
  - Use of slip retardant footwear and locating electrical cords, cables and ropes in common areas and marked corridors to prevent risk of slips and fall associated with uncontrolled use of electrical cords and cables on the ground.
  - Use of control zones and safety monitoring systems to warn workers of their proximity to fall hazard zones, as well as securing, marking, and labeling covers for openings in floors, roofs, or walking surfaces.
- Promote frequent and thorough hand washing, including by providing workers, customers, and worksite visitors with a place to wash their hands. If soap and running water are not immediately available, provide alcohol-based hand rubs containing at least 60% alcohol.
- Encourage workers to stay home if they are sick.
- Encourage respiratory etiquette, including covering coughs and sneezes.
- Provide customers and the public with tissues and trash receptacles.
- Employers should explore whether they can establish policies and practices, such as flexible worksites (e.g., telecommuting) and flexible work hours (e.g., staggered shifts), to increase the physical distance among employees and between employees and others if state and local health authorities recommend the use of social distancing strategies.
- Discourage workers from using other workers' phones, desks, offices, or other work tools and equipment, when possible.
- Maintain regular housekeeping practices, including routine cleaning and disinfecting of surfaces, equipment, and other elements of the work environment. When choosing cleaning chemicals, employers should follow the manufacturer's instructions for use of all cleaning and disinfection products (e.g., concentration, application method and contact time, PPE).
- Workers should wear masks, gloves and goggles at all time in the sites.

### **Site Construction Safety and Insurance**

Further to enforcing the compliance of environmental management, contractors are responsible on providing insurance for construction labors, staff attending to the construction site, citizens for each subproject, the insurance requirements and clauses are stated in the bidding documents complying to the labor law.

### **Annex 3: Environmental Code of Practice (ECOP) for Batteries Collection, Transport, Recycling and Disposal**

#### **Objectives**

The ECOP has been developed specifically for equipment financed under the Yemen Emergency Energy Access Project (YEEAP), namely solar PV systems, for critical facilities including schools and health clinics. The key issues associated with the project are the appropriate handling, recycling and disposal of Batteries. The ECOP seeks to set guidelines for contractors on battery management requirements for the provisions of solar PV systems under YEEAP.

#### **Responsibilities of the Contractors**

##### **Community and User Awareness**

Contractors are required to provide awareness and training to beneficiaries with the aim of improving knowledge of environmental and health issues associated with the entire battery lifecycle including end-of-life management. The awareness materials and training shall provide information on:

- The safe handling of batteries including installation, removal, transport, storage and disposal (more information provided below);
- The environmental and health aspects of poor battery disposal; and
- Focused information on the environmental and health issues associated with high toxicity content of batteries and explanation as to why they must be stored, transported and disposed of in certain ways and therefore why it is in the interests of individuals, the community, the environment (and therefore future generations in communities) that the methods outlined in this ECOP be followed.

##### **Direct Management of Used Batteries by the Solar Systems Suppliers**

The contractors shall provide a Battery Management Plan which details arrangements for the collection, transport, storage and disposal of batteries under the warranty and/or O&M provisions as part of the bid submission process. The submission will be evaluated for compliance with the guidelines set out in this ECOP.

UNOPS will be responsible for monitoring and supervising the implementation of the ECOP by the contractors. They will carry out random checks on each contractor to verify compliance with the ECOP and provide status update reports to the World Bank on a frequent basis.

### **Batteries Collection, Transport, Recycling and Disposal**

Within the Battery Management Plan that each contractor will submit as part of their bid, they must outline the arrangements they have made with local contractors and facilities to handle the following aspects of the reverse supply chain:

- After sales service centers for maintenance and reconditioning of batteries,
- Firms or centers that will handle the collection, storage and transportation of used and end-of-life batteries from the facilities in which they were collected to re-exporting centers or to landfills for final disposal.

Firms and centers can be existing or new ones and could be the contractor's own centers or subcontracted through a local partner. Geographic locations of these firms and centers should be in main cities/towns and should be provided by the contractor within the Battery Management Plan. These firms and centers will then be approved by UNOPS.

In all cases these firms and centers should comply with Occupational Health and Safety guidelines such as using personal protective equipment, using proper drums for storing acid, having impermeable grounds in maintenance and collection, adequate ventilation etc. The cost for OHS measures should be incorporated into the bidding documents.

The Battery Management Plan should outline how the contractor will include the end-user in the reverse-supply-chain management through training and setup of adequate procedures to ensure environmental concerns are taken into account from the beginning to the end of the chain.

### **Guidelines for Safe Handling and Disposal of Batteries**

The below clauses will be incorporated into all contracts for the installation of solar PV systems under the Yemen Emergency Electricity Access Project.

#### **Before Working with a Battery**

Training in proper handling procedures is very important. Contractors should provide the following key aspects as part of any awareness and training program:

- Consult battery owners' manuals for instructions on battery handling and hazard identification;
- Wear personal protective equipment (PPE) such as chemical splash goggles and a face shield;
- Wear acid-resistant equipment such as gauntlet style gloves, an apron, and boots;
- Do not tuck pant legs into boots because spilled acid can pool in the bottom of your boots and burn your feet;
- Place protective rubber boots on battery cable connections to prevent sparking on impact if a tool does accidentally hit a terminal;
- Ensure that all metal tools (spanners, socket wrench drivers, etc.) that will come in contact with the battery terminals have metal handles taped with electrical tape or are protected by other means to help prevent inadvertent short circuits.
- Clean the battery terminals with a plastic brush because wire brushes could create static and sparks;
- Always remove your watches and jewelry before working on a battery. A short-circuit current can weld a ring or strap to metal and cause severe burns;
- Cover maintenance tools with several layers of electrical tape to avoid sparking.

## **Occupational and Bystander Health and Safety**

The systems must be installed by qualified and experienced trades' people in order to avoid or minimize electrocution and other health and safety issues associated with working with hazardous materials. Unauthorized access to battery areas should be prohibited.

### **Chemical Hazards Posed by Batteries**

Lead Acid: Sulfuric acid (electrolyte) in lead-acid batteries is highly corrosive and acid exposure can lead to skin irritation, eye damage, respiratory irritation, and tooth enamel erosion. Contractors should train beneficiaries to follow the following principles to minimize risk:

- Never lean over a battery while boosting, testing or charging it.
- If acid splashes on your skin or eyes, immediately flood the area with cool running water for at least 15 minutes and seek medical attention immediately.
- Always practice good hygiene and wash your hands after handling a battery and before eating.
- If you handle the lead plates in a battery and do not wash your hands properly, you could be exposed to lead. Signs of lead exposure include mood swings, loss of appetite, abdominal pain, difficulty sleeping, fatigue, headaches and loss of motor coordination.
- The chemical reaction by-products from a battery include oxygen and hydrogen gas. These can be explosive at high levels. Overcharging batteries can also create flammable gases. For this reason, it is very important to store and maintain batteries in a well-ventilated work area away from all ignition sources and incompatible materials. Cigarettes, flames or sparks could cause a battery to explode.
- Before working on a battery, disconnect the battery cables. Be careful with flammable fluids when working on a battery-powered system. The electrical voltage created by batteries can ignite flammable materials and cause severe burns. Workers have been injured and killed when loose or sparking battery connections ignited gasoline and solvent fumes during system maintenance.
- Before making wiring changes to the system, disconnect the battery, either through opening the circuit breaker or over-current device, or by disconnecting the cables. Adding distilled water or cleaning terminals can be done without disconnecting.

### **Safe Battery Movement**

Lifting and moving batteries needs to be undertaken with care so as to avoid personal and environmental harm. Contractors should remind beneficiaries of, at minimum, the following Key principles:

- Use proper lifting techniques to avoid back injuries;
- Battery casings can be brittle and break easily; they should be handled carefully to avoid an acid spill;
- Make sure that a battery is properly secured and upright in the vehicle or equipment;
- If a battery shows signs of damage to the terminals, case or cover, replace it with a new one.

**Annex 4: Number of Beneficiaries**

The table below shows the number of beneficiaries:

| # | NAME                          | Type          | GOVERNORATE | DISTRICT | Beneficiaries / Yr |        | Total |
|---|-------------------------------|---------------|-------------|----------|--------------------|--------|-------|
|   |                               |               |             |          | Male               | Female |       |
| 1 | Magraba Health Center         | Health Center | Hajjah      | Magraba  | 360                | 390    | 750   |
| 2 | A'ahem (Kushar) Health Center |               | Hajjah      | Kusher   | 415                | 465    | 880   |
| 3 | Hoqah Health Center           |               | Hajjah      | Wesha'ah | 330                | 335    | 665   |

**Annex 5: Sample of Consultation Questionnaires**

الاستبيان - سؤال - ما هي الملاحظات التي تبرزها الطاقة المتجددة؟

التاريخ المقبول: \_\_\_\_\_  
 اسم المنظمة: \_\_\_\_\_  
 اسم المستشفى: \_\_\_\_\_  
 اسم الشخص الذي تم مقابله: \_\_\_\_\_  
 الوظيفة والمؤهل: \_\_\_\_\_  
 الأمانة العامة: \_\_\_\_\_

رشاد صالح ربيع  
 مركز مغربة الصحي / مغربة / حجة -  
 عبد الكريم عبد المؤيد  
 مدير المركز / بك تربيخ  
 ضع دائرة حول واحدة مما يلي : أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

(اختياري)

تأثير المشروع م سويت :  
 يقلل من الكلفة المالية (الذيزل) على ادارة المستشفى

1

يمكن من تقديم خدمات صحية أفضل للمجتمع .

2

يقدم الخدمات الأمنة صحيا نتيجة التنظيم الممتصر .

3

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

4

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

5

توفر طاقة أمنة بيئيا وصحيا .

6

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

7

الآثار السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

1

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

2

قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .

3

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الفرة المسائية

4

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ابيئة ( التخلص، بطريفة غير صححة) .

5

احتمال تلف الاواح بالراجع من الرصاص أو لأي سبب آخر .

6

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

6x

الأثر السلبى على جدول التوقيت، الاستعداد، السلامة، الصحة، والبيئة المحيطة

(اختيار)

|   |                           |
|---|---------------------------|
|   | تاريخ المقابلة:           |
| رشا صالح محمد ربيع  | اسم البلاطة:              |
| مركز معزبه الصحي / معزبه / حجه                                  | اسم المستشفى:             |
| يوسف ناصر حسن   | اسم الشخص الذي تم مقابله: |
| معامية / بل كريخا   | اللقب والموظف:            |
| وضع بطاقة حول واحدة مما يلي: (15) ، (18-25) ، (26-45) ، (46-65) | اللقب للممرجة:            |

- تنفيذ المشروع سوف:
- 1 يقلل من الكلفة المالية (الديزل) على ادارة المستشفى
  - 2 ويمكن من تقديم خدمات صحية أفضل للمجتمع .
  - 3 يقدم الخدمات الآمنة صعبا نتيجة التحكيم المستمر.
  - 4 ويمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .
  - 5 يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية
  - 6 يوفر طاقة آمنة بيئيا وصحيا .
  - 7 يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

- الأثار السلبية
- 1 انخفاض قدرة الطاقة في اوقات المساء المتأخرة .
  - 2 ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .
  - 3 قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .
  - 4 ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الفترات المسائية
  - 5 قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث البيئة ( التخلص، بطريقة غير صحيحة).
  - 6 احتمال تلف الاواح بالراجع من الرصاص أو لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

أولاً: ضع دائرة حول واحدة مما يلي: أقل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

تاريخ العقيلة:

رشاح صالح ربيد

اسم الباعثة

مركز مغربية / مغربية / حجة

اسم المستشفى:

فارس أحمد علي المؤيد

اسم الشخص الذي تتم مقابلاته

حيدلي / حيدله

الوظيفة والمؤهل

الغرفة العمرة وضع دائرة حول واحدة مما يلي: أقل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

(التقييم)

تنفيذ المشروع 6 مؤلف:

يقلل من الكلفة المالية (الدولار) على ادارة المستشفى

1

يمكن من تقديم خدمات صحية أفضل للمجتمع .

2

يقدم الخدمات الأمنية صحيا نتيجة التنظيم المستمر .

3

يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطلقة .

4

يمثل عمل جذاب، واستقطب المرضى والمحتاجين للخدمات الصحية

5

يوفر طاقة آمنة بيئيا وصحيا .

6

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

7

الأثر السلبية

انخفاض فترة الطاقة في اوقات المساء المتأخرة .

1

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

2

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .

3

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الف ترة العمالية

4

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

5

احتمال تلف الاطوار بالراجع من الرصاص أو لأي سبب آخر .

6

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتفاد إجراءات السلامة اللازمة .

7

(مختبري)

رشاد صالح بربر  
مركز مغربة الحدي / مغربة / حجة  
عبد المجيد صالح  
مختبري / مختبرات

تاريخ الملاحظة:

اسم الهاتنة

اسم المستشفى:

اسم الشخص الذي يتم مقابلاته

الوظيفة والموظف

اللغة العربية

ضع دائرة حول واحدة مما يلي: أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

تنفيذ المشروع موفيا:

يقلل من الكلفة المالية (النزول) على ادارة المستشفى

يمكن من تقديم خدمات صحية افضل للمجتمع .

يقدم الخدمات الامنة صحيا نتيجة التقييم المستمر.

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوفر طاقة امنة بيئيا وصحيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء .

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لاثار السلبية

انخفاض قدرة الطاقة في اوقات الممساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة فاصدة في الفرة المسلية

اقصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

احتمال تلف الانواع بالراجع من الرصاص او لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

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أشياء أخرى... (المرجع: المبادئ التوجيهية للمشاريع الإنسانية)

(اختياري)

تفريغ الطاقة:

رشا صالح ربيح  
مركز مغربية الصخري / مغربية / حجة  
عبد العزيز ناصر المؤيد

اسم الهيئة:

اسم المستشفى:

اسم الشخص الذي يتم مقارنته:

الوظيفة والمؤهل:

الفترة المبررة:

وضع دائرة حول واحدة مما يلي: لكل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

تنفيذ المشروع معناه:

ونقل من الكلفة المالية (الديزل) على ادارة المستشفى

يمكن من تقديم خدمات صحية افضل للمجتمع .

يقدم الخدمات الامنة صغيا نتيجة التعقيم المستمر.

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوثر علاقة ائمة بيا وصغيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

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الآثار السلبية

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انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الف ترة المسائية

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

احتمال تلف الانواع بالراجع عن الرصاص او لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نخرجة عدم اتغلا لجراءات السلامة اللازمة .

أثناء العمل على إعداد خطة العمل، يجب أن تأخذ في الاعتبار ما يلي:

تاريخ المقابلة:

رشاد صالح ربيد

اسم البلدة:

مركز مغربية الصخري / مغربية / حجة

اسم المستشفى:

يسرى ناصر الشفري

اسم الشخص الذي تتم مقابلاته:

تحسين / م / حبيب

الوظيفة والمؤهل:

(اختياري)

الجهة المبررة:

ضلع دائرة حول واحدة مما يلي: (15)، (18-25)، (26-45)، (46-65).

تنفيذ المشروع سوفا:

يقال من الكفاءة المالية (الدولار) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الأمانة صحيا نتيجة التحسين المستمر.

يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة .

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوفر طاقة أمنة بيئيا وصحيا .

وساهم في تحقيق الراحة النفسية للمعلمين في المستشفى والمرضى على حد سواء

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الأثار السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الف ترة المسائية

فصغر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

احتمال تلف الاواح بالراجع من الرصاص أو لاي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوائث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

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(التقييم)

تاريخ العقيدة:

مرشاه صالح ربيد

اسم الوحدة:

مركز مغربة الحربي / مغربة / حجة

اسم المستشفى:

سعاد أحمد المؤيد

اسم الشخص الذي تم مقابله:

مخبرية / مخبرات

الوظيفة والمؤهل:

ضع دائرة حول واحدة مما يلي: أقل من (15) ، (18-25) ، (26-45) ، (46-65) ،

الأداة المصورة:

تنفيذ المشروع 4 سنوات:

1

وإلّا من الكلفة المالية (النزول) على إدارة المستشفى

ويمكن من تقديم خدمات صحية أفضل للمجتمع .

2

يقدم الخدمات الأمنة صحيا نتيجة التقييم المستمر.

3

ويمكن من استقبال المرضى في مختلف الأوقات لتوفر الطلقة .

4

يعمل عامل جذب واستقطاب المرضى والمختلطين للخدمات الصحية

5

ويوفر طاقة أمنة بيئيا وصحيا .

6

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

7

الأثار السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

1

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

2

قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .

3

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الفرة المسائية

4

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

5

احتمال تلف الانواع بالراجع من الرصاص أو لأي سبب آخر .

6

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

7

التاريخ: \_\_\_\_\_ من: \_\_\_\_\_ إلى: \_\_\_\_\_

(اختياري)

تاريخ المقابلة:

اسم الجهة:

اسم المستشفى:

اسم الشخص الذي يتم مقابته:

الوظيفة والمؤهل:

الجهة المصيرية:

رشا صباح ربيد  
مركز مغربة الصحي / مغربة / حجة  
سهام أحمد ناصر  
وحدة انجابية / قابلة

ضع دائرة حول واحدة مما يلي: أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

تنفيذ المشروع سنوات:

ويقل من الكلفة المالية (الديزل) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الأمنية صحيا نتيجة التحقيم المستمر.

يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة .

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوفر طاقة آمنة بيئيا وصحيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

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الأثار السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الف ترة المسائية

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

احتمال تلف الاواح بالراجع عن الرصاص أو لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

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أثناء عمل فريق العمل على إعداد خطة العمل الاستراتيجية للمملكة الأردنية

تاريخ المقابلة:

اسم الباعثة:

رشا صالح ربيع  
مركز مغربية الحرمي / مغربية / حجه

اسم المستشفى:

مهدي يحيى الحسيني

اسم الشخص الذي يتم مقابته:

هيدي / حيدلة

الوظيفة والموظف:

الأداة المصرية

(اختياري)

ضع دائرة حول واحدة مما يلي: أكل، من (15)، (18-25)، (26-45)، (46-65).

تنفيذ المشروع موفف:

ويقال عن الكلفة الصافية (الذيلا) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الآمنة صحيا نتيجة التنفيذ المستمر.

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

يمثل عامل جذب، واستقطاب المرضى والمستلجين للخدمات الصحية

يوفر طاقة آمنة بيئيا وصحيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

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الآثار السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الف ترة المصانية

قصير عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

احتمال تلف الالواح بالراجع من الرصاص او لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

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استاذي ...

(اختياري)

تاريخ المقابلة:

اسم الياضة:

اسم المستشفى:

اسم الشخص الذي تتم مقابلة:

الوظيفة والمؤهل:

اللغة العربية:

رسا صباح ربيير  
مركز مغزبة الصحي / مغزبة / حجة  
سكر مطبخ قايد  
ممرضة / كرفيا

ضع دائرة حول واحدة مما يلي : أقل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

تنفيذ المشروع 6 سنوات :

يقلل من الكلفة المالية (الميزل) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

ويكسب الخدمات الأمانة صحيا نتيجة التقديم المستمر .

يمكن من استئصال المرضى في مختلف الاوقات لتوفر الطاقة .

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوفر طاقة أمانة بيئيا وصحيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

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الآثار السلبية

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انخفاض قدرة الطاقة في اوقات العماء المتأخرة .

ضرورة تكليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الفترات المسائية

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ابيئة ( التخلص بطريقة غير صحيحة) .

احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ إجراءات السلامة اللازمة .

8

(التعليق)

تاريخ المقابلة:

اسم الباحث:

اسم المستشفى:

اسم الشخص الذي تم مقابلة:

الوظيفة والموظف:

الأداة المستخدمة:

رشا صالح ربيد  
مركز مغربة الحرجي / مغربة / حجة  
خبير الحديد علي يحيى

ممرضها / م / طبيب

ضع دائرة حول واحدة مما يلي : أقل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

تنفيذ المشروع مخطط:

ويقلل من الكلفة السلبية (التوزل) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الآمنة صعبا نتيجة التقييم المستمر.

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

يعتل عامل جذب واستقطاب المرضى والمعتلين للخدمات الصحية

يوفر طاقة آمنة بيديا وصعبا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

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الأثار السلبية

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انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الف

ترة المسائية

فصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا

لبينة ( التخاص، بطرقة غير صحيحة).

احتمال تلف الاواح بالراجع عن الرصاص أو لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

α

(القطر)

تاريخ المقابلة:

رشاد صالح ربيع

اسم الباحث:

مركز مغربة الصحي / مغربة / حجة

اسم المستشفى:

معه صالح المزيد

اسم الشخص الذي تم مقابلاته:

مريض / صرخان

الوظيفة والموظف:

ضع دائرة حول واحدة مما يلي : أقل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

الفئة العمرية:

تنفيذ المشروع سواء:

يقال من الكفاءة المالية (الذي) على ادارة المستشفى

1

يمكن من تقديم خدمات صحية افضل للمجتمع .

2

يقدم الخدمات الآمنة صحيا نتيجة التنظيم المستمر .

3

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

4

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

5

يوفر حلقة آمنة بيئيا وصحيا .

6

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء .

7

الآثار السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

1

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

2

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .

3

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الفترات المسائية

4

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث البيئة ( التخلص ، بطريقة غير صحيحة ) .

5

احتمال تلف الاواح بالراجع من الرصاص أو لأي سبب آخر .

6

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

7

أستاذة / د. غسان محمد العبدون / استشارية الخدمات الصحية بالطاقة الشمسية

تاريخ المقابلة:

لمساحيلح ربيد

اسم البلاطة

مركز مغربة العمري/مغربة / حجة

اسم المستشفى:

(اختياري)

نسيم خالد ناصر

اسم الشخص الذي يتم مقابته

مخبري / مخبران

الوظيفة والموظف

وضع دائرة حول واحدة مما يلي : أقل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

اللغة العربية

تنفيذ المشروع صوبت :

ونقل من الكلفة المالية (الديزل ) على ادارة المستشفى

1

يمكن من تقديم خدمات صحية افضل للمجتمع .

2

يقدم الخدمات الآمنة صعبا نتيجة التجهيز المستمر.

3

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

4

يعتل عمل جذب وامتنعاب المرضى والمحتاجين للخدمات الصحية

5

يوفر طاقة آمنة بيئيا وصعبا .

6

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

7

ثار السلبية

انخفاض فترة الطاقة في اوقات المساء المتأخرة .

1

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

2

قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .

3

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لهمة خاصة في اوقات المسائية

4

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

5

احتمال تلف الاواح بالراجع من الرصاص أو لأي سبب آخر .

6

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

7

أستاذة / د. غسان محمد د. الاستشارات الصحية بالطاقة الشمسية

تاريخ المقابلة:

رشا صالح ربيع

اسم الباحث

مركز مغربة العمري / مغربة / حجة

اسم المستشفى:

(اختياري)

نسيم خالد ناصر

اسم الشخص الذي يتم مقابته

مخبري / مخبران

الوظيفة والموظف

وضع دائرة حول واحدة مما يلي : أقل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

الغنة الصرية

تنفيذ المشروع صوب:

ونقل من الكلفة المالية (الديزل) على ادارة المستشفى

1

يمكن من تقديم خدمات صحية افضل للمجتمع .

2

يقدم الخدمات الآمنة صعبا نتيجة التحجيم المستمر.

3

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

4

يعتدل عمل جذب وامتنعاب المرضى والمحتاجين للخدمات الصحية

5

يوفر طاقة آمنة بيئيا وصعبا .

6

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

7

ثار السلبية

انخفاض فترة الطاقة في اوقات المساء المتأخرة .

1

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

2

قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .

3

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في اوقات نرة المسائية

4

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

5

احتمال تلف الاوضاع بالراجع من الرصاص أو لأي سبب آخر .

6

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

7

أولاً: من أجل توفير ...

(اختياري)

|                            |                                 |
|----------------------------|---------------------------------|
| تاريخ المقابلة:            | مركز صحاح / سيد                 |
| اسم الواجهة:               | مركز مغربة الصحاح / مغربة / حجة |
| اسم المستشفى:              | سعاد زيد الحمر                  |
| اسم الشخص الذي تم مقابلته: | حجة انجابه / قابله              |
| الوظيفة والموال:           | مركز مغربة الصحاح / مغربة / حجة |
| الجهة الممولة:             | مركز مغربة الصحاح / مغربة / حجة |

مركز مغربة الصحاح / مغربة / حجة

|  |   |
|--|---|
| تنفيذ المشروع م سويت:  | 1 |
| يقلل من الكلفة العادية (النيزل) على ادارة المستشفى                       | 2 |
| ويمكن من تقديم خدمات صحية افضل للمجتمع .                                 | 3 |
| يقدم الخدمات الامنة صحيا نتيجة التنظيم المستمر.                          | 4 |
| يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطلقة .                   | 5 |
| يعمل عامل جذب واستقطاب المرضى والمختارين للخدمات الصحية                  | 6 |
| يوفر طلقة امنة بيئيا وصحيا .   | 7 |
| يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء . |   |

|  |   |
|--|---|
| انخفاض قدرة الطاقة في اوقات المساء المتأخرة .  | 1 |
| ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .  | 2 |
| قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتستغل اكثر من جهاز في وقت واحد .                                    | 3 |
| ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الفرة المسائية                           | 4 |
| قصير عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ابيونة ( التخلص، بطريقة غير صحيحة). | 5 |
| احتمال تلف الالواح بالراجع عن الرصاص او لأي سبب آخر .  | 6 |
| تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .  | 7 |

استبيان حول تلبية المستشفيات المعجزة بالطاقة الشمسية

|  |                            |
|--|----------------------------|
|  | تاريخ المظلمة:             |
| فرسان صالح مرشد  | اسم الباحث                 |
| مركز جبل الرياشيه بالعقبه/ جبل عقبه/ الرياشيه/ البهجه  | اسم المستشفى:              |
| (اختياري)  | اسم الشخص الذي تقدم مقابلة |
| حاله علي أحمد  | الوظيفة والمؤهل            |
| قابله / د. قبالة   | اللغة النصرية              |
| ضع دائرة حول واحدة مما يلي: أقل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .                                |                            |
| <b>تنفيذ المشروع موفق:</b>   | 1                          |
| يقلل من الكلفة المادية (الديزل) على ادارة المستشفى   | 2                          |
| يمكن من تقديم خدمات صحية أفضل للمجتمع .  | 3                          |
| يقدم الخدمات الإعتة صحيا نتيجة التنظيم المستمر.  | 4                          |
| يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة .   | 5                          |
| يمثل عامل جنبا واستقطاب المرضى والمحتاجين للخدمات الصحية   | 6                          |
| يوفر طاقة آمنة بيئيا وصحيا .   | 7                          |
| يساهم في تحقيق الراحة النفسية للمعالين في المستشفى والمرضى على حد سواء   |                            |
|  | <b>الأثار السلبية</b>      |
| انخفاض قدرة الطاقة في اوقات السماء المتأخرة .  | 1                          |
| ضرورة تقليل استخدام الطاقة لضمان استمراريته طوال اليوم .   | 2                          |
| قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .                                  | 3                          |
| ضخف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الفترات العمالية                      | 4                          |
| فصير عمر البطارية وضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ابينة ( التخلص، بطريقة غير صحيحة). | 5                          |
| احتمال تلف الألواح بالراجع من الرصاص او لأي سبب آخر .  | 6                          |
| تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .                                      | 7                          |

استاذي ان شاء الله تعالى في المحاضرة التي ألقيتها في الجامعة الأردنية

تاريخ المقابلة:

رشا صالح ربيد

اسم الباحث:

مركزه المهني / وسعته / حجه

اسم المستشفى:

حمدا رشاد حزام

اسم الشخص الذي تتم مقابلاته

مدير المركز / م / الحبيب

الوظيفة والمؤهل

(اختياري)

الجهة المصيرية

ضع دائرة حول واحدة مما يلي : لكل من ( 15 ) ، ( 18-25 ) ، ( 26-45 ) ، ( 46-65 ) .

تنفيذ المشروع موفق :

يقلل من الكلفة المالية (الوزن) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الآمنة صحيا نتيجة التنظيم المستمر .

يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة .

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوفر طاقة آمنة بيئيا وصحيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء .

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لأثر السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الفرة المسائية

قصير عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث البيئة ( التخلص، بطريقة غير صحيحة).

احتمال تلف الاواح بالاراجع من الرصاص أو لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

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المشروع: مركز حواء الصحي / وشحة / حجة

(اختيار)

تاريخ المقابلة:

اسم الباحث:

اسم المستشفى:

اسم الشخص الذي يتم مقابته:

الوظيفة والمؤهل:

اللفة السنوية:

يضع دائرة حول واحدة مما يلي: أكثر من (15) ، (18-25) ، (26-45) ، (46-65) .

تنفيذ المشروع بنجاح:

وتقلل من الكلفة السلبية (الدول) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الآمنة صحيا نتيجة التنظيم المستمر .

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقه .

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوفر طاقه آمنه بيئيا وصحيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

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الآثار السلبية

انخفاض قدرة الطاقه في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقه لضمان استمراريتها طوال اليوم .

قوة الطاقه الشمسية أقل من الطاقه الكهربائيه لتشغيل أكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الي تأجيل بعض الاستخدامات لمهمة خاصة في الفترات المسائية

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الي تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

اعتماد تلف الاواح بالراجع من الرصاص أو لأي سبب آخر .

تنفيذ المشروع قد يؤدي الي حوادث نتجة عدم اتخاذ اجراءات السلامة اللازمة .

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أداء العمل في ضوء التقييمات المتعددة باستخدام المقاييس التالية:

الاعتبار

رشاح صالح ربيع  
مركز حقه المحرمي / وسحبه / حجه

عبد الله ناصر مسعود  
حبيب / بك كرديش

ضع دائرة حول واحدة مما يلي: أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

تاريخ المقارنة:

اسم المرشح

اسم المستشفى

اسم الشخص الذي تم مقارنته

الولاية والموقع

الفئة العمرية

تنفيذ المشروع بوقت:

يقل من الكفاءة المطلوبة (الذي) على ادارة المستشفى

ويمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الأمنة صحويا نتيجة التعليم المستمر .

يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة .

يمثل حمل بونب واستقبال المرضى والمحتاجين للخدمات الصحية

يوفر طاقة أمنة بيئيا وصحيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

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الأثر السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .

ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الفترات المسائية

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث البيئة (التخلص، بطريقة غير صحيحة).

احتمال تلف الاواح بالاراجع من الرصاص أو لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى عوائق نتيجة عدم اتخاذ إجراءات السلامة اللازمة .

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(100%)

رشا صالح ربيع  
مركز حقها الصحي / وشحة / حجة  
ابراهيم حمود مسفر  
تخذية / صخيرات

تاريخ المقابلة:  
اسم العيادة  
اسم المستشفى  
اسم الشخص الذي يتم مقابلة  
الوظيفة والموظف  
الجهة الصحية

ضع دائرة حول واحدة مما يلي: أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

تخفيض المشروع سوف:  
يقلل من الكلفة المالية (النزل) على ادارة المستشفى  
يمكن من تقديم خدمات صحية افضل للمجتمع .  
يقدم الخدمات الأمانة صعبا نتيجة التجهيز المستمر .  
يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقه .  
يعتل عامل جذب واستقطاب المرضى والمتقايين للخدمات الصحية  
يوفر طاقة لمتة بيئيا وصعبا .

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يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

انخفاض قدرة الطاقة في اوقات الممنا المتأخرة .  
ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .  
قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .  
ضعف شحن البطارية أحيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الفرة المسائية  
قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ابيئة ( التخلص، بطريقة غير صحيحة).  
احتمال تلف الاواح بالراجع من الرصاص او لأي سبب آخر .

- لأثار السلبية
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  - 6
  - 7

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

استبيان حول توريد المستشفيات الصحية بالطاقة الشمسية

(اختياري)

تاريخ المقابلة:

اسم الباحث:

رشاد صالح ربيع

اسم المستشفى:

مركز حقه الحرجي / وشحه / حجه

اسم الشخص الذي تتم مقابله:

نصر أحمد محمود

الوظيفة والمؤهل:

تحسين / مختبر

الفئة العمرية:

ضع دائرة حول واحدة مما يلي: أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

تنفيذ المشروع سنوي:

يقلل من الكلفة المادية (الديزل) على ادارة المستشفى

يمكن من تقديم خدمات صحية افضل للمجتمع .

يقدم الخدمات الامنة صحيا نتيجة التعقيم المستمر.

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوفر طاقة آمنة بيديا وصحيا .

يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء

الآثار السلبية

انخفاض قدرة الطاقة في اوقات المساء المتأخرة .

ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .

قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .

ضغط شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الف ترة المسائية

قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة ( التخلص، بطريقة غير صحيحة).

احتمال تلف الالواح بالراجع من الرصاص أو لأي سبب آخر .

تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .