



UNITED NATIONS OFFICE FOR PROJECT SERVICES

(UNOPS)

YEMEN INTEGRATED URBAN SERVICES EMERGENCY PROJECT – PHASE II

(YIUSEP II)

COMPONENT 1

SERVICE RESTORATION

SUB-COMPONENT 1.4

ENERGY FOR CRITICAL SERVICES

**Supply and Installation of PV-Diesel Systems to 6 Health Facilities in
Amran, Dhamar, Taiz, Lahj, Mukalla and Zinjibar Cities**

Environmental and Social Management Plan (ESMP)

22 JULY, 2022

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Abbreviation

AC	Air Condition
CE	European Union's (EU) mandatory conformity
DC	Direct Current
DCJB	DC Junction Box
DOD	Depth of Discharge
EHS	Environmental, Health and Safety
ESF	Environmental and Social Framework of the World Bank
ESHS	Environment, Social (including labor), Health, and Safety
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
FMFA	Financial Management Framework Agreement
FCV	Fragility, Conflict and Violence
GBV	Gender Based Violence
GHS	General Health and Safety guidelines
GIIP	Good International Industry Practice
GM	Grievance Mechanism
GRM	Grievance Redress Mechanism
GSM	Global System for Mobile Communication
HSSE	Health, Safety, Social and Environment
IDA	International Development Association
IDP	Internally Displace Person
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LMP	Labor Management Procedures
MCB	Miniature Circuit Breakers
MCCB	Molded Case Circuit Breaker

MPPT	Maximum Power Point Tracking
PAP	Project Affected People
PV	Photovoltaic
PVC	Permanent virtual circuit
RF	Resettlement Framework
ROY	Republic of Yemen
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
SEP	Stakeholder Engagement Plan
SMP	Security Management Plan
SPD	Surge Protector Device
TPM	Third Party Monitoring
TUV	Technischer Überwachungsverein (Association for Technical Inspection)
UL	Underwriters' Laboratories
UNOPS	United Nations Office for Project Services
UV	Ultraviolet
XLPE	Cross linked polyethylene cable.
YIUSEP II	Second Yemen Integrated Urban Services Emergency Project

Summary Sheet

Sub-Project Name	Supply and Installation of PV-Diesel Systems to 6 Health Facilities in Amran, Dhamar, Taiz, Lahj, Mukalla and Zinjibar Cities.
Sub-Project Location	Amran, Dhamar, Taiz, Lahj, Mukalla and Zinjibar Cities
Implementing Partner	Directly implemented by UNOPS through Local Contractors
Risk level	Moderate
Estimated Total Investment	1,772,000 USD
Date of the field visit	April 2022
Date of consultation	April 2022
Observations/Comments:	Indicated below.
Signature of ESSO:	
Date:	

1. Introduction

The Environmental and Social Management Plan (ESMP) for Supply and Installation of PV-Diesel Systems to 6 Health Facilities in Amran, Dhamar, Taiz, Lahj, Mukalla and Zinjibar Cities under Sub-Component 1.4, Energy for Critical Services of YIUSEP II was prepared in accordance with the Environmental and Social Management Framework (ESMF) for YIUSEP II. The ESMF was updated for YIUSEP II AF and disclosed in November 2021 link provided (<https://ye.unopsmr.org/publications/>)

United Nations Office for Project Services (UNOPS) has in parallel prepared a Labor Management Procedures (LMP) to meet the requirements of ESS2, and a GBV/SEA/SH Plan and a Security Management Plan (SMP) to meet the requirements of ESS4, and a Resettlement Framework (RF) to meet the requirements of ESS5, and a Stakeholder Engagement Plan SEP, to meet the requirements of ESS10.

The only relevant ESSs for these subprojects are ESS1, ESS2, ESS3, ESS4 and ESS10. As a result, these subprojects will follow the requirements of the LMP for labor working conditions and OHS, the GBV action plan for any GBV issues and the SMP to manage any potential security risks.

The overall objective of YIUSEP II is to restore access to critical urban services of selected cities within the Republic of Yemen.

Project Components

This ESMP is prepared under Yemen Integrated Urban Services Emergency Project, Phase II (YIUSEP II). Building on the success of YIUSEP I, the overall project objective is to restore access to critical urban services in selected cities of Yemen where most of the conflict-related damage has occurred. The targeted services in YIUSEP II cover four subcomponents: (i) tertiary municipal services and solid waste

management; (ii) urban water and sanitation; (iii) urban roads; and (iv) electricity for critical service. The current ESMP targets subcomponent 1.4 (electricity for critical service)

The Project will be financed through an IDA grant the restoration of critical urban infrastructure damaged by the conflict and recent flooding (Component 1), whilst strengthening the capacity of local institutions to provide continuity and sustainability of urban service delivery (Component 2). The selection of subprojects under YUSEP-II is based on technical and sustainability criteria, including: (a) ability to address the unmet needs in targeted cities; (b) impact on COVID-19 response; (c) potential to build resilience to urban flooding; (d) feasibility (considering access to goods and supply, conflict, capacities) and potential of integration with other activities; and (e) potential for local job creation. A core Project principle is to prioritize investments which offer the greatest value for money and maximize the number of beneficiaries, including vulnerable groups. Based on the lessons learned from YIUSEP, this is best achieved through a spatially targeted and integrated approach to investments, with multisectoral coordination and participatory identification and planning of interventions. To retain flexibility and adaptability, subproject selection occurred on an incremental basis to respond to changing needs on the ground¹. Notwithstanding the above, fair distribution of resources across the different cities and sectors during the two years of Project implementation, is also a key consideration in Project design.

Subcomponent 1.4: Energy for Critical Services

The objective of this subcomponent is to restore electricity supply to hospitals, clinics, and other medical facilities, in the targeted cities. The subcomponent will be closely coordinated with relevant UN agencies, local partners, and subcomponent 1.2 (which restores electricity for critical water and wastewater assets). To contribute to climate change mitigation, renewable and clean power generation will be encouraged as far as possible. This includes rooftop or ground-mounted solar photovoltaic (PV) based generation (with battery storage), diesel- solar PV hybrid systems.

To contribute to climate change mitigation, renewable and clean power generation will be encouraged as far as possible. This includes rooftop or ground-mounted solar photovoltaic (PV) based generation (with battery storage), diesel- solar PV hybrid systems. Wherever feasible, energy efficient LED lights in buildings and solar water heaters will be integrated with the electricity supply interventions. Although preference will be given to installation of solar PV and hybrid generation technologies, given the severity and urgency of the situation on the ground in Yemen, rehabilitation of existing conventional diesel generators may be unavoidable in some instances. For instance, diesel generation systems will be required for some hospital buildings and health facilities (and a small number of educational facilities). Notwithstanding it is expected that renewable energy solutions under the project can showcase their feasibility and path the way forward for increased use of renewable energies in future private construction and energy efficiency in public buildings.

2. Sub-Projects/Component Description

Due to the conflict in Yemen, which resulted in lack of power supply, it is difficult for health facilities to secure diesel fuel and provide regular maintenance services for operating the diesel generators.

¹ Selection criteria is further detailed in the Project Operations Manual (POM).

Therefore, it is planned to provide PV-Diesel Systems to 6 Health Facilities in Amran, Dhamar, Taiz, Lahj, Mukalla and Zinjibar Cities to be supplied and installed by local contractors.

The sub-projects will include supply, delivery, installing, testing, commissioning, operating, handing over and maintaining² PV-Diesel Systems for 6 health and educational health facilities as mentioned in the table below:

#	Facility Name/Location	Type	PV Capacity
			KWp
1	22 May Hospital- Amran City.	Health Facility	102 KW
2	Dhamar General Hospital - Dhamar City.	Health Facility	144 KW
3	Al Jamhuri hospital-Taiz City.	Health Facility	102 KW
4	Abn Khaldoun Hospital- Lahj City.	Health Facility	205 kW
5	Bin Sina'a Teaching hospital- Mukalla City.	Health Facility	205 kW
6	Al Razi Hospital- Zinjibar City.	Health Facility	128 KW

Location

The targeted 6 facilities are located in urban area of in Amran, Dhamar, Taiz, Lahj, Mukalla and Zinjibar Cities with the coordinates indicated in the following table:

LOCATION OF THE TARGETED HEALTH FACILITY

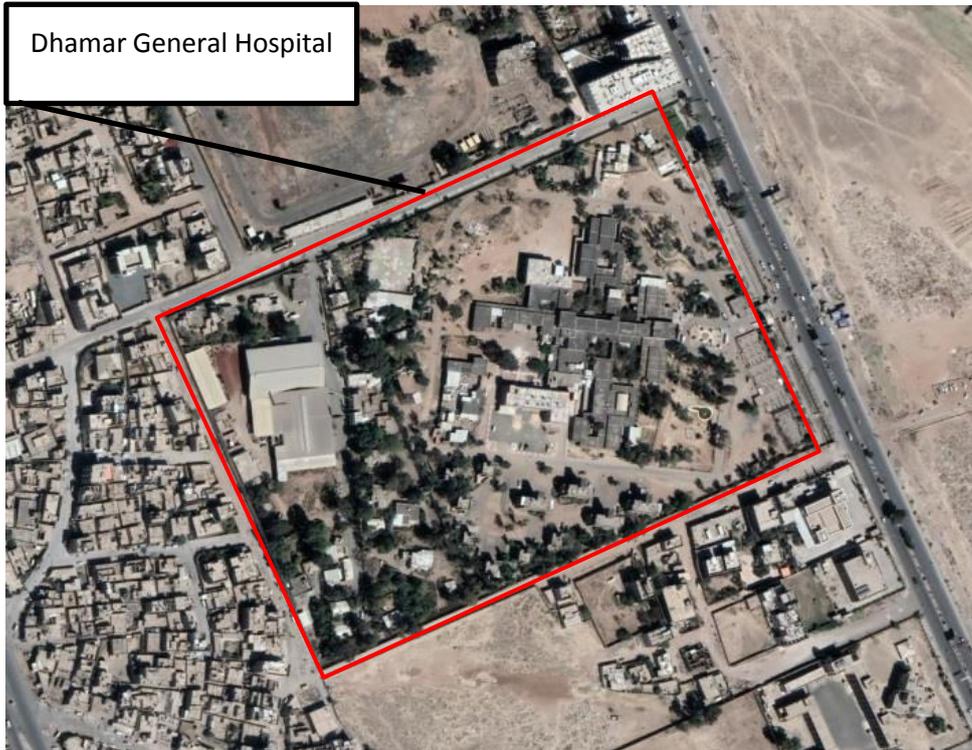
#	Health/Education Facility Name	Location Coordinates		City	District
		N	E		
1	22 May Hospital- Amran City.	15°39'13.24"N	43°57'39.96"E	Amran	Amran
2	Dhamar General Hospital -Dhamar City.	14°33'10.76"N	44°23'25.19" E	Dhamar	Dhamar
3	Al Jamhuri hospital-Taiz City.	13.571089°N	44.018379°E	Taiz	Altazieiah
4	Abn Khaldoun Hospital- Lahj City.	13° 3'2.91"N	44°52'58.91"E	Lahj	Alhota
5	Bin Sina'a Teaching hospital- Mukalla City.	14°28'16.46"N	49° 2'0.95"E	Mukalla	Almukalla
6	Alrazi Hospital- Zinjibar City.	13°12'42.34"N	45°18'29.41"E	Abyan	Zinjibar city

² The project will be handed over to the health facilities and maintenance will be the responsibility of those facilities after the hand over.

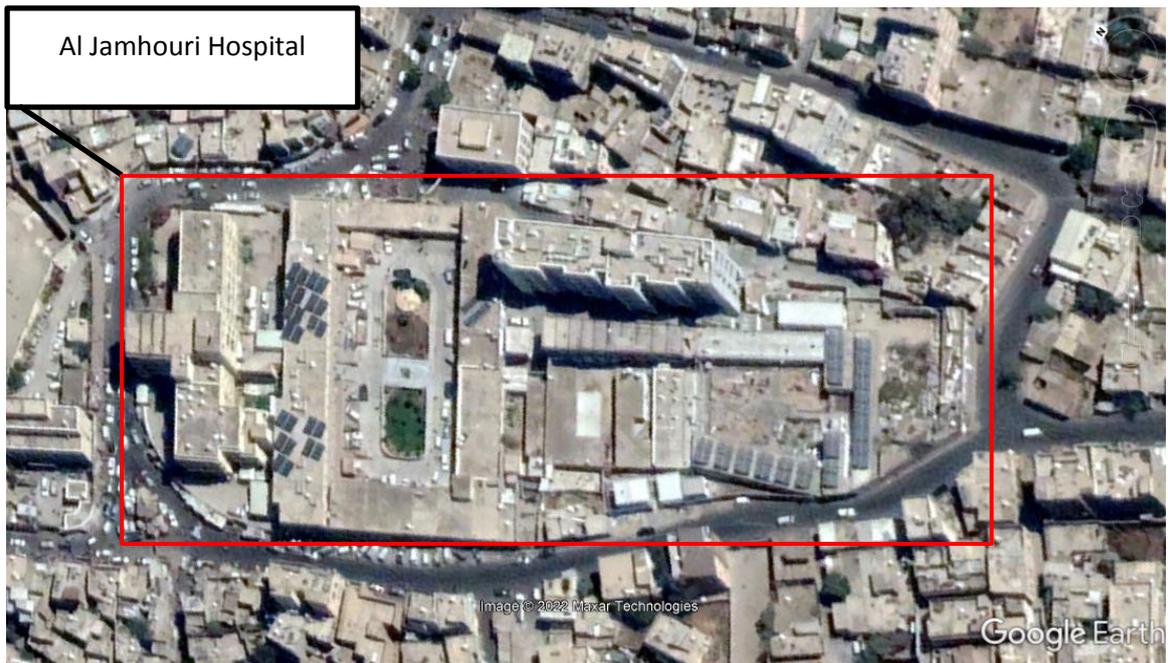
1. Map shows location of 22 May Hospital- Amran City, Amran District



2. Map shows location of Dhamar General Hospital - Dhamar City, Dhamar District



3. Map shows location of Al Jamhuri hospital-Taiz City, Al Tazieiah District



4. Map shows location of Abn Khaldoun Hospital- Lahj City , Alhota District



5. Map shows location of Bin Sina'a Teaching hospital- Mukalla City, Mukalla District



6. Map shows location of Alrazi Hospital- Zinjibar City , Zinjibar District



Planned activities

The mounting structures and the PV Panels will be handled manually through the internal stairs of the building or by using a HIAB, where the mounting structure are in the form of pre-made parts and no welding will take place in the site, the mounting structure for 5 facilities will be fixed in the rooftop by using anchor bolts and PV Panels will be installed on the mounting structure as well as the combiner box will be installed on the mounting structure and in one facility the solar panels will be fixed on ground and rooftop.

#	Facility Name/Location	Type	PV Capacity	Number of panels	Installation Place
			KWp		
1	22 May Hospital- Amran City.	Health Facility	102 KW	256	Roof Top
2	Dhamar General Hospital -Dhamar	Health Facility	144 KW	360	Ground / Roof Top

3	Al Jamhuri hospital-Taiz	Health Facility	102 KW	256	Roof Top
4	Abn Khaldoun Hospital- Lahj	Health Facility	205 kW	512	Roof Top
5	Bin Sina'a Teaching hospital- Mukalla	Health Facility	205 kW	512	Roof Top
6	Alrazi Hospital- Zinjibar	Health Facility	128 KW	320	Roof Top

PV inverters with the control panels and monitoring equipment will be installed inside the control room located in the ground floor of the main building.

Installation of two fire extinguishers, as well as fire alarm detection system in the control room in addition to installation of ventilation fans in room for air circulation.

The installed system is PV-Diesel with fire alarm system that includes smoke and flame detectors and powder and CO2 fire-extinguishers. In addition to that, the facilities are equipped with their own fire safety system for other sections/buildings.

The nature and extent of life and fire safety measures required will take in consideration the building type, occupancy, and exposures. Preventive or corrective measures might include:

- Fire Prevention
- Means of Egress
- Detection and Alarm Systems
- Emergency Response Plan
- Operation and Maintenance.

Installation of Inverters, on the wall of the control room, and installation of inverters output circuit breakers in the control room. Upon completion of the installation of the main parts of the system and the completion of the installation of cables, the cables of the solar panels will be extended from the panels to the inverters and then to the output breakers.

Make small excavations around 50 cm depth for wiring earthing cable and connecting to earth busbar in control room.

There are several fire prevention measures during the design preparation, design review, technical specification preparation, work implementation and operation.

Fire Prevention measures during design stage:

- Selecting proper size of cabling compatible with international standards to avoid overloading/overheating of the cables.

- Include appropriate size of circuit breakers between the solar system components to prevent electrical surge.

Fire Prevention measures of the solar system specifications:

- Ensure high quality cables standard outdoor and indoor is applied.
- Ensure high quality circuit breakers is provided.

Fire Prevention measures during implementation and operations stage:

- Detection and fire alarm system
- CO2 fire-extinguishers
- Powder fire-extinguishers
- Emergency Response plan
- Solar System Monitoring Unit to detect any problems and shut down the solar system and recording the system faults log.
- Provide Fire Safety training and drill for the facility operation staff and technicians.

Work arrangements

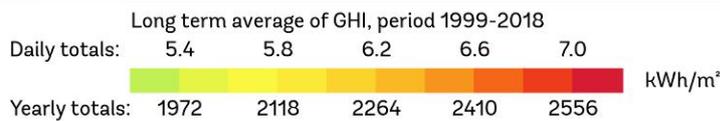
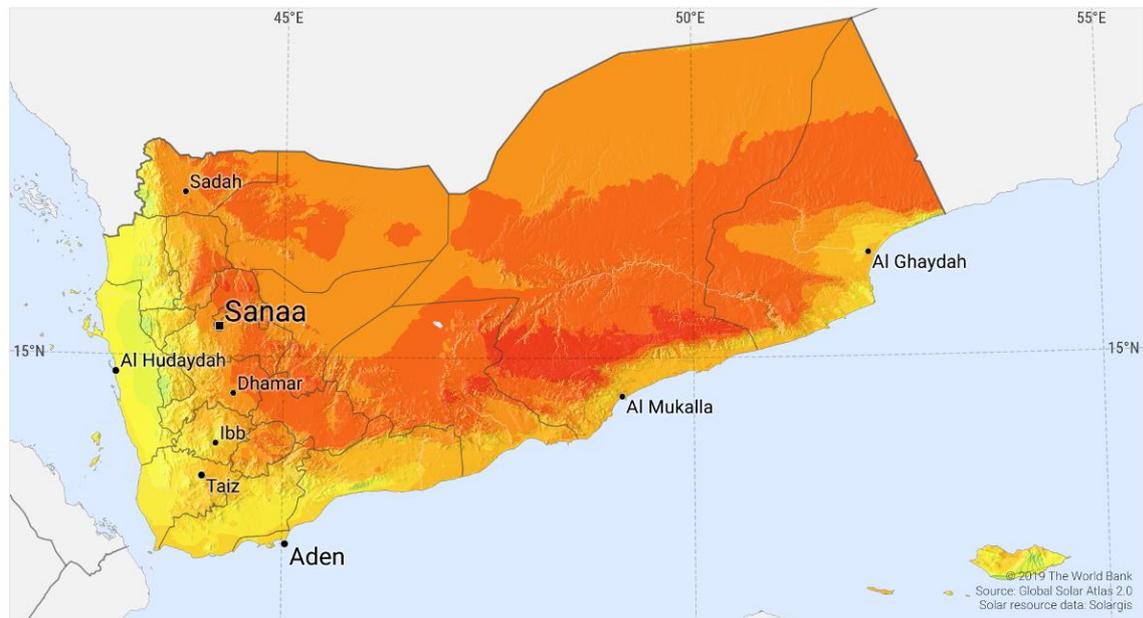
It was agreed with the facilities administrations that there will be two different and separate entrances for workers and hospital visitors and the working site will be isolated, fenced and only authorized persons can have access. As well as agreement on training, operation and future maintenance of the solar systems after the warranty period elapsed.

UNOPS carried out an integrity test (Structural integrity assessment is a process by which determine how reliable an existing structure is able to carry current and future loads and fulfil the task for a given time period) for the building rooftop during selection of targeted facilities and the mounting structures is designed to tolerate wind load up to 120 Km/hr.

3. Environmental and Social Baseline

SOLAR RESOURCE MAP

GLOBAL HORIZONTAL IRRADIATION REPUBLIC OF YEMEN



This map is published by the World Bank Group, funded by ESMAP, and prepared by Solargis. For more information and terms of use, please visit <http://globalsolaratlas.info>.

Yemen Solar Energy Irradiation

Amran City

Amran City is a district in Amran Governorate that is situated north of Sana'a and away from Sana'a City by roughly 50 km. It is bordered by Saada Governorate from north, Sana'a Governorate from South, Hajjah and Al Mahweet from west, Al Jawf and Sana'a from east.

Climate and Weather

The factors affecting the climate in the governorate are the elevation so that Amran Governorate is characterized by diverse types of terrains. The climate is varied. In the northern parts of the governorate, the temperature is low, and the climate is often mild in summer and cold in winter. The maximum temperature in Amran City during the year ranges from 3 Degrees Celsius in winter and rises in the summer up to 30 Degrees Celsius. Rainfall occurs in summer in most of the districts and precipitation level varies from 100 to 450 mm. There is rainfall in winter but rare and limited.

Air Quality and Noise

Based on field visit, it was noticed that the air quality in the selected road subproject is good. It was noticed that there is dust emission caused by traffic movements because of the deterioration of asphalt pavement. The traffic is the main source of pollution in addition to the economic activities along the road. During implementation, air pollution is expected to be minor due to the nature and scope of activities.

Likewise, the noise is caused by traffic volume as well as the commercial activities. Limited noise is expected during the implementation due to the use of non-heavy equipment.

Socioeconomic aspects:

Population

Population of Amran Governorate is about 877,786 in 2004 with annual increase of 1.82%. This number has increased and reached 1,192,697 according to the estimated population in 2021. Population constitutes 4.5% of the total population of Yemen. They are distributed administratively into 20 districts, and Amran city is the capital of the governorate. And the population of Amran City is 130,577 inhabitant.

Socio-economic

Agriculture is the most important activity for the population of the governorate. The most important crops are cereals and vegetables. Livestock breeding is also an important economic activity. Agricultural production has been declining since the outbreak of the war as high fuel prices and falling household purchasing power have increased costs and reduced income for farmers. The governorate is home to the Amran Cement Factory, which uses locally mined scoria and perlite.

In 2014, Amran governorate derived 94% of its total general revenue from grants and central subsidies, while local revenues accounted for 6%. The most significant local sources of revenue are local shared revenues, zakat, revenues from goods and services, and fines. The war has damaged the governorate's economy and the establishment of the General Zakat Authority and the transfer of zakat to central revenue has caused the governorate to lose an important source of income.

In 2014, the poverty rate in Amran was already very high at 76%.4 this rate has likely increased significantly during the past few years and may exceed 80-90%. The Interim Food Security Classification for 2019 ranks Amran as the governorate with the third-highest levels of poverty, after Al-Hodeidah and Hajjah. Unemployment is very high.

Dhamar

Climate and Weather

- **Temperature**

The warm season lasts for 1.8 months, from May 20 to July 14, with an average daily high temperature above 79°F. The hottest month of the year in Dhamar is June, with an average high of 81°F and low of 54°F.

The cool season lasts for 3.3 months, from October 28 to February 9, with an average daily high temperature below 72°F. The coldest month of the year in Dhamar is December, with an average low of 39°F and high of 70°F.

- **Precipitation**

Dhamar does not experience significant seasonal variation in the frequency of wet days (i.e., those with greater than 0.04 inches of liquid or liquid-equivalent precipitation). The frequency ranges from 1% to 8%, with an average value of 3%.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. The month with the most days of rain alone in Dhamar is August, with an average of 2.0 days. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 8% on August 1.

- **Rainfall**

Dhamar experiences some seasonal variation in monthly rainfall.

Rain falls throughout the year in Dhamar. The month with the most rain in Dhamar is August, with an average rainfall of 0.4 inches.

The month with the least rain in Dhamār is November, with an average rainfall of 0.1 inches

- **Humidity**

The perceived humidity level in Dhamar, as measured by the percentage of time in which the humidity comfort level is humid, does not vary significantly over the course of the year, remaining a virtually constant 0% throughout, with the maximum humidity in August 1%

- **Wind**

The average hourly wind speed in Dhamar experiences mild seasonal variation over the course of the year.

The most windy part of the year lasts for 5.6 months, from May 20 to November 7, with average wind speeds of more than 6.4 miles per hour. The windiest month of the year in Dhamar is July, with an average hourly wind speed of 7.1 miles per hour.

The calmer time of year lasts for 6.4 months, from November 7 to May 20. The calmest month of the year in Dhamar is December, with an average hourly wind speed of 5.8 miles per hour.

- **Solar Energy**

The average daily incident shortwave solar energy experiences some seasonal variation over the course of the year.

The brighter period of the year lasts for 3.8 months, from February 25 to June 20, with an average daily incident shortwave energy per square meter above 7.1 kWh. The brightest month of the year in Dhamar is May, with an average of 7.3 kWh.

The darker period of the year lasts for 1.1 months, from July 15 to August 18, with an average daily incident shortwave energy per square meter below 6.3 kWh. The darkest month of the year in Dhamar is December, with an average of 6.2 kWh.

Air Quality and Noise

Air pollution in Yemen is caused by a variety of factors, including emissions from transportation. The main source of air pollution. However, particularly in cities such as Dhamar, the source of emission is mainly from vehicles.

The pollutant concentrations are estimated to be several times higher than set standards for air quality as well as the noise level.

Socio-economic

Population

The city of Dhamar is the capital of the governorate, and is situated around the main road, which connects Sana'a with a number of other governorates

The estimated population of Dhamar in 2020 is about 351,000 inhabitants, and is divided among 12 administrative districts.

Socio-economic

Agriculture is the main economic activity in Dhamar, which is the fifth largest agricultural producer in Yemen, accounting for 5.3% of total production. The most important crops are vegetables, cereals, and fodder. Dhamar is one of the main sources for construction stones and minerals in Yemen, and quarrying and mining of ascoria, zeolite, and agate make it a center of Yemen's small and largely artisanal mining sector.

According to the local authority's 2014 budget, grants and central subsidies constituted 96% of the total revenue for the governorate, while local revenues covered 4%.²Please see the appendix for further information on these different types of revenue. The most significant local sources of income are local shared revenues, particularly zakat, taxes, revenue from the sale of goods and services, fees on transportation of construction stones and sand. The local revenues were adversely affected by the war.

According to the 2014 Household Budget Survey, the poverty rate in Dhamar was 31.1%. With the decline of economic conditions in Yemen, this number has likely increased now.

Taiz

Climate and Weather

- **Temperature**

The hot season in Taiz lasts for 2.5 months, from May 3 to July 21, with an average daily high temperature above 29°C. The hottest month of the year in Taiz is June, with an average high of 31°C and low of 20°C.

The cold season lasts for 2.4 months, from December 2 to February 13, with an average daily high temperature below 25°C. The coldest month of the year in Taiz is January, with an average low of 13°C and high of 23°C.

- **Precipitation**

The chance of wet days in Taiz varies throughout the year.

The wetter season lasts 1.9 months, from July 9 to September 7, with a greater than 10% chance of a given day being a wet day. The month with the wet days in Taiz is August, with an average of 5.0 days with at least 1mm of precipitation.

The drier season lasts 10 months, from September 7 to July 9. The month with the fewest wet days in Taiz is November, with an average of 0.5 days with at least 1mm of precipitation.

- **Rainfall**

Taiz experiences some seasonal variation in monthly rainfall.

The rainy period of the year lasts for 6.2 months, from March 30 to October 4, with a sliding 31-day rainfall of at least 13mm. The month with the most rain in Taiz is August, with an average rainfall of 36mm.

The rainless period of the year lasts for 5.8 months, from October 4 to March 30. The month with the least rain in Taiz is December, with an average rainfall of 5mm.

- **Humidity**

Taiz experiences some seasonal variation in the perceived humidity.

The most humid period of the year lasts for 5.2 months, from May 11 to October 18 and the month with the most humid days in Taiz is August.

The month with least humid days in Taiz is January.

- **Wind**

The average hourly wind speed in Taiz experiences seasonal variation over the course of the year.

The windier part of the year lasts for 1.9 months, from June 27 to August 24, with average wind speeds of more than 11.7 Km per hour. The windiest month of the year in Taiz is July, with an average hourly wind speed of 14.6 Km per hour.

The calmer time of year lasts for 10 months, from August 24 to June 27. The calmest month of the year in Taiz is September, with an average hourly wind speed of 8.9 Km per hour.

- **Solar Energy**

The average daily shortwave solar radiation experiences some seasonal variation over the course of the year.

The brighter period of the year lasts for 2.4 months, from February 21 to May 1, with an average daily incident shortwave energy per square meter above 6.7 kWh. The brightest month of the year in Taiz is March, with an average of 7.1 kWh.

The darker period of the year lasts for 2.0 months, from July 4 to September 5, with an average daily incident shortwave energy per square meter below 5.6 kWh. The darkest month of the year in Taiz is July, with an average of 5.3 kWh.

Air Quality and Noise

Air pollution in Yemen is caused by a variety of factors, including emissions from transportation. The main source of air pollution. However, particularly in cities such as Taiz, the source of emission is mainly from vehicles.

The pollutant concentrations are estimated to be several times higher than set standards for air quality as well as the noise level.

Socio-economic

Population

Rapid urbanization of Taiz city began in the early 1970s as a result of growing inflow of workers' remittances, stagnation of agriculture, growth of governmental services as well as the growth in incomes. After the 1980s, Taiz continued to grow rapidly with a year-on-year growth of approximately 3 and 9 percent between 1994 and 2005, until it reached more than 466,000 inhabitants in 2004. However, several rounds of conflict in Taiz have led to massive population outflows from Taiz city to rural areas; Humanitarian Needs Overview (HNO) data suggests that the city lost about 43 percent of its pre-conflict population due to these conflicts. In 2019, HNO data estimated the city's total population at 372,845, a drop of more than 280,000 inhabitants. On the other hand, there has been an inflow of IDPs into Taiz city; the International Organization for Migration (IOM)/ Displacement Tracking Matrix (DTM) reports a presence of almost 50,300 IDPs in Taiz city.

Socio-economic

Taiz has a more diversified economy than most Yemeni governorates. While agriculture and animal husbandry are key economic activities, a significant part of the workforce is engaged in fishing along the Red Sea coast. In addition, there are a number of industrial plants in the governorate, including Al-Barih Cement Factory and a range of light industries. There are also a number of stone, marble, sand, and salt quarries. Taiz is also home to traditional crafts, such as metalsmithing, jewelry making, stonemasonry, and textile and leather production.

Taiz derived 93% of its total revenue from central subsidies, while local revenues accounted for 7%. The most significant sources of local revenue were local shared revenues, especially from zakat, the sale of goods and services, fines and penalties, and taxes, and goods and services.

Taiz has been on the front lines of the conflict since 2015, with a blockade, regular shelling, and ongoing fighting taking a dramatic toll on a governorate that has long been Yemen's economic heartland. The

economy of Taiz was devastated by the war and the basis for local revenue generation has been eroded significantly.

According to the 2014 Household Budget Survey, the poverty rate in Taiz governorate was 41%. After years of ongoing military confrontations, the poverty rate has increased sharply in the governorate.

-Lahj

Climate and Weather

- **Temperature**

The hot season in Lahj lasts for 3.9 months, from May 20 to September 18, with an average daily high temperature above 35°C. The hottest month of the year in Lahj is June, with an average high of 37°C and low of 29°C.

The cool season lasts for 3.4 months, from November 26 to March 7, with an average daily high temperature below 30°C. The coldest month of the year in Lahj is January, with an average low of 22°C and high of 28°C.

- **Precipitation**

Lahj does not experience significant seasonal variation in the frequency of wet days (i.e., those with greater than 1mm of liquid or liquid-equivalent precipitation). The frequency ranges from 1% to 9%, with an average value of 4%.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. The month with the most days of rain alone in Lahj is August, with an average of 2.3 days. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 9% on July 30.

- **Rainfall**

Lahj experiences some seasonal variation in monthly rainfall.

The rainy period of the year lasts for 2.2 weeks, from August 20 to September 4, with a sliding 31-day rainfall of at least 13mm. The month with the most rain in Lahj is August, with an average rainfall of 13mm.

The rainless period of the year lasts for 11 months, from September 4 to August 20. The month with the least rain in Lahj is December, with an average rainfall of 3mm.

- **Humidity**

Lahj experiences extreme seasonal variation in the perceived humidity.

The humid period of the year lasts for 9.6 months, from February 24 to December 12, during which time the comfort level is humid, at least 44% of the time. The month with the most humid days in Lahj is August.

The month with the fewest humid days in Lahj is January, with 9.1 days that are humid.

- **Wind**

The average hourly wind speed in Lahj experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 6.8 months, from October 9 to May 3, with average wind speeds of more than 13.8 Km per hour. The windiest month of the year in Lahj is January, with an average hourly wind speed of 17.7 Km per hour.

The calmer time of year lasts for 5.2 months, from May 3 to October 9. The calmest month of the year in Lahj is June, with an average hourly wind speed of 10.1 Km per hour.

- **Solar Energy**

The average daily shortwave solar radiation experiences some seasonal variation over the course of the year.

The brighter period of the year lasts for 2.4 months, from February 22 to May 3, with an average daily incident shortwave energy per square meter above 6.7 kWh. The brightest month of the year in Lahj is March, with an average of 7.1 kWh.

The darker period of the year lasts for 3.0 months, from June 12 to September 11, with an average daily incident shortwave energy per square meter below 5.2 kWh. The darkest month of the year in Lahj is July, with an average of 4.8 kWh.

Air Quality and Noise

Air pollution in Yemen is caused by a variety of factors, including emissions from transportation. The main source of air pollution. However, particularly in cities such as Lahj, the source of emission is mainly from vehicles.

The pollutant concentrations are estimated to be several times higher than set standards for air quality as well as the noise level.

Socio-economic

Population

Lahj Governorate was home to an approximate 1,090,000 residents in 2019, 25 living in rural areas (>90 percent) with more or less an equal distribution between male and female. The local Health and Population Directorate estimated the population of Al Hawtah city in 2020 to be 39,009, growing at a yearly rate of about 2.52 percent since 2004; 52 percent of the city's habitants are between 16-64 years of age, while forty-four percent are between 0-14 years of age and four percent are over 65. The Humanitarian Needs Overview (HNO) population data stipulates that Al Hawtah has a larger population of males compared to females. However, the fluid nature of the conflict also means that the continuous influx and outflow of IDPs could alter these population estimates at any given time.

Socio-economic

Lahj is an agricultural governorate and produces about 4% of the total agricultural production of the Republic of Yemen. The most important crops are vegetables, fruits and feed crops. Lahj produces construction materials for neighboring Aden and other parts of Yemen. Quarrying and clay mining are important economic activities.

According to the 2014 local authority budget for Lahj central subsidies constituted 98% of the total revenue for the governorate, while local revenues accounted for only 2%. The most significant sources of local revenue were local shared revenues, income from the sale of goods and services, fines and penalties, leasing land, and selling quarries. These local revenues were negatively affected by the war, and the governorate faced major economic disruption as the site of an active front in the conflict, especially in 2015. Most of the governorate is under control of the Hadi government.

The poverty rate in Lahj was 69% in 2014. With the economic disruptions brought on by the war, this rate has likely increased over the past years.

Mukalla City

Mukalla city is bordered on the south by Arab Sea and east by A-Shihir city, on the north by Wadi Hadhramout, and on the west by Shabwah Governorate. It is the third large city in Yemen after Sana'a and Aden and it has a main port.

It is about 800 km away from Sana'a, where about 73% of this distance travels within Hadhramout itself due to its large size. And it is away about 620 km away from Aden.

Mukalla is located in the southern part of Hadhramaut at 49.10 degrees longitude and 14.33 degrees latitude.

The city overlooks the Arabian Sea and is divided into two halves by Khor Al Mukalla. It is the capital of Hadhramout Governorate. Mukalla ranks the first in terms of populations in Hadhramout with an estimated population of Mukalla in 2021 is about 1,261,750 inhabitants, who are urban and is a relatively urban society, compared to the rest of Yemen's cities, which are dominated by tribal society.

The city of Mukalla consists of 12 main areas or districts, surrounded by seven country sides and valleys, and there are seven major universities, and the city is witnessing a significant urban expansion.

Climate and Weather

Hadramaut is generally hot and dry (semi-arid to arid). The average annual temperature is about 80°F (26.7°C), although during the winter, high temperatures can exceed 100°F (37.8°C). During the summer, the average temperature occasionally falls below 70°F (21.1°C). The average rainfall is approximately 2.9 inches (73 millimeters) per year. A few times throughout the year, however, Hadramaut experiences heavy rainfall resulting in significant flooding.

However, Mukalla city is generally hot and semi wet, the weather is hot in summer and mild in winter, and rainfall is semi- seasonal. It is surrounded by a group of medium-height Mountains in a circular motion and several valleys that flow into its coasts pass through it.

Air Quality and Noise

Data on air quality in Yemen generally, and in the subproject area in particular, is extremely scarce. No air quality monitoring data for the project area was found. In fact, air pollution in Yemen is caused by a variety of factors, including emissions from vehicles. The main source of air pollution, particularly in Mukalla is emissions from vehicles and the economic activities, such as workshops, factories, etc. Another source of air pollution is potholes and pavement deterioration particularly.

When vehicles pass in the deteriorated sections, dust emitted. The main source of noise is also vehicles. The traffic volumes vary based on the road tracks.

Socioeconomic aspects:

Population

The estimated population of Mukalla in 2021 is about 1,261,750 inhabitants, Mukalla city has 12 districts and surrounded by ~~an~~ valleys.

Socio-economic

Most of the economically active population in Hadhramout is engaged in agriculture, fishing, or livestock rearing. The governorate produces around 5% of Yemen's total agricultural production, notably dates, cereals, and cash crops. Hadhramout's coast includes rich fisheries in the Arabian Sea. Alongside Marib and Shabwah, the governorate is home to the main oil-producing region of Yemen. Other mineral resources, such as gold, are present, but not currently exploited in large quantities. Hadhramout has many cultural landmarks, but tourism is very limited. The Al-Wadiyah border crossing with Saudi Arabia generates significant customs revenue. However, Marib currently controls the border crossing.

According to Hadhramout's 2014 budget, grants and central subsidies constituted 89% of the total revenue for the governorate, while local revenues accounted for 11%. The most significant sources of local revenue were local shared revenues, taxes, income from the sale of goods and services, and fines and penalties.

Despite the disruption of central government subsidies in various governorates, the local authority in Hadhramout has kept its local revenues, being far from military confrontations. This has enabled the government to continue regular payment of salaries and to cover the operational costs of the governorate. In addition, the governorate covers the investment budget for services and infrastructure maintenance from oil income, which the governorate currently receives according to a 20%-80% formula. The residents of Hadhramout had previously called for a share of oil income. The "all-inclusive Hadhramout Conference", held on 26 April 2017, for example, called for increasing the governorate's share to 20% for reinvestment in the governorate. Hadhramout has also received support from its large diaspora, which has been instrumental for the governorate to continue service provision.

According to the 2014 Household Budget Survey, the poverty rate in Hadhramout was 60% of the total population. This number has likely increased since. Despite the absence of open conflict in the governorate, rapid inflation has eroded purchasing power among the population.

-Zinjibar

Climate and Weather

- **Temperature**

The hot season in Zinjibar lasts for 4.2 months, from May 18 to September 24, with an average daily high temperature above 34°C. The hottest month of the year in Zinjibar is June, with an average high of 35°C and low of 30°C.

The cold season lasts for 3.5 months, from November 29 to March 15, with an average daily high temperature below 30°C. The coldest month of the year in Zinjibar is January, with an average low of 23°C and high of 28°C

- **Precipitation**

Zinjibar does not experience significant seasonal variation in the frequency of wet days (i.e., those with greater than 1mm of liquid or liquid-equivalent precipitation). The frequency ranges from 1% to 4%, with an average value of 2%.

Among wet days, we distinguish between those that experience rain alone, snow alone, or a mixture of the two. The month with the most days of rain alone in Zinjibar is April, with an average of 1.0 days. Based on this categorization, the most common form of precipitation throughout the year is rain alone, with a peak probability of 4% on April 10.

- **Rainfall**

The sliding 31-day quantity of rainfall in Zinjibar does not vary over the course of the year, staying 3mm of 5mm throughout.

- **Humidity**

Zinjibar experiences extreme seasonal variation in the perceived humidity. The humid period of the year lasts for 9.8 months, from February 21 to December 14, during which time the comfort level is humid at least 54% of the time. The month with the most humid days in Zinjibar is July, with 30.5 days that are humid. The month with the fewest humid days in Zinjibar is January.

Wind

The average hourly wind speed in Zinjibar experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 6.6 months, from October 10 to April 29, with average wind speeds of more than 14.8 Km per hour. The windiest month of the year in Zinjibar is January, with an average hourly wind speed of 19.3 Km per hour.

The calmer time of year lasts for 5.4 months, from April 29 to October 10. The calmest month of the year in Zinjibar is June, with an average hourly wind speed of 10.6 Km per hour.

- **Solar Energy**

The average daily shortwave solar radiation experiences seasonal variation over the course of the year.

The brighter period of the year lasts for 2.4 months, from February 22 to May 3, with an average daily incident shortwave energy per square meter above 6.7 kWh. The brightest month of the year in Zinjibar is March, with an average of 7.1 kWh.

The darker period of the year lasts for 3.0 months, from June 7 to September 9, with an average daily incident shortwave energy per square meter below 5.2 kWh. The darkest month of the year in Zinjibar is July, with an average of 4.8 kWh.

Air Quality and Noise

Air pollution in Yemen is caused by a variety of factors, including emissions from transportation. The main source of air pollution. However, particularly in cities such as Zinjibar, the source of emission is mainly from vehicles.

The pollutant concentrations are estimated to be several times higher than set standards for air quality as well as the noise level.

Socio-economic

Population

Available data is essentially directed at the governorate level, and it is difficult to obtain up to date population data at city level. However, with some calculations based on displacement data and Central Statistical Organization (CSO) projections estimates the population of Zinjibar City in 2019 to be approximately 38,715 inhabitants, of which about 7,500 (or 20 percent) are IDPs, which is a significant 18 percent increase compared to 2017. Compared to 2004 data, this shows a very high annual growth rate of 4.5 percent. Recent displacement data suggests that about one fifth of a total of 2,940 of the people that were displaced from Zinjibar district have moved to Aden, the nearest location for displacement. It is important to note that individuals who moved to Zinjibar district are mainly from Al Hodeidah and Taiz Governorates.

Socio-economic

Agriculture and fishing are the main economic activities in the Governorate of Abyan. Agricultural production from Abyan constitutes approximately 5% of the total agricultural production of the Republic of Yemen. The most important crops produced in the governorate are cotton, vegetables, and fruits. The governorate is also the site of livestock breeding and beekeeping.

According to the 2014 Local Authority Budget, central grants and subsidies constituted 97% of the total income of the governorate, while local revenues amounted to only 3% of the budget. Local revenues were mostly shared local revenues derived from sales of goods and services, zakat, taxes on goods and services, taxes on income, as well as fines and penalties. Revenues were adversely affected by the war.

According to the 2014 Households Budget Survey, the poverty rate in Abyan was 48.6%. With the economic downturn the governorate has faced due to the war, this rate is likely to have increased tremendously over the past few years.

Targeted Facilities Beneficiaries

#	Facility Name	Number of Beneficiaries(Based on the Facility records)
		Total
1	22 May Hospital- Amran City.	348,000
2	Dhamar General Hospital -Dhamar	385,140
3	Al Jamhuri Hospital-Taiz	288,000
4	Abn Khaldoun Hospital- Lahj	129,960
5	Bin Sina'a Teaching Hospital- Mukalla	286,260
6	Al Razi Hospital- Zinjibar.	86,400

Layouts, drawings and photos from field visits for inspecting existing situation of the targeted health facility:

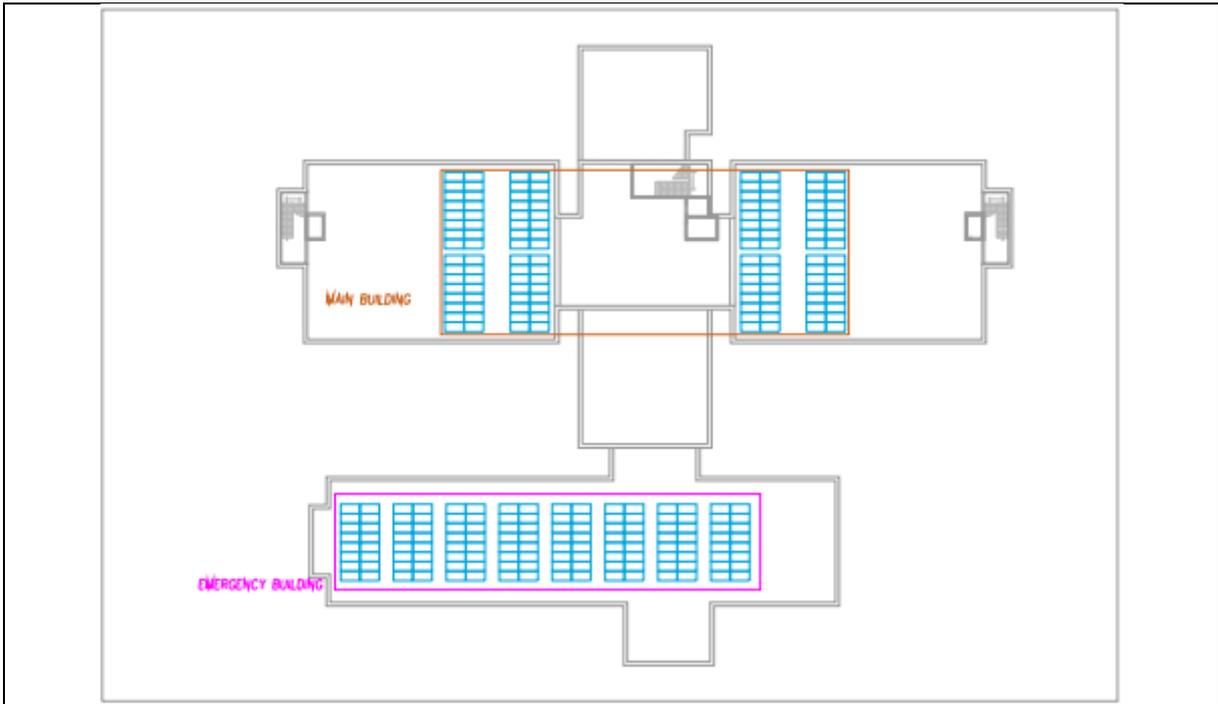
1- 22 May Hospital- Amran City



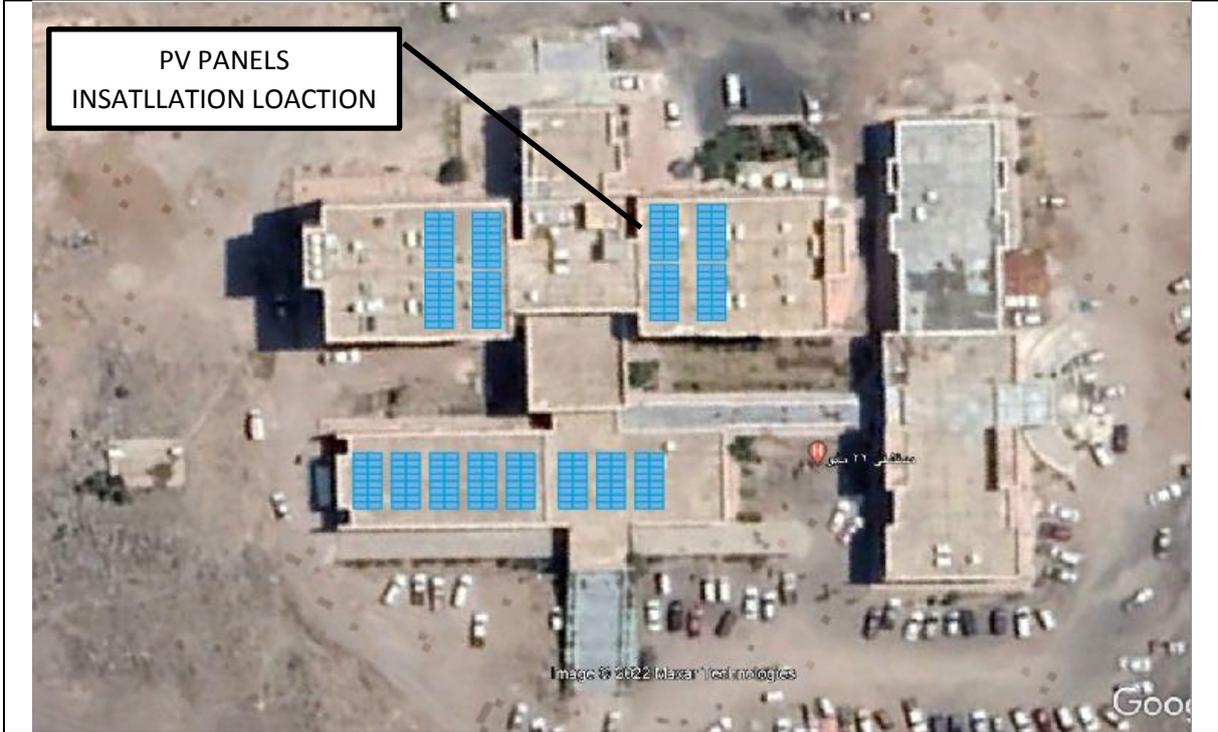
Building from inside



Building Rooftop



ROOFTOP PV INSTALLATION DIAGRAM



Rooftop PV Panels installation location

2- Dhamar General Hospital –Dhamar City.



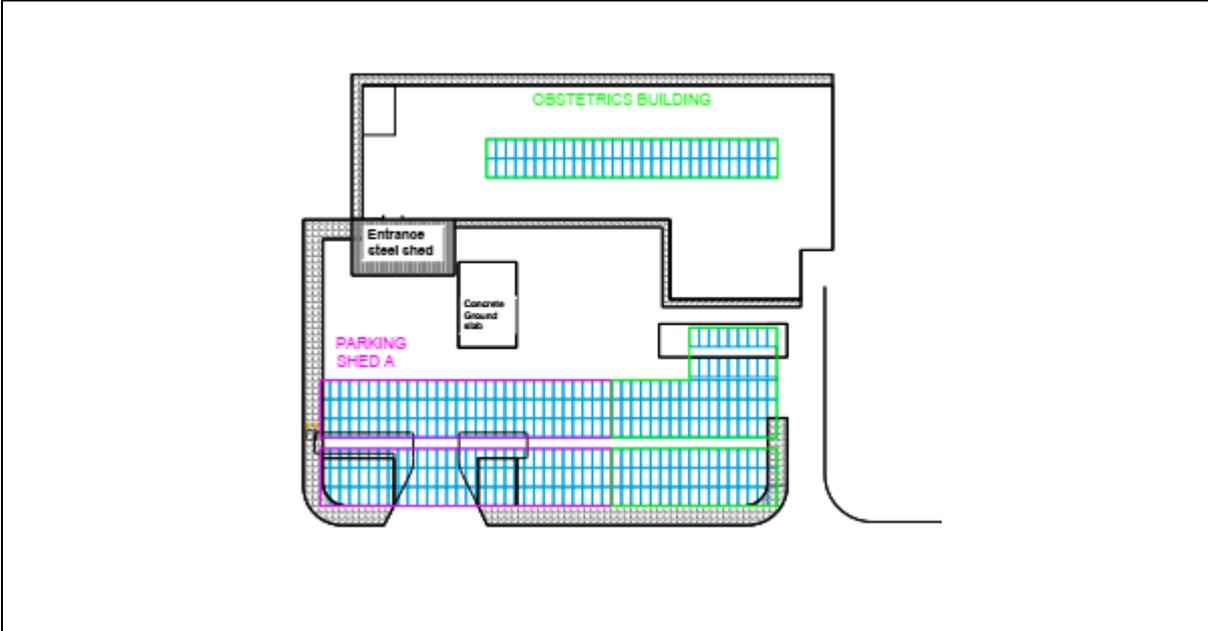
Building from inside



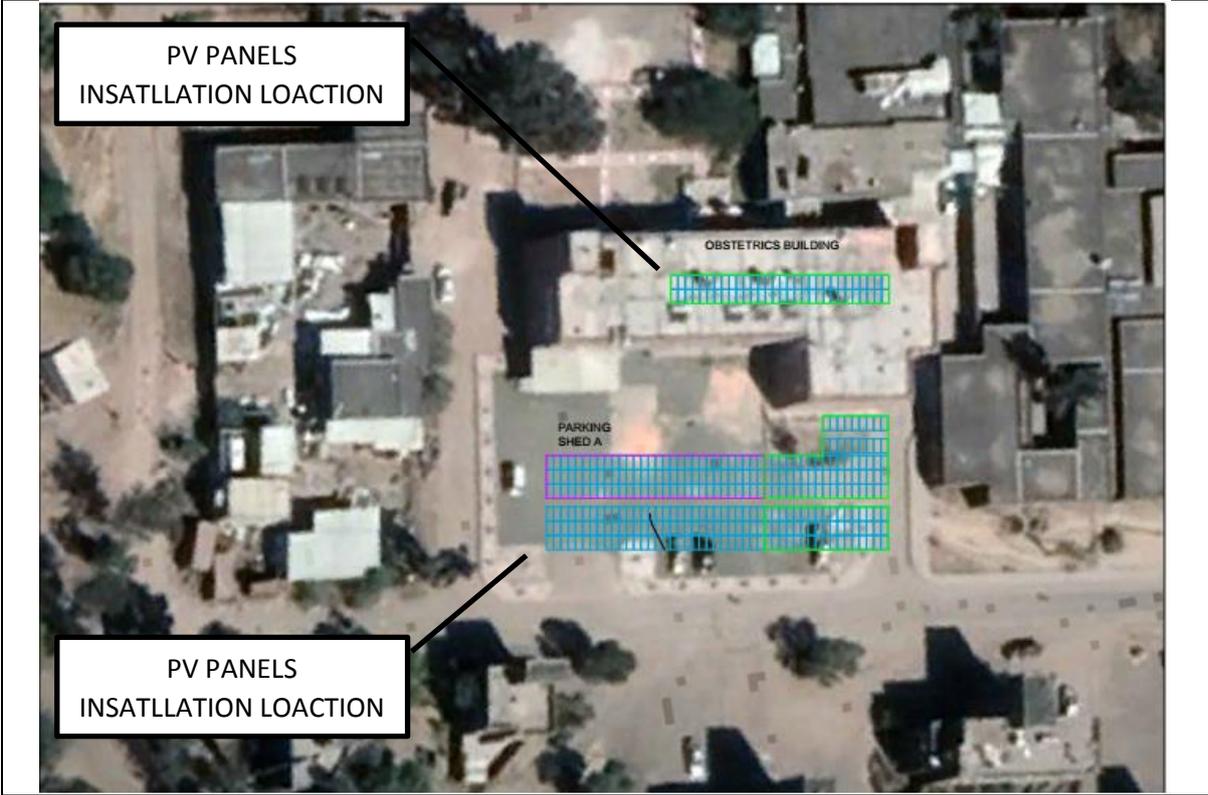
Rooftop



Ground



ROOFTOP PV INSTALLATION DIAGRAM



Rooftop PV Panels installation location

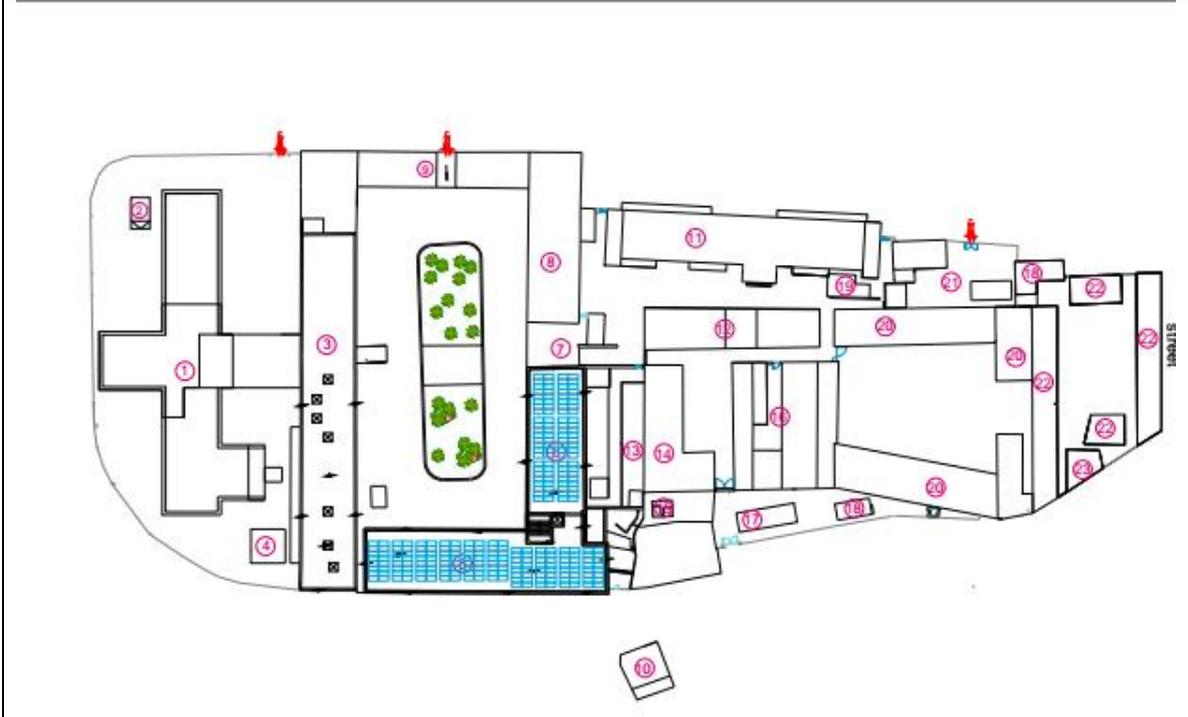
3- Al Jamhuri Hospital -Taiz City



Building from inside



Building Rooftop

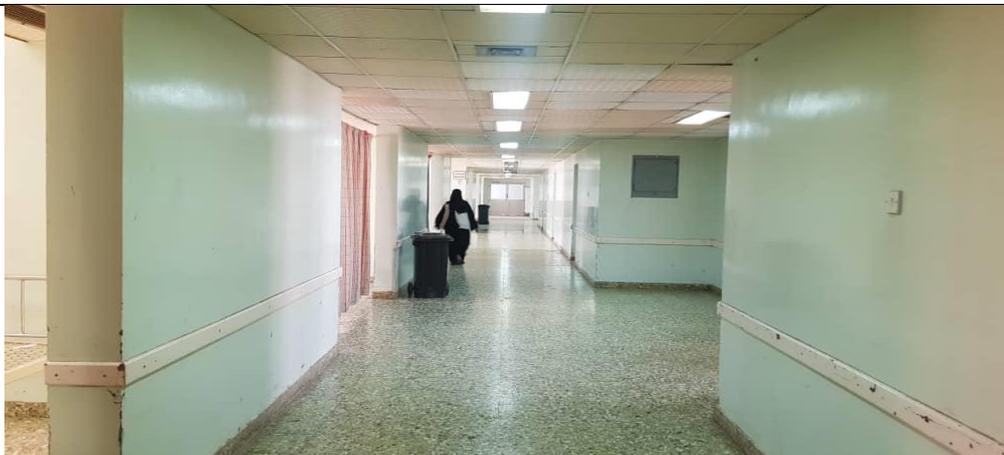


ROOFTOP PV INSTALLATION DIAGRAM



Rooftop PV Panels installation location

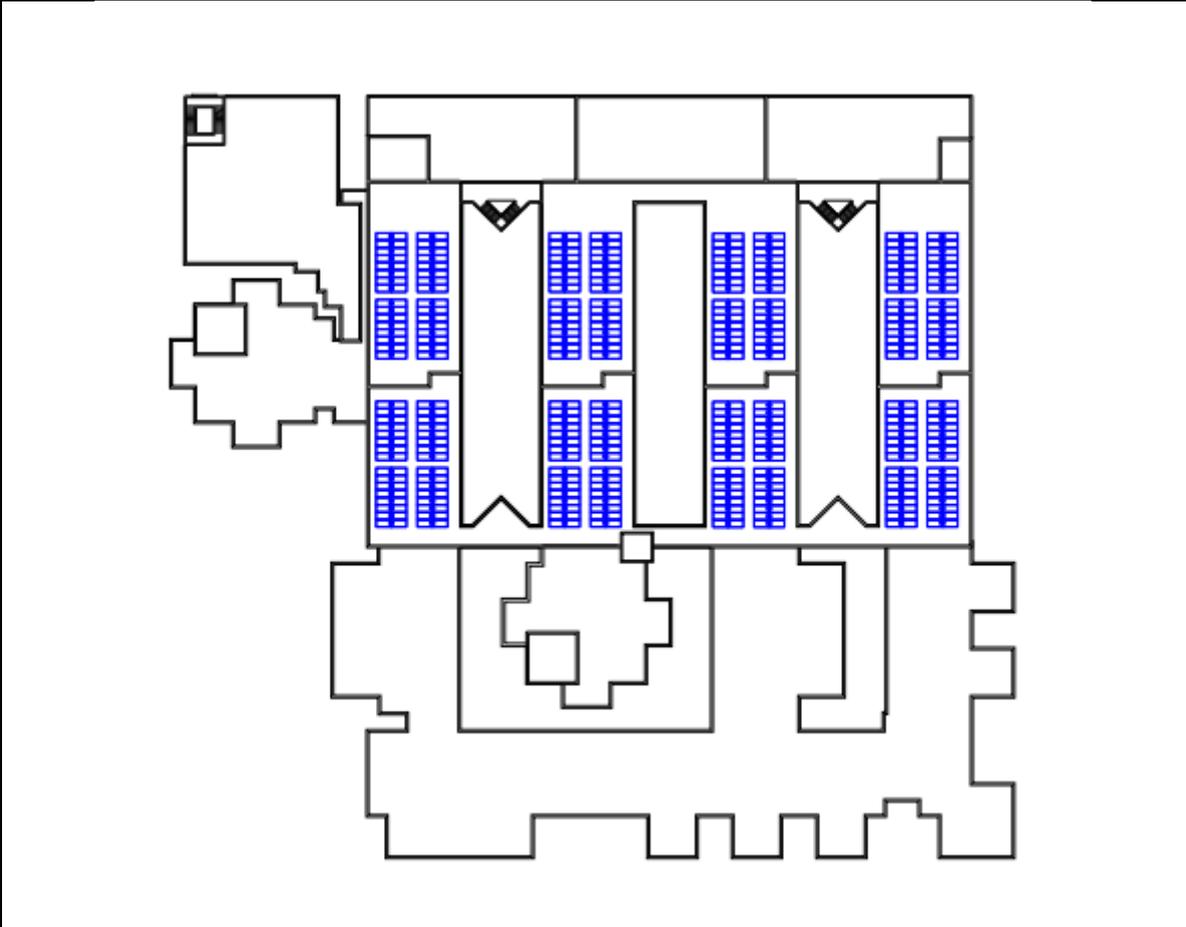
4- Abn Khaldoun Hospital- Lahj City



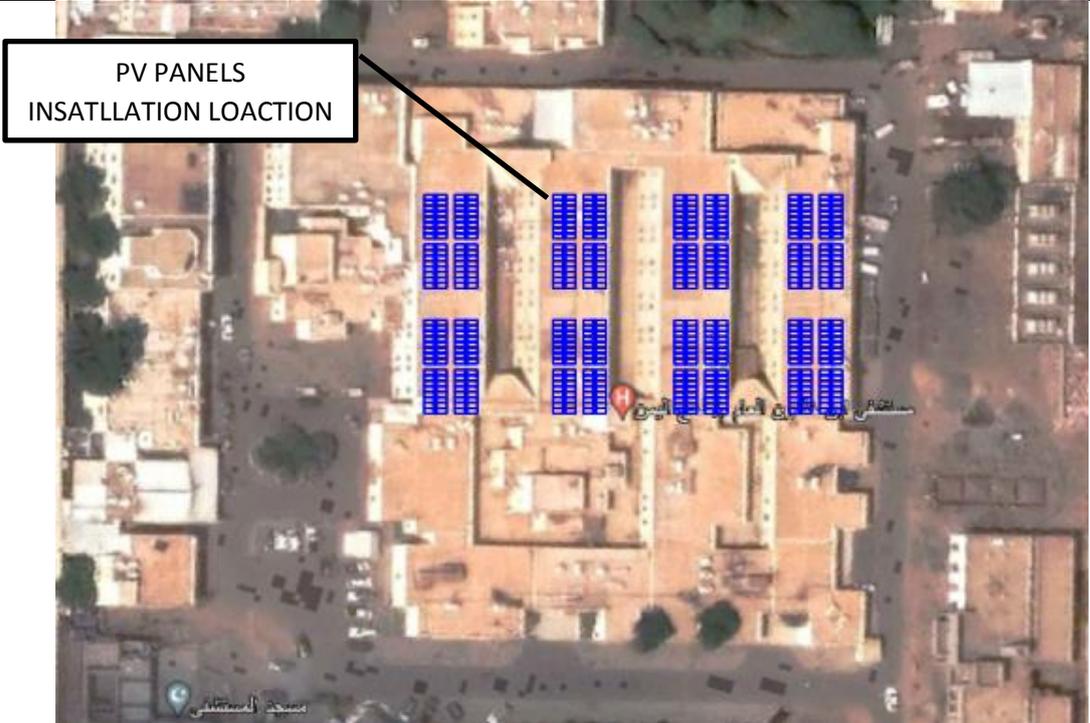
Building from inside



Building Rooftop



ROOFTOP PV INSTALLATION DIAGRAM



Rooftop PV Panels installation location

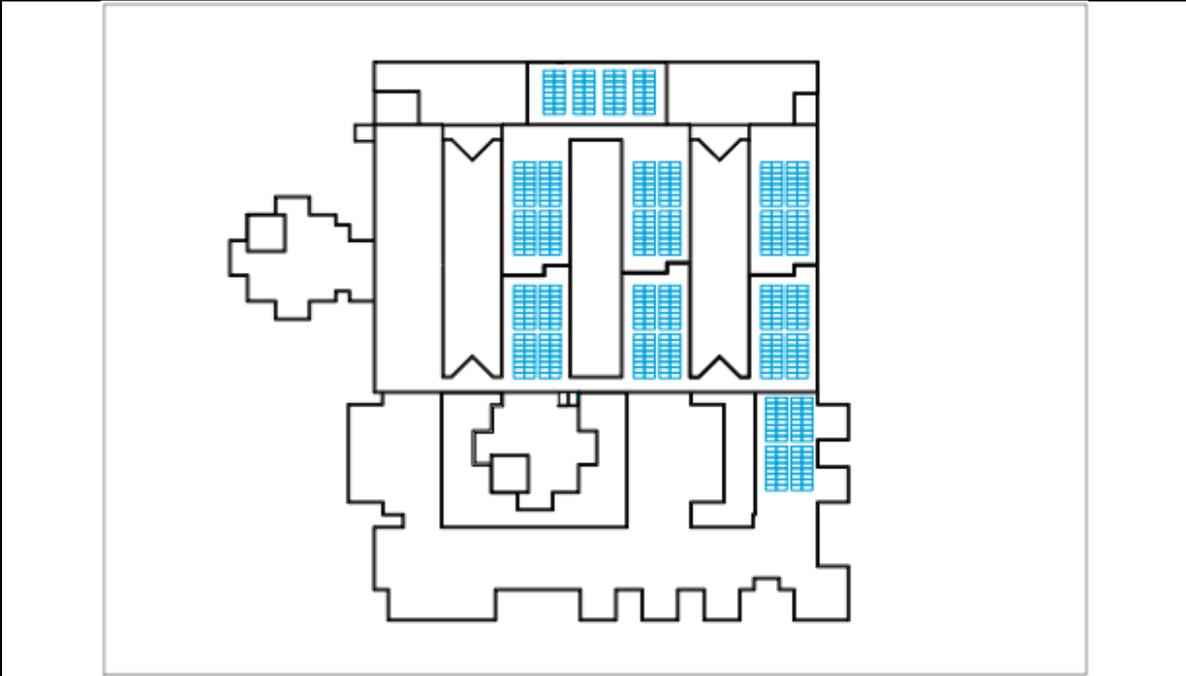
5- Bin Sina'a Teaching Hospital- Mukalla City



Building from outside



Building Rooftop



ROOFTOP PV INSTALLATION DIAGRAM



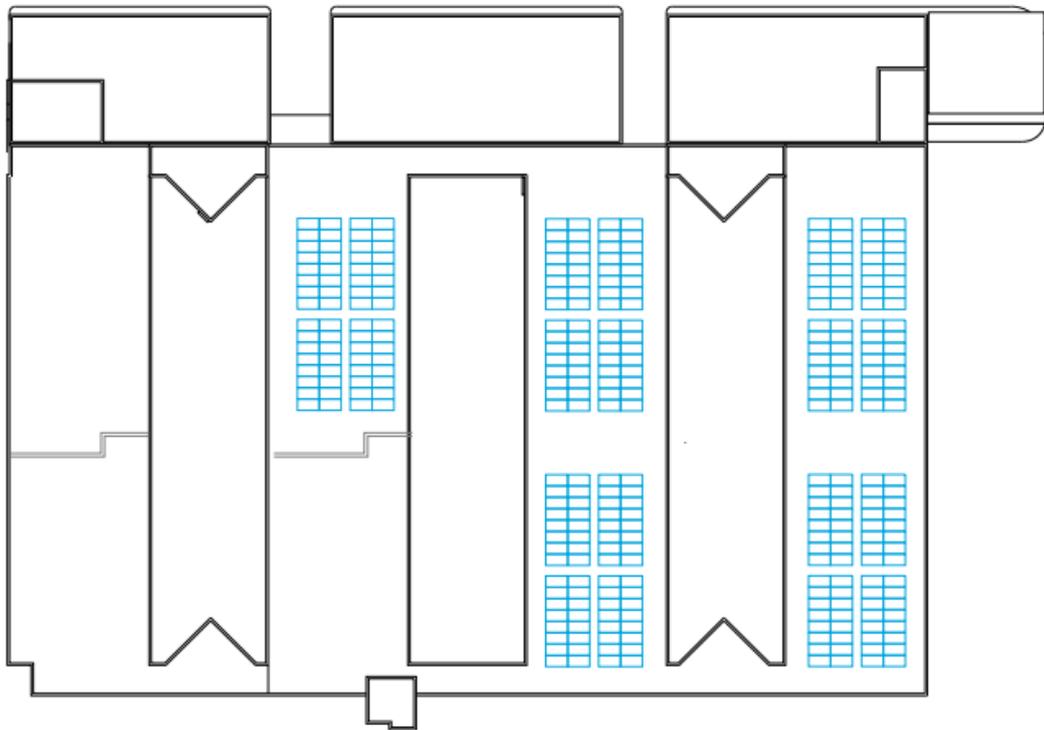
Rooftop PV Panels installation location

6- Alrazi Hospital- Zinjibar City

	
Building from inside	



Rooftop



ROOFTOP PV INSTALLATION DIAGRAM

PV PANELS
INSATLLATION LOACTION



Rooftop PV Panels installation location

4. Consultation

Consultations were conducted by the social facilitators in different sessions with total of 101 persons out of which 60 males and 41 females as follow:

Targeted Facility	Consulted Females	Consulted Males	Total Consulted People
22 May Hospital- Amran City.	7	14	21
Dhamar General Hospital –Dhamar City.	8	12	20
Al Jamhouri hospital-Taiz City.	6	14	20
Abn Khaldoun Hospital- Lahj City.	10	10	20
Bin Sina'a Teaching hospital- Mukalla City.	4	6	10
Alrazi Hospital- Zinjibar City.	6	4	10

Topics of the consultations are to:

- Inform beneficiaries about the activities to be undertaken and the sub-project timetable;
- Document and address local beneficiaries concerns, expectations and feedback;
- Ensure participation of sub-project beneficiaries both females and males with awareness on their rights to participate and give feedback including GM contacts, anonymous complaints and escalation of grievances if not satisfied with the resolution and action taken;
- Discuss the positive impacts that the sub-projects that will have and the sub-project potential negative impacts and proposed mitigation measures to avoid possible impacts.
- Raise the awareness on the protective measures from Covid-19 Pandemic.
- Provide awareness to the consulted persons both males and females on their rights to participate in all sub-project implementation phases, give their feedback and raise their concerns.

Consultation Findings and Feedback

Interviews were conducted by the Female Social Facilitators. The consultation process takes the form of semi-structured discussions and interviews with the staff of the targeted health facility and beneficiaries' visitors both males and females, and feedback was updated and collected by questionnaires. The interview started by a brief explanation of the nature and objective of the sub-projects and potential impacts with proposed mitigation measures.

The interviewed people both males and females of the targeted health facilities have emphasized the importance of continuous operation and maintenance of health services and appreciate the support of supplying and installing solar systems in their facilities to ensure sustainable and clean source of energy to be supplied for continuous operation of health care services and improvement of provided health services quality. All mitigation measures were discussed in details with the consulted persons.

5. Environmental and Social Impact Assessment

Applicability:

YIUSEP II ESMF applies because this sub-project may trigger some HSSE impacts such as Occupational Health and Safety OHS impact.

Eligibility:

These sub-projects are eligible for support because it does not have any of the attributes in the following exclusion list:

Exclusion List

#	Question	Answer	
		Yes	No
1	Production or activities involving harmful or exploitative forms of forced labor/harmful child labor; For direct and contracted workers		X
2	Production or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements;		X
3	Production or trade in weapons and munitions;		X
4	Gambling, casinos and equivalent enterprises;		X
5	Trade in wildlife or wildlife products regulated under CITES;		X
6	Production or trade in radioactive materials;		X
7	Production or trade in or use of un-bonded asbestos fibers;		X
8	Production or trade in wood or other forestry products from unmanaged forests;		X
9	Production or trade in products containing PCBs;		X
10	Production, trade, storage, or transport of significant volumes of hazardous chemicals, or commercial scale usage of hazardous chemicals;		X
11	Production or trade in pharmaceuticals subject to international phase outs or bans;		X
12	Production or trade in pesticides / herbicides subject to international phase outs or bans		X
13	Production or trade in ozone depleting substances subject to international phase out;		X
14	Production or activities that impinge on the lands owned, or claimed under adjudication, by indigenous peoples, without full documented consent of such people.		X
15	Landfills and waste transfer stations,		X

16	Power plants,		X
17	Large-scale transport infrastructure such as highways, expressways, urban metro-systems, railways, and ports,		X
18	Investments in extractive industries; commercial logging,		X
19	Dams, or projects involving allocation or conveyance of water, including inter-basin water transfers or activities resulting in significant changes to water quality or availability,		X
20	Activities that would convert natural habitats or significantly alter potentially important biodiversity and/or cultural resource areas,		X
21	Activities that would require the relocation of residential households and/or significant involuntary land acquisition,		X
22	Activities in disputed areas.		X

6. Environmental and Social Screening

Environmental and social screening was conducted using the YIUSEP II ESMF screening form, the solar system is environmental-friendly, who's PV Panels and equipment will be installed within the same facilities and do not cause disturbance to the community, and the environmental and social impacts will be mostly positive.

Due to the nature and scope of the PV solar activities, the expected air pollution and noise level are low.

Question	Answer		ESS relevance	Due diligence/ Actions
	Yes	No		
Does the subproject involve civil works including new construction, expansion, upgrading or rehabilitation of existing infrastructure?	X		ESS1	ESMP, SEP
Does the subproject involve land acquisition and/or restrictions on land use?		X		SEP
Is the subproject associated with any external waste management facilities such as a sanitary landfill, incinerator, or wastewater treatment plant?		X		ESMP, SEP
Does the sub-project use additional technically feasible water conservation measures?	X		ESS1, ESS3	ESMP

Does the sub-project consider additional strategies to adopt measures that avoid or minimize negative effects of emissions?	X			
Does the subproject have an adequate system in place (capacity, processes and management) to address waste?	X			
Does the subproject involve the recruitment of workers including direct, contracted, primary supply, and/or community workers?	X		ESS2	LMP, SEP
Does the subproject have appropriate OHS procedures in place, and an adequate supply of PPE (where necessary)?	X		ESS2, ESS4	LMP
Does the sub-project have a GM in place, to which all workers have access, designed to respond quickly and effectively?	X		ESS10,ESS2	SEP
Does the subproject involve use of security or military personnel during construction and/or operation of healthcare facilities and related activities?		X		
Does the sub-project establish and implement appropriate quality management systems to anticipate and minimize risks and impacts that services may have on community health and safety.	X		ESS4	ESMP, SEP
Does the sub-project apply the concept of universal access where technically and financially feasible?		X		
Is the subproject located within or in the vicinity of any ecologically sensitive areas?		X		ESMP, SEP
Is the subproject located within or in the vicinity of any known cultural heritage sites?		X		ESMP, SEP
Does the project area present potential Gender-Based Violence (GBV) and Sexual Exploitation and Abuse (SEA) or Sexual Harassment (SH) risk?	X		ESS1/ESS4	ESMP, SEP/GBV Action Plan

7. Risk Level and Mitigation Instruments

The sub-projects assigned risk is moderate, because the subprojects interventions are small to medium scale, and do not involve activities that have a high potential environmental and social and OHS impacts, and the solar systems are environmental-friendly. Actions required to minimize risk to OHS of workers, inadequate site management. Therefore, UNOPS will include environmental and social requirements for contractor including all OHS requirements, as well as Health and Safety prevention measures from COVID-19 in the contracts and tender documents.

This Environmental and Social Management Framework (ESMF) was prepared by UNOPS to meet the requirements of the World Bank's Environmental and Social Framework (ESF) including the WBG Environmental Health and Safety guidelines, as well as national environmental laws and regulations.

Environmental Risk and Impacts:

- Solid waste produced by work accumulated and pollutes the environment.
- Environment Pollution
- Environmental pressures on workers (heat strokes, dust storms)
- GHG emissions.

Social Risk and Impacts:

- Lack of worker's awareness and knowledge on social safeguard issues on gender, SEA and GBV.
- Child Labor
- Low aesthetic value
- Access of public into working site. Impacts:
- Public Exposure to high risk activities (students and hospital patients) (Lifting, Excavation,)

OHS Risk and Impacts:

- Working at Height Impacts:
- Occupational fatalities and major injuries caused by falling from heights
- Lifting Operations Impacts:
- Failure of lifting equipment;
- Falling loads; and
- Workers being crushed by a moving Load or lifting equipment which all might result in fatalities or injuries.
- Air pollution due to emissions from equipment/transportation trucks. that might result in:
 - Mortality caused by cardiovascular and respiratory disease
 - Lung cancer

- Chronic incidence caused by respiratory or cardiovascular disease
 - Decline in physiologic functions Intrauterine growth restriction
 -
 - Electricity Shock Impacts:
 - Thermal burns
 - Muscle, nerve and tissues damage due to electrical shock
 - Fall from height due to sudden electric shock
 - Fatalities or injuries
 - Manual Handling Impacts:
- Manual Handling Injuries that includes
- Fractures
 - Damage to muscles, ligaments and tendons
 - Spinal disc injuries
 - Trapped nerves
 - Abrasions and cuts
 - Burns
 - Hernias
 - Excavation Impacts:
 - Dust generated by excavation activities
 - Waste generated from the excavation
 - Hazardous Substances and Wastes Impacts:
 - Injuries or fatalities that result from:
 - Electric shock
 - Fire
 - Flash burns
 - Infection by Covid-19 Impacts:
 - Transmission of corona virus between site workers
 - Site workers lives could be at risk.

Operation and maintenance

- Operation and Maintenance (Staff Health and Safety) i.e. for risk of potential electric shock to the maintenance staff and working at height risks that may be caused during cleaning/ inspection or general maintenance of the solar panels systems.
- Operation and Maintenance (cleaning using water).
- Proper management of wastes (e.g. PV panels) and encourage recycling where appropriate after lifespan elapsed (25 years) in appropriate arrangements with the facilities administrations.

UNOPS will ensure that:

- The generic environmental and social requirements for contractor including all OHS requirements that are relevant to the project activities will be applied to contractor, as well as site specific OHS requirements as indicated in the site ESMP and included in the tender

documents and contract to fully avoid or mitigate environmental, social, occupational health and safety impacts that might arise from this activity.

- The supply and installation of PV solar system equipment will be compliant to environmental, health and safety standards and specifications including electricity safety, weather resistance, and UL standards.
- Safe installation of solar system and solid fixation of PV mounting structures in safe place on the rooftop of the health facility.
- The facility administration, guard and/or technician will receive proper training on the safe operation and maintenance of the solar PV system.
- The operation and maintenance training will be conducted by the contractors to the facility administration staff and training will be conducted by UNOPS for both contractors' workers before installation and the facility administration staff after installation .

UNOPS will also require that contractor:

- Inspect existing facility 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 submit it for review and approval.
- Fully implement permit to work system, method of statement and job safety analysis to ensure all tasks are well prepared and follow all necessary safety mitigation and prevention measures.
- Provide safety training to all workers including working at height, lifting operations, electrical safety and permit to work before commencing any work
- Provide the required safety and health PPE and hygienic materials to workers to protect workers and ensure their safety and prevent them from Covid-19 infection.
- Provide fully insulated PPE, isolated installation tools, instruments and equipment.
- Provide appropriate training on the use, serviceability and integrity of the necessary PPE.
- Ensure proper use of ladders and scaffolds by trained employees, apply regular inspection and testing, 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.
- Prepare emergency response plan including contact numbers, evacuation plan and provide necessary first aid equipment in site and transportation and contracted nearest hospital in case of any emergency.
- A health and safety training should be provided to workers to avoid electrocutions and potential electric hazards and wearing proper PPEs.
- The contractors must also comply with the project LMP, including the establishment and maintenance of a grievance mechanism GM for workers.

- 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 resistant 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 has already taken the following steps in GBV/SEA/SH:

- In the stakeholder consultation meetings UNOPS has presented the project GBV SEA/SH action plan and during the meetings we focused on female's participants and ensure to explain about the GM mechanism and highlighted how it is transparent, secure and confidential to use any of the GM access point
- UNOPS has developed visibility materials to promote awareness for PSEA/SH in local language (Arabic) the materials and messages used adapted to be suitable for Yemen context and sensitivity of the subject.
- GM focal point received specialized training about SEA/SH cases and the way to deal with it using Victim centered approach
- UNOPS developed SOP and protocol for GM in how to deal with SEA/SH cases.
- UNOPS has conducted refresh sessions for Project Personnel in GBV/SEA/SH and trained retainer's sites engineers as well
- UNOPS has prepared risk assessment tools for GBV and will require contractors to fill a checklist on GBV/SEA/SH and to prepare code of conduct for their workers/staff.
- AS part of YIUSEPII GBV SEA/SH action plan UNOPS will roll out SEA/SH prevention and response plans for contractors , where the contractors need to prepare the action plan as part of the tender documents , UNOPS is supporting to enhance the contractors capacity in this area looking to the fact that almost they have zero knowledge and capacity , for that UNOPS developed contractors action plan template where it covers the most priority areas and UNOPS conducted induction session for contractors about this requirement and presented to contractors on how to prepare their own GBV SEA/SH prevention and response plans (GBV Action Plans) using the developed template , other in depth training sessions will follow and will continue during project life span
- UNOPS will train contractors' PSEA/SH focal points
- UNOPS will require contractors to employ at least 5% female staff to encourage gender mainstreaming.

Labor Management:

The estimated/planned number of labors for solar installation is 12 skilled and 6 unskilled workers in each facility which the contractor is responsible for.

Child Labor and Forced Labor:

- Ensure all workers are 18 Years old or older, and no child, forced, involuntary or unpaid labor will

be used in any work. UNOPS will ban all forms of forced labor under the project as it has been stated in the LMP and ESMF.

- UNOPS will include specific language in the bidding documents so as to alert the industry to the issue of forced labor and requires that bids are accompanied by declarations from suppliers. And will include in applicable procurement documents that solar panels/components for the “core functions of a project” as defined in the World Bank’s Environmental and Social Framework): (i) applicable provisions in the invitation for bids, instructions to bidders and qualification requirements; (ii) a Forced Labor Performance Declaration; (iii) a Forced Labor Declaration; and (iv) a strengthened contract clause on Forced Labor.
- All procurements that apply the declaration will be subject to Bank prior review and Bank no objection. The new requirements apply to both international and national competitive procurement and any direct selection/direct contracting within the scope of application. The requirements apply to new procurement advertised or direct contracting awarded on or after January 1, 2022.
- The contractor shall protect the workers from any risk that may be encountered during the implementation including the exposure to the virus (COVID-19).
- The contractor shall maintain occupational health and safety system in the site to protect workers from hazards and risks and provide adequate health and safety training, required PPE, first aid box, and toilets and potable drinking water.
- UNOPS will ensure in the tender documents that contractor must provide valid insurance policy covering worker’s insurance during sub-project implementation and maintenance period.

Community health and safety

1. Exposure to COVID, risk during installation of the panels.
2. Carrying the PV panels within these public buildings and the hazard that the educational communities will be exposed to.
3. Access of public into working site.

These impacts on the community health and safety can be mitigated through:

1. Working hours will be scheduled when the educational facilities are closed
2. Install barriers, danger warning signs and restriction signs to only authorized persons and signs showing the potential danger to the public. And establish barriers around the working site rooftop, equipment area and excavation area.

GM:

UNOPS has established Grievance Mechanism (GM) with the following contact channels: UNOPS/Sana’a –Toll Free Number 8000190 -Tel: 01 504914/915 - SMS: 739888388 Email: GRM.yemen@unops.org for Yemen Integrated Urban Service Emergency Project (YIUSEP II) with a new Toll Free Phone Number 8000190 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 GM (which attached in Annex 1) was provided to the interviewed people and they have been informed about the GRM contact information that will be also posted at the sub-project site signboard 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.

Anonymous complaints can be provided for both staff and local community and GM can be used as a channel for any kind of complaints including GBV/SH and will handle such complaints

Grievance Mechanism for Workers

The Contractor shall put in place a Grievance Mechanism for workers and the workers of its subcontractors that is proportionate to its workforce. The GM shall be distinct from the Project level Grievance Mechanism for affected individuals and communities, and shall adhere 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 confidentially. 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 the World Bank 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. Any records on SEA shall be registered separately and under the strictest confidentiality.
- *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.

Gender – based Violence (GBV)/Sexual Exploitation and Abuse (SEA)/Sexual Harassment (SH):

The contractor and workers should sign the Code of Conduct, and ensure workers respect and adhere

to the Code of Conduct CoC to respect the local community cultures, and adhere to the social safeguard issues on Gender, SEA/SH and GBV. Raise awareness on GM system and how it can be used to report any GBV cases.

Training of workers: UNOPS and Contactor should provide the workers with required training and daily toolbox talk in the OHS, GBV, SEA and GRM.

Contactor should provide the work site with GM system for all workers including providing complaints box and complaint means.

Information Dissemination and Disclosure

The survivor-centered approach is based on a set of principles and skills designed to guide professionals, regardless of their role, in their engagement with survivors (predominantly women and girls but also men and boys) who have experienced sexual or other forms of violence. The survivor-centered approach aims to create a supportive environment in which the survivor's interests are respected and prioritized, and in which the survivor is treated with dignity and respect. The approach helps to promote the survivor's recovery and ability to identify and express needs and wishes, as well as to reinforce the survivor's capacity to make decisions about possible interventions.

There will be Gender-sensitive communication channels. And in disclosure it will take into consideration women's safety when designing and dealing with information.

COVID 19

UNOPS will require contractor 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 value of alcohol recommended by WHO.
- 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 site.

HSSE Impacts Analysis Plan and Mitigation Measures

Responsibilities:

The UNOPS ESSO (Environment and Social Safety Officer):

- Determine the environmental and social issues that might be triggered by the subproject,
- Identify the relevant Environmental and Social Standards (ESS)
- Determine the appropriate Environmental and Social risk rating for the subproject
- Specify the type of environmental and social assessment required, including specific instruments/plans.
- Conducting the Environmental and social impact screening for the sub-project
- Prepare and/or update health, safety, social and environmental management plans, review them on a regular basis and keep them up to date at all times.
- Advise and instruct project staff, contractors, consultants and other stakeholders on various safety, health, social and environmental related matters related to project implementation.
- Support the Project Manager in raising awareness on health and safety issues among project staff, consultants, contractors and other stakeholders and within UNOPS
- Conduct risk assessment and enforce preventative measures on HSSE.
- Initiate, organize and conduct HSSE training for UNOPS project team, contractors, consultants and other stakeholders.
- Inspect work sites and the work of personnel on a regular basis to identify issues or non-conformity, and enforce necessary actions where unsafe acts or processes that seem dangerous or unhealthy are detected.
- Oversee installations, maintenance and disposal of substances, plant and equipment etc. to ensure they are done in conformity with applicable laws and industry best practice.
- Record and investigate incidents (including near misses) to determine the cause and to propose improvements to processes in the future.
- Prepare reports on incidents (including near misses) and compile statistical information to present to upper management on HSSE matters.
- Ensure a safe workplace environment is maintained at all times without risk to health and safety of everyone including workers, UNOPS staff, other stakeholders and general public.
- Ensure that all Health & Safety policies, procedures, rules and regulations are adhered to and are regularly reviewed, updated and communicated.
- Ensure the contractor meets its statutory obligations in all areas pertaining to health, safety and welfare at work, including statutory training and reporting.
- Ensure that safety inspections, risk assessments, working procedures are managed, and contractors and employees are aware of their responsibilities in relation to health and safety issues.
- Co-ordinate the development of HSSE policies, systems, procedures and guidelines.
- Ensure full and accurate health and safety training records are documented.
- Establish a full programme of documented HSSE inspections, audits and checks.
- Establish and conduct a structured programme of health & safety training (including a well-developed induction program) for project staff, contractors, consultants and other stakeholders.

- Establish an HSSE Committee, manage and devise the agenda for, chair and formulate & distribute minutes for the Health & Safety Committee meetings.
- Keep up to date with all aspects of relevant health, safety & welfare at work legislation and communicate relevant changes to the stakeholders.
- Provide regular reports to the Project Manager on relevant health and safety activities.
- Participate in regular site meetings to report on relevant health & safety matters and to provide necessary advice.
- Any other tasks assigned by the Project Manager.

The UNOPS Project Team

- UNOPS will mitigate the ESHS risks associated with contractors and their activities, by including in the contracts the ESHS requirements for contractors
- UNOPS will ensure that the Environmental and Social Requirements for Contractors will be applied by contractors, to fully avoid or mitigate environmental or social impacts that might arise from their activities.
- UNOPS will conduct regular visits by their HSSE team to monitor implementation of safeguards.
- UNOPS will monitor the contractors technical work by conducting regular monitoring visits to the sites

The contractor

- The contractors are responsible for fulfilling the Environmental and Social safeguards as listed in the BOQs and the environmental and social requirements for contractors and all OHS requirements.
- The contractor will be responsible to:
 - Provide competent safety Officer for each site.
 - Provide Occupational Health and Safety training to all employees/workers involved.
 - Apply Safety Permit to Work, Job Safety Analysis, Method of Statement and Risk Assessment for all working activities at site to ensure full implementation of ESMP and OHS requirements.
 - Provide adequate safety training to all workers.
 - Provide well-maintained checked equipment and licensed operators.
 - Avoid indirect impact on existing near old buildings such as affecting masonry through vibration.
 - UNOPS will require contractors to provide a list of equipment planned to be used with their specifications and current status of maintenance.
 - UNOPS will require contractors to provide third party testing certificates for equipment e.g., excavations and lifting equipment and licenses for operators and drivers.
 - UNOPS will require contractors 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

Potential Impact Factor	Mitigation Measure	Implementation Responsibility ³	Estimated cost for each subproject (USD)
Occupational Health and Safety			
Work related accidents and injuries	<p>Ensure the following aspect are applied: Maintaining a record of injuries and accidents specifying cause and location. Provide a list of trained workers, whom will be checked for their training skills. Measures will be implemented onsite and followed by regular monitoring visits</p>	Contractor and UNOPS	NA
Working at Height Impact: Occupational fatalities and major injuries caused by falling from heights	<p>Ensure that the roof is well protected by proper parapet without openings and enough and clean space. Ensure proper use of ladders and hiabs use by trained workers and inspected, tested regularly by competent inspectors, use of fall prevention devices, including safety belt and lanyard to prevent access to fall hazard area, or fall protection devices such as full body harnesses and head helmets used in conjunction with shock absorbing lanyards. Inspect ladders and their stability before using Installation of guardrails with mid-rails and toe boards at the edge of any fall hazard area.</p>	Contractor and UNOPS ESSO	\$600

³ The contractor is responsible of applying all UNOPS HSSE guidelines, SOPs and OHS requirements.

The UNOPS is responsible of supervising the contractor implementation of HSSE guidelines and OHS requirements.

	<p>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:</p> <p>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.</p> <p>Training and use of personal fall arrest systems, such as full body harnesses and energy absorbing lanyards able to support 5000 pounds.</p>		
<p>Lifting Operations Impact: Failure of lifting equipment; Falling loads; and workers being crushed by a moving Load or lifting equipment which all might result in fatalities or injuries.</p>	<p>Close the lifting area with fence to prevent access to the lifting area during lifting work.</p> <p>Install warning signs for lifting activities</p> <p>Prevent accessibility to non-workers at lifting zones or any construction zone</p> <p>Ensure safe distance from lifting sites and no worker is standing under lifting zone</p> <p>Carry out lifting work by well trained, qualified, and certified lifting team and with proper communication means and flagman.</p> <p>Provide workers with all necessary Personal Protective Equipment PPEs and safety materials.</p> <p>Use well-maintained equipment for lifting that are appropriate for the weight; well checked and tested by a third party.</p>	<p>Contractor and UNOPS ESSO</p>	<p>300\$</p>

	<p>Secure loads when lifting and use strong and reliable fixation materials to make sure that the load is well tighten and no solid parts falls from the load during lifting.</p> <p>Protect the units against staining, discoloration and other damage until they are installed in their final location.</p> <p>Lifting device capacity shall be 1.65 times the maximum calculated static load at that point.</p> <p>An ultimate load shall be ≥ 4 times the maximum static load.</p>		
<p>Electricity Shock Impact: Thermal burns Muscle, nerve and tissues damage due to electrical shock Fall from height due to sudden electric shock Fatalities or injuries</p>	<p>Inspect existing facility and apply all safety measures to prevent the risk of any injury to the workers by electricity shock during installation or the users during operation, and apply Hot Work Permit and Electricity Isolation Certificate subject to written approval by the UNOPS engineer provided before implementation of work.</p> <p>Carefully design using appropriate technologies to minimize hazards.</p> <p>Build security fences around electricity areas.</p> <p>Contractor electricians should be well trained and provided with appropriate insulated PPE and work tools and should be aware of electricity shocks and avoidance techniques.</p> <p>Avoid working during rainy times</p> <p>Install danger signage in the electrical hazard areas and apply all safety measures to prevent exposures.</p>	Contractor and UNOPS ESSO	NA

	<p>Ensure skilled workers are hired for each work. Conduct regular awareness sessions and daily Toolbox Talks on OHS requirements before commencing any work. Periodic inspection to ensure that mitigation measures are implemented and stop any unsafe act or unsafe situation. Emergency response plan to be in place with details and contact of the nearest hospital or medical center, responsibilities are understood for all works, first aid boxes are available and a list of trained first aiders is posted and known by all workers with available transportation. Immediately report all accidental occurrences with serious accident potential such as major equipment failures, contact with high-voltage lines, and exposure to hazardous materials, slides, or cave-ins to UNOPS Contractors shall monitor, keep records and report on the following environmental and social issues:</p> <ul style="list-style-type: none"> • <i>Safety:</i> hours worked, lost time injury (LTI), lost workdays, 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). 		
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	<ul style="list-style-type: none"> • <i>Environmental incidents and near misses: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.</i> • <i>Major works: those undertaken and completed, progress against project schedule, and key work fronts (work areas).</i> • <i>ESHS requirements: noncompliance incidents with permits and national law (legal noncompliance), project commitments, or other ESHS requirements.</i> • <i>ESHS inspections and audits: by Project Company, Independent Engineer, UNOPS and its implementing partners, or others—to include date, inspector or auditor name, sites visited and records reviewed, major findings, and actions taken.</i> • <i>Maintaining a record of injuries and accidents specifying cause and location</i> • <i>Provide a list of trained workers, whom will be checked for their training skills. Measures will be implemented onsite and followed by regular monitoring visits.</i> • <i>Ensuring the contractor is taking care of the safety of workers while working in the site and give all necessary vaccines to workers to prevent any infection with epidemic and pandemic diseases.</i> 		
Manual Handling Impacts: Manual Handling Injuries that includes	Provide required information and training on manual handling to the site workers. Ensure applying safe handling techniques.	Contractor and UNOPS ESSO	NA

<p>Fractures Damage to muscles, ligaments and tendons Spinal disc injuries Trapped nerves Abrasions and cuts Burns Hernias.</p>	<p>Remove space constraints, ensure good housekeeping and providing improved layouts Keep manual handling to one level, improve floor conditions and improve the environmental conditions. The floor must be clean from any obstacles and well protected. Ensure use of appropriate PPE and safety materials. Addressing potential use of handling aids with matching safety measures.</p>		
<p>Excavation Impact: Dust generated by excavation activities Waste generated from the excavation</p>	<p>Excavation will be less than 50cm depth. Excavation area to be appropriately secured using barricades, fences and precaution tapes. Reflective Safety signs to be placed. Continuously remove the waste and transfer it to the approved disposal site by the local district authorities Excavation activities will be away from facility people access way and out of their working/ attendance hours. Ensure workers are wearing PPEs and masks Use dust sweeping methods and if necessary, use water for dust suppression preferably greywater if available.</p>		NA
<p>Injuries or fatalities that result from: Electric shock and fire flash burns.</p>	<p>UNOPS will ensure that contractor will provide workers with well insulated tools, instruments, devises and provide workers with isolated PPE (gloves etc.) and all electrical work will not be</p>	Contractor and UNOPS ESSO	NA

	<p>conducted unless electric isolation certificate is issued to ensure all electric sources are dis-energized before commencing any electrical work.</p>		
<p>Infection by Covid-19 Impact: Transmission of corona virus between site workers Site workers lives could be at risk (Illness /Death).</p>	<p>UNOPS will ensure that contractor will provide health, safety and hygiene awareness and materials to staff, workers and visitors and provide proper training on health and hygiene issues.</p> <p>Contractor to maintain 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).</p> <p>Workers should wear masks, gloves and goggles at all time in the sites.</p>	<p>Contractor and UNOPS ESSO</p>	<p>800\$</p>
<p>Environmental pressures on workers (heat strokes, dust storms)</p>	<p>Not working during high temperatures and start the work early in the morning and working in calm weather conditions.</p> <p>raise awareness on the importance of drinking enough water</p> <p>Provide proper PPEs against heat and dust</p> <p>Do not allow working during bad weather, rain, dust storms</p> <p>Provide adequate and suitable breaks and supply workers with drinking/potable water</p>	<p>Contractor and UNOPS ESSO</p>	<p>NA</p>

Dealing with hazardous materials (i.e diesel)	<p>Ensure hazardous materials, and diesel fuel is stored in well ventilated areas inaccessible to pedestrians and animals</p> <p>Ensure hazardous materials and fuel are stored according to their Materials Safety Data Sheets (MSDSs).</p> <p>Ensure handling of chemicals and hazardous materials are carried out by trained workers</p> <p>Ensure fire prevention kits are present on site</p> <p>Ensure spill prevention kits are present on site</p>	Contractor and UNOPS ESSO	\$500
Environmental Impacts			
Solid waste produced by work accumulated and pollutes the environment.	<p>Ensure that work wastes are properly stored at designated sites and regularly collected and transported to authorized disposal site and arrange for safe path of last destination of E-waste.</p> <p>Ensure waste areas are properly fenced and insulated.</p> <p>Ensure regular and proper housekeeping is maintained</p>	Contractor and UNOPS ESSO	500\$
<p>Air pollution due to emissions from equipment/transportation trucks. that might result in:</p> <p>Mortality caused by cardiovascular and respiratory disease</p> <p>Lung cancer</p> <p>Chronic incidence caused by respiratory or cardiovascular disease</p>	<p>Visual observation and applying equipment checklist for inspection to ensure low emission and well-maintained equipment will be only used.</p> <p>Provide workers with proper PPEs</p> <p>Use minimal water and preferably grey water for dust suppression.</p> <p>Use dust sweeping methods.</p>	Contractor and UNOPS ESSO	NA

Decline in physiologic functions Intrauterine growth restriction Environment Pollution			
GHG emissions	Ensure that panels and related equipment are sought from energy efficient dealers. The requirements for goods supply include Tier 1 financial ability, production quality and Good International Industry Practices GIIP including energy efficiency.	Contractor and UNOPS ESSO	NA
Ambient Noise impacts from machines, transport vehicles and workers.	Properly maintain equipment Ensure all work will be conducted during the day	Contractor and UNOPS ESSO	NA
Soil contamination from Diesel and hazardous materials	-Spill prevention kit shall be available on site in case of oil/fuel/diesel spills -Store diesel/oil/fuel in insulated areas to avoid leakage and soil contamination and according to its material safety data sheet (MSDS). Two tanks/containers should be provided for used oil and ensure safe disposal.	Contractor and UNOPS ESSO	NA
Social Impact			
Lack of workers awareness and knowledge on social safeguard issues on gender, SEA and GBV.	Contractor and workers to sign the code of conduct, and ensure workers respected and adhere to the code of conduct. Conduct regular awareness session on site in GBV prevention. GM system is in place to handle any issue on Gender SEA and GBV.	Contractor and UNOPS ESSO	\$200

	GM system for all workers including providing complaints box and complaint means.		
Child Labor	All workers should be more than 18 years old. Verifying age of workers by checking IDs and official documents. Ensure a worker log is available, and all workers are registered.	Contractor and UNOPS ESSO	NA
Low aesthetic value	Ensure proper waste management and good housekeeping is kept Ensure all construction materials are stored properly and away from the public	Contractor and UNOPS ESSO	NA
Access of public into working site. Impacts: Public Exposure to high risk activities (students and hospital patients) (Lifting, Excavation).	Install barriers, danger warning signs and restriction signs to only authorized persons and signs showing the potential danger to the public. And establish barriers around the working site rooftop, equipment area and excavation area. Do not allow public to access working sites in all cases Avoid construction work during academic seasons Ensure proper storage of construction material and fencing the storage area to prevent accessibility.	Contractor and UNOPS ESSO	500\$
Noise, nuisance to hospital patients and staff	The hospital facilities sections where the work will be conducted will not be in use during installation. And there is different entrance of workers isolated and fenced site. And no noisy work will take place (No welding or grinding allowed at site (Readymade and pre- framed outside the site mounting structures).	Contractor and UNOPS ESSO	NA

Operation and maintenance			
Operation and Maintenance (Staff Health and Safety) i.e. for risk of potential electric shock to the maintenance staff and working at height risks that may be caused during cleaning/ inspection or general maintenance of the solar panels system.	Same mitigation measures for installation will apply for inspection and maintenance as well.	UNOPS, Contractor and Facility Administration.	NA
Operation and Maintenance (cleaning using water).	Ensure water is used efficiently while cleaning the panels in order to avoid wasting water. The solar panel cleaning will be wiper cleaning and water saving practice by using Rubber Blade water sprayers with very little amount of water for conservation of water.	Facility Administration.	NA
Waste management (e.g. solar PV panels)	Empty diesel/oil containers are stored in safe areas that are insulated and disposed of by certified contractors. Ensure safe waste disposal of PV Solar Panels will be followed by the facility's administration after lifespan of PV Solar Panels elapsed.	Facility Administration	NA

Environmental and Social Monitoring Plan

Impact	Measurements (incl. methods & equipment) and indicators	Frequency	Implementation responsibility
Community Health and Safety			
Public safety during the construction work.	Visual observation and photographic documentation of safety measures. Visual observation for installing of warning signs, barricading of working area with safety tapes and fencing/barricades to prevent unauthorized access of public to the working site including workers entrance. Visual observations and records of any construction or storage areas without fencing Visual observations of any non-allowed public access.	Daily	Contractor and UNOPS ESSO
Poor coordination, planning and sequencing of work could lead to breakage of underground pipes (electric power cables, telephone lines, water distribution).	Inspection and photographic documentation. The contractor and UNOPS engineers should ensure that the site supervisor shall submit daily report on the movement of workers, approved and trained workers in place and conduct monitoring to ensure Permit to Work PTW and TBT applied and workers to be well informed about risks, mitigation measures and OHS requirements before commencing any work.	Daily	Contractor and UNOPS ESSO
The risk of employing children and forced labor for work activities.	Site inspection, checking and documentation of contractor employee records and checking/verifying age documents.	Weekly during site inspection and regularly by TPM	UNOPS and TPM
Low aesthetic value of landscape such as accumulation of waste and debris in the site.	Site inspection and documentation of general landscape	Monthly	Contractor and UNOPS ESSO

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.).	Monthly	Contractor and UNOPS ESSO
External stakeholder grievances	Number of grievances 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.	Continuous Monthly	Contractor, UNOPS and TPM
Complaints Handling	Complaints register will be kept on site and this will feed into the GRM. Details of complaints received will be incorporated into the audits as part of the monitoring process.	Weekly	Contractor and UNOPS ESSO
GBV and SEA issues	Number of reported and registered cases of SEA/SH through project GM Number of reported cases of contractors noncompliance to PSEA/SH obligations in work sites	Weekly	Contractor, UNOPS and TPM
General Environmental Impacts			
Dust generation during work implementation.	Visual observation and photographic documentation of equipment induced dust clouds during work activities.	Weekly	Contractor and UNOPS ESSO
Increased level of noise and vibration.	Site supervision/inspection and documentation to ensure compliance with the noise mitigation measures. Indicators: Number of GRM and complaints related to noise	Weekly	Contractor and UNOPS ESSO
Air pollution due to emissions from equipment/transportation trucks.	Visual observation and photographic documentation of equipment induced emissions from vehicles and transport trucks during implementation of activities.	Weekly	Contractor and UNOPS ESSO

Production, proper disposal and disposal of work's debris and waste materials.	Inspection and photographic documentation. Indicators: presence of wastes at undesignated sites Presence of pests	Daily	Contractor and UNOPS ESSO
Soil contamination	Visual inspection and photographic documentation. Indicator: Presence of spills, changes in soil colors, presence of hazardous materials, diesel containers stored directly on the ground.	Daily	Contractor and UNOPS
Operation and Maintenance (cleaning using water)	Visual inspection to ensure that water saving practice is implemented efficiently.	Weekly(After Installation)	Facility Administration
Occupational Health and Safety			
Working at Height Activities	Visual inspection to ensure that all working at height activities are monitored and all safety associated instructions are implemented according to OSH requirements. Indicator: records of injuries from height activities	Daily	Contractor and UNOPS ESSO
Lifting Operations	Visual inspection to ensure that all lifting activities in the work site are executed safely and as per the standard lifting safety rules. Visual inspection that safety distance from lifting sites is adhered to. Indicators: records of lifting accidents	Daily	Contractor and UNOPS ESSO
Electricity Operation	Visual inspection to Ensure that all electricity safety rules are implemented, followed and communicated. Ensure that only skilled workers are authorized to perform any electrical operations through qualification inspections.	Daily	Contractor and UNOPS ESSO

Manual Handling	Visual inspection to ensure that all manual handling activities are performed according to the OSH manual handling safety rules and instructions. . Record any noncompliance Ensure that the implementation of the safety techniques to control the manual handling risk is monitored continuously. Indicators: number of injured workers from manual handling	Daily	Contractor and UNOPS ESSO
Excavation	Visual inspection to ensure that all excavation activities are executed safely and all safety rules are implemented. Record any noncompliance.	Daily	Contractor and UNOPS ESSO
Hazardous Substances and Wastes	Visual inspection to ensure batteries are well placed in a safe and proper ventilated room with appropriate fire extinguisher and conduct regular monitoring. Record any noncompliance and take photographic proof. Indicators: Presence of hazardous wastes in undesignated zones	Daily	Contractor and UNOPS ESSO
Infection by Covid-19	Visual inspection to ensure that health, safety and hygiene awareness are followed and communicated. Visual inspection to ensure that all health, safety and hygiene materials are provided. Indicators Record any non- compliance in wearing PPEs, presence of sick workers	Daily	Contractor and UNOPS ESSO

Work related accidents and injuries.	<p>Inspection and photographic documentation</p> <p>Ensure the following aspect are applied: Maintaining a record of injuries and accidents specifying cause and location. Provide a list of trained workers, whom will be checked for their training skills. Measures will be implemented onsite and followed by regular monitoring visits.</p> <p>Indicators: number of injured workers and type</p>	Daily	Contractor, UNOPS and TPM
Poor onsite housekeeping, toilet and water supply, leading to illness and disease.	<p>Visual site inspection and photographic proof</p> <p>Indicators: presence of pests, presence of wastes at undesignated sites, lack of soap and water at latrines</p>	Weekly during site inspection and regularly by TPM	UNOPS and TPM
Complaints.	Number of GRM Reports and number of solved issues.	Weekly	Contractor and UNOPS ESSO
Safety	Hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases, first aid cases, high potential near misses, remedial and preventive measures required (for example, revised job safety analysis, new or different equipment, manual handling and skills training etc.	Daily	Contractor and UNOPS v
Environmental incidents and near misses	<p>Records of environmental incidents and high potential near misses and how they have been addressed, how they have been reported, incidents review, and lessons learned.</p> <p>Monitoring working in good weather conditions.</p>	Daily	Contractor and UNOPS ESSO
Major works:	Work undertaken and completed, progress against project schedule, and key work fronts (work areas).	Daily	Contractor and UNOPS ESSO

E&S and OHS requirements:	Non-compliance with OHS requirements, national law (legal noncompliance), project commitments and E&S requirements.	Daily	Contractor and UNOPS ESSO
E&S/OHS 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.	Daily	Contractor and UNOPS ESSO
Workers:	Number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age with evidence that no child labor is involved, and skill level (unskilled, skilled, supervisory, professional, management).	Daily	Contractor and UNOPS ESSO
Training on E&S issues	Including dates, number of trainees, and topics.	Weekly	Contractor and UNOPS ESSO
Footprint management:	Details of any work outside boundaries or major off-site impacts caused by ongoing work—to include date, location, impact, and actions taken.	Monthly	Contractor and UNOPS ESSO
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	When occurred	Contractor and UNOPS ESSO
Worker grievances:	Number of grievances and 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. Details of complaints received will be incorporated into the audits as part of the monitoring process.	Weekly	Contractor, UNOPS and TPM

Major changes to contractor's environmental and social practices.	Monitor and record contractor's environmental and social practices noncompliance through visual inspections.	Weekly	Contractor, UNOPS and TPM
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.	Weekly	Contractor, UNOPS and TPM
Operation and Maintenance			
Operation and Maintenance (Staff Health and Safety and community health and safety)	Ensure same monitoring measures are implemented during operation and maintenance	Continuous daily	UNOPS, Contractor and Facility Administration.
Operation and Maintenance (training to facility staff)	Training on how to handle solar panels, clean them, proper PPEs and safety measures etc.	Prior to handing the project to the facility administration (i.e school)	UNOPS, Contractor and Facility Administration.
Training to facility staff on PV diesel systems	Number of trainings received by facility workers.	Prior to handing over the operation PV diesel systems	Contractor, UNOPS and TPM
All costs will be under the responsibility of each party including the contractor and will be included in the contract BoQ.			

Annex 1: Design Requirements and Guidelines:

The UNOPS will carry out the detailed design works for the PV solar system as per the following requirements:

- **Technical Assessment Report:** Preparation of the technical assessment 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 the 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 system 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

Include the following:

1. PV System layouts and drawings including Single Line Diagram (SLD), Cable routing layout for DC & AC, earthing system, 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).

Design Guidelines:

Design Parameters and Assumptions

The following parameters and inputs will be considered for system sizing and design:

- Solar irradiance and total system loss caused by temperature, azimuth (system orientation), dust, inverter inefficiency, will be calculated using PVSyst.
- Each PV-inverter will be connected to four strings, each string will contain 16 PV modules connected in series.

The maximum power for the inverter sizing will be considered as in the following table:

Inverter Sizing

System Size [kWp]	Inverter No. [kVA]	System Type
102	4*20	3 ph
128	5*20	3 ph
102	4*20	3 ph
144	6*20	3 ph
128	5*20	3 ph
205	8*20	3 ph

Technical Specifications.

PV Modules

- Solar PV panels suitable for the project purposes and local conditions;
- Solar PV panel should be of the mono-crystalline technology;
- Module capacity with minimum 400 Wp.
- Solar PV panel rating should be at least that specified in the technical drawings;
- The rated output power of any supplied module shall have positive tolerance;
- Solar PV panel conversion efficiency should be equal to or greater than 19.5 % under STC;
- The supplied module DC voltage should be not less than 1000 VDC;
- The module type must conform with CE and IEC 61215, IEC 61730, IEC 61701 or equivalent standards; The bidder shall provide the manufacturer certificates, proving that the PV modules are compliant with these requirements;
- PV panels should be procured from tier-1 manufacturers;
- The PV panels must have a minimum manufacturing warranty of 10 years and a performance warranty of a minimum of 25 years. The following minimum power warranties shall be guaranteed:
 - First 10 years at 90% of the nominal rated power output;
 - Subsequent 15 years at 80% of the nominal rated power output. Or linear power output characteristic can be accepted.

Inverters

- On grid inverters, rated at 20KVA, with at least two MPPTs;
- Insulation testing feature on DC side;
- The minimum 'European Efficiency' of the inverter shall be a minimum of 97.9%;
- Complete installation following recommendations by the manufacturer (minimum spacing, temperature of the room, etc.);
- Ground connection of the inverter to the equipotential bonding conductor and to the protective conductor of the AC side;
- PV specific surge arrester type 2 shall be provided on the DC side;

- AC Type 1+2 surge arrestor shall be provided on the AC side;
- Setting, labelling and commissioning of inverters;
- Remote monitoring of the inverters;
- Inverters shall be suitable for the Plant climatic conditions and with proven track record for similar projects;
- Suitable consideration of inverter ventilation to avoid potential capacity de-rating;
- The quoted inverter capacity shall be suitable for local ambient temperature;
- Monitoring System – The inverters shall all be integrated in one Plant monitoring and control system.

DC and AC cabling circuit cable routing

- All cables and connectors used for the installation of the solar array must be of solar grade robust and durable in harsh environmental conditions including High temperatures, UV radiation, rain, humidity and dirt as per IEC standards.
- Design, procure and supply all DC cables, connections, fixings and cable trays between the PV panels and the Inverters and all the AC connection and cables between the inverters and their respective MDBs.
- DC Cables: Outer sheath of cables shall be electron beam cross-linked XLPE type, or equivalent. Cable Jacket should also be electron beam cross-linked XLPE, flame retardant, UV resistant. 4mm² or 6mm² cables can be used.
- Cables terminations shall be made with suitable cable lugs & sockets etc., crimped properly and passed through brass compression type cable glands at the entry & exit point of enclosures, or equivalent.
- All cable/wires shall be provided with UV resistant printed ferrules for both DC and AC sides. The marking on tags shall be done with good quality letter and number ferrules of proper sizes so that the cables can be identified easily.
- Cable trays and racks shall also be provided of hot dip galvanized steel.
- AC Cable trays shall have a spare area of 50% of the whole section, a minimum distance equivalent to one diameter of the AC cables is to be left between cables on the cable trays.
- DC Cables can be bundled on cable trays
- Cables with different voltage level shall be separated by use of different ladders or trays. Particular attention should be given to separating Power lines from control cables.
- Cable trays shall be protected by use of a cover.
- For underground cables in trenches: Excavated in a depth of min. 70 cm. The bottom of the trench shall be smooth, compacted and free of stones, roots and pipes. The bottom of the trenches shall be covered with a 15-cm layer of riddled, stone-less sand. After laying of the electric conduits, they shall be covered with a further layer of the same

sand, depth 15 cm. a second layer of conduits for control cables is then laid in place, covered with a third layer of 10cm sand. Remaining volume can be backfilled from excavated material. A warning tape and a bare copper cable should be installed as detailed in the trenches drawings. Asphalt should be corrected in all affected areas.

- Supply and Install a complete earthing system including earthing rods and all earth wiring and accessories for equipotential connection.

Control and signal Cables

- Multi core insulated cables suitable for outdoor use and laying under-ground, with copper conductor and copper shielding
- The cables shall be provided with a min. of 20% spare conductors, except for the inter-inverters control cables.
- Separate cable trays or conduits shall be used for LV and control / signal cables.
- Contractor is responsible for providing a layout of the control cables as required by the proposed topology, and responsible for installation of such network.

Electrical Boxes

- Class II boxes suitable for outdoor use (minimum IP67 protection if implemented outdoor, in compliance with the applicable standards which should be sunlight/ UV resistive as well as fire retardant)
- Includes a disconnecting device for upstream boxes by removable and lockable handles. This applies to both combiner boxes and main totalizer boxes.
- Includes suitable protections. e.g. DC fuses on both the positive polarity (+) and negative polarity (-) in the DC side,
- Protective device against surges suitable for photovoltaic systems according to the applicable standard.
- Included tracking labels and signal "Warning: energized cables " and "Do not operate in charge" both in Arabic and English language
- All electrical boxes must be labelled with permanent marking denoting the associated inverter and Combiner box numbers as per the as-built drawings.
- The boxes will have suitable cable entry points fitted with cable glands of appropriate sizes for both incoming and outgoing cables preserving the IP of the box.
- The electrical boxes must be grounded properly to ensure all safety related measures for safe operation.
- All the electrical boxes to be manufactured with sufficient space for easy handling and must have temperature suitability for local conditions and maximum current rating.

PV-Diesel System Controller

A tested commercial solar diesel hybrid control system should be provided to manage energy production from the solar inverters to preserve grid stability during Diesel Generators operation and guarantee a minimum loading factor on the generators.

The controller is expected to operate as follows:

- The controller shall be able to operate at least three different diesel generators which do not operate in synchronization.
- The controller will continuously monitor the running generator output via dedicated meters (independent from the GCU measurements). In case the loading on the diesel generator is reduced to less than a certain minimum loading factor (MLF), the controller will send instructions to all inverters to reduce their power output such that MLF is respected. This action should prevent reverse power on the generator side and will always maintain a stable grid. The inverters will be acting as a slave to the system controller. Response times should be within 1 second of instruction. The MLF value should reside between 30 to 40%, but the exact value of MLF should be customizable on site and will be communicated to the contractor at a later stage. It is expected that MODBUS communication will be used, but other configurations are acceptable if technically equivalent.
- The controller should also be able to actively control the reactive power output from the PV inverters to keep the DG running in its optimal power factor range. The control algorithm will be communicated in a later stage.
- The controller should be able to operate the pv inverters either with diesel generators or public utility grid with zero export feature.
- All operating parameters from the controller should be fully logged in the dedicated logger It should be placed in a protected enclosure. It should be protected from surges and power fluctuations.

Monitoring & Data Acquisition

The contractor is responsible for the supply and installation of a data acquisition unit (data logger) for efficient plant operation and control and compatible with all measuring components. All measurements are to be logged locally, and available from a remote location through an internet connection, including the data from the weather station(s), the inverters, the power analyzers and the solar-diesel controller.

- Supply, installation and connection of a solar technology sensors and temperature (ambient temperature + modules reference) within a weather monitoring station complete with sensors with valid calibration certificates including as a minimum:
 - 1 x Global Horizontal Irradiance pyranometers;
 - 1 x Plane of Array Irradiance pyranometers;
 - 1 x Shielded and ventilated ambient temperature sensors;
 - 1 x module temperature sensors;
 - 1 x wind speed sensors
- Supply, installation and connection of kWh meters. The power meter should measure 4 quadrant power parameters and have built-in storage and online monitoring capabilities.
- Provision of data acquisition software;

- The system should be capable to operate through both GSM and LAN, contractor should provide all accessories needed such as sim card and modules;
- A data access for remote monitoring shall be provided to UNOPS and the facility operator.
- A small UPS system should be included to power all monitoring and controller equipment. The UPS should have a 1kWh battery storage capacity and a 1000W power rating. The UPS operating voltages should be chosen according to the offered components requirements.
- Bidder should grant access to a web portal page for at least 5 years, supporting documents from the vendor should be provided.

Dynamic Display Panel

50-inch TV screen and display interface for indoor use, exact location to be communicated later. The display shall follow below features:

- Should display at least: Instant Power (kW), Total produced Energy (MWh), cumulative CO2 emission saved (Ton);
- Graphic design considering the illustrations and texts to be approved by the facility;
- The Contractor will be responsible for the supply and installation of a communication device between the Plant remote monitoring system and the TV display (through LAN or other wired technology as convenient).

Earthing System

For the equipotential bonding of the PV system the contractor shall equip the plant with an adequate earthing system following below features:

- Earth rods of 2.4m length, 14.2mm diameter are to be installed in an earth pit, casted in concrete.
- Earthing diagram and earth cabling sections to be provided by the contractor. Main earth cables between earth rods and earthing bars should not be less than 70mm².
- Each array structure of the PV modules should be grounded properly. Suitable accessories for bonding between copper and metallic structures to be used, to avoid potential difference induced corrosion.
- Piercing PV clamps should be used to bond PV panel frames on the same row
- 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.
- Earthing installation in accordance with the IEE Wiring regulations BS 7671.

Mounting Structure.

- The frames, post, cap plate, assembly of the structures, etc. shall conform to European standards as detailed in shop drawings of structural members. All elements sections shall be A36 steel with minimum yield stress 248MPa.

- The HSS purlins shall be hot dipped galvanized steel and fixed by stainless steel self-drilling fasteners as detailed in the shop drawings.
- The angle sections on the purlins shall be galvanized steel L 30x30x3 with 18 cm long for internals and 9 cm long for edges, fixed by stainless steel self-drilling fasteners as detailed in the shop drawings.

Training

The Contractor shall provide technical and safety training for the facility staff on all operational and maintenance aspects for the Plant including but not limited to:

- Start-up and shut down of the solar plant
- Remote monitoring system and logging system;
- Inverter functionality, resets and interface;
- Solar panels cleaning and panel replacement;
- All protection devices operation and functionality.

Scope of work

The general scope of work includes supply, delivery, installation and commissioning of PV - diesel system and

The technical advantage will be given to the good quality material proposed; bidders are advised to propose high quality products and the latest available technologies;

All as built drawings and layout shall be prepared using AutoCAD including but not limited to: single line diagram (SLD), PV layout, cable routing, and structural design;

Bidders shall submit data sheets for the proposed material with detailed technical specifications of the PV system components;

The contractor will be responsible for providing training course focusing on system operation, maintenance and management, the scope of training and schedule shall be proposed by the contractor and approved by UNOPS engineer;

Contractor will be responsible for the system maintenance during the DNP, including replacement for components if needed;

It is the contractor responsibility to set a protection strategy to protect the system against lightning, any equipment fails due to lightening will be replaced by the contractor and on its own cost.

Fire Extinguisher

- A portable fire extinguisher shall be provided, 2 extinguishers for each facility should be supplied one to be placed near to the control room and the other one placed near the MDB;
- Fire extinguisher 1: 5 kg carbon dioxide (CO2);
- Fire extinguisher2: 6 kg powder;
- Warranty: at least two years.

Smoke & Heat Detector

- Shall be located inside the control room;
- Include button for false alert;
- Battery life not less than three years;
- Warning sound delivers sounds of >85 Db.
- PVC pipe type: High quality heat rated PVC pipes and accesses

Danger Labels and Signage

- Awarded Bidders are entitled to provide outdoor, sun proof danger signage where necessary including but not limited to, solar inverter, and junction box(s).
- Size and test of the signage shall be finalized in consultation with UNOPS engineer.

Annex 2: GRM Complaint and Suggestion Form

Yemen Integrated Urban Services
Emergency Project
YIUSEP II
Sample of GRM
Complaint and Suggestion Form

أستمارة توثيق ومتابعة شكاوى المستفيدين
من المشروع الطارئ للخدمات الحضرية
المتكاملة – المرحلة الثانية

المشروع الطارئ للخدمات الحضرية المتكاملة
المرحلة الثانية
نموذج لآلية التظلمات والشكاوى

"Documenting and Monitoring Complaints Form of

Beneficiaries of Yemen Integrated Urban Services Emergency Project YIUSEP II"

			الاسم الثلاثي للمستفيد: Beneficiary Name
رقم الهاتف للمتابعة Tel Number for follow up			رقم البطاقة الشخصية: ID No.
			العنوان الدائم: Permanent Address
			اسم النشاط المنفذ (مركز/وحدة) Name of Activity under implementation
المحافظة: Governorate	المديرية: District	القرية: Village	مكان تنفيذ النشاط: Place of activity under implementation

أخرى Other	مالية Financial	فنية Technical	إدارية Administrative	نوع الشكاوى Complaint Type

موضوع الشكاوى:

Complaint Subject

		الوضع الحالي: Current Situation
		أسباب المشكلة: Reason of the problem
توقيع صاحب الشكاوى: Complainant Signature		التاريخ: Date

- الجهة التي يجب أن يقدم لها الشكاوى: ... UNOPS – Tool Free No 8000190 Tel: 01 504914/915 - SMS: 739888388 Email: GRM.yemen@unops.org.....

The entity, which the complaint should be forwarded to:

.....-الرأي في جدية الشكاوى:

Opinion on the seriousness of the complaint

.....-الجهة المحول لها الشكاوى:

The complaint transferred to

.....- المدة الزمنية اللازمة للبت في الشكاوى:

Time required for response

.....مدى رضى المستفيد عن الاستجابة لحل شكواه:

Satisfaction of beneficiary in responding to his/her complaint

		الإجراءات المتخذة : Action taken	
	التاريخ: Date		ماترتب عليها من نتائج: The results of the action taken

..... اسم مستلم الشكوى ووظيفته:

Name of person received the complaint and his/her position

توقيع الموظف المختص / Signature

..... : التاريخ / Date

.....:

Annex 3: Environmental and Social Requirements for Contractors

These requirements for contractors are generic and clauses applied as relevant to each sub-project.

Contractors shall meet the following Environmental, Health, Safety and Social (including labor) requirements – thereafter called ESHS requirements⁴.

The ESHS requirements include 10 sections

1. Contractor Environmental and Social Management Plan (C-ESMP)
2. ESHS Training
3. Construction Site Management
4. Occupational Health and Safety (OHS)
5. Road safety and Traffic Safety
6. Chance Find Procedures
7. Emergency Preparedness and Response
8. Stakeholder Engagement
9. Code of Conduct
10. Contractor Environmental and Social Reporting

Contractor Environmental and Social Management Plan (C-ESMP)

- Prepare and submit to UNOPS for approval a Contractor Environmental and Social and Social Management Plan (C-ESMP).
- Include in the C-ESMP a detailed explanation of how the contractor's performance will meet the ESHS requirements.
- Ensure that sufficient funds are budgeted to meet the ESHS requirements, and that sufficient capacity is in place to oversee, monitor and report on C-ESMP performance.
- Put in place controls and procedures to manage their ESHS performance.
- Get prior written approval from UNOPS Engineers before starting construction or rehabilitation activities.

ESHS Training

- Determine ESHS training needs in collaboration with UNOPS.
- Maintain records of all ESHS training, orientation, and induction.
- Ensure, through appropriate contract specifications and monitoring that service providers, as well as contracted and subcontracted labor, are trained adequately before assignments begin.
- Demonstrate that its employees are competent to carry out their activities and duties safely. For this purpose, the Contractor shall issue a Competence Certificate for every person working on site (relative to aspect of work assignment) that specifies which tasks can be undertaken by which key personnel.

Orientation Training

- Provide ESHS orientation training to all employees, including management, supervisors, and workers, as well as to subcontractors, so that they are apprised of the basic site rules of work at/on the site and of personal protection and preventing injury to fellow employees.
- Training should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-

⁴The ESHS requirements build on the General EHS Guidelines of the World Bank Group, but also take into account other World Bank guidelines, and good practice notes

specific hazard or color coding in use should be thoroughly reviewed as part of orientation training.

Visitor Orientation

- Establish an orientation program for visitors, including vendors that could access areas where hazardous conditions or substances may be present.
- Visitors shall not enter hazard areas unescorted.
- Ensure that visitors shall always be accompanied by an authorized member of the contractor, or a representative of UNOPS or of its implementing partners, who has successfully fulfilled the ESHS orientation training, and who is familiar with the project site construction hazards, layout, and restricted working areas.

New Task Employee and Contractor Training

- Ensure that all workers and subcontractors, prior to commencement of new assignments, have received adequate training and information enabling them to understand work hazards and to protect their health from hazardous ambient factors that may be present. The training should adequately cover the step by step process that is needed for Project activities to be undertaken safely, with minimum harm to the environment, including:
 - Knowledge of materials, equipment, and tools.
 - Known hazards in the operations and how they are controlled.
 - Potential risks to health.
 - Precautions to prevent exposure.
 - Hygiene requirements.
 - Wearing and use of protective equipment and clothing.
 - Appropriate response to operation extremes, incidents and accidents.

Construction Site Management Vegetation

- Prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the construction site.
- Protect all trees and vegetation from damage by construction operations and equipment, except where clearing is required for permanent works, approved construction roads, or excavation operations.
- Re-vegetate damaged areas on completion of the Works, and for areas that cannot be revegetated, scarifying the work area to a condition that will facilitate natural revegetation, provide for proper drainage, and prevent erosion.
- Use, as much as possible, local species for replanting and species that are not listed as a noxious weed or invasive species.
- Repair, replant, reseed or otherwise correct, as directed by UNOPS or its representative, and at the Contractor's own expense, all unnecessary destruction, scarring, damage, or defacing of the landscape resulting from the Contractors operations.
- Transport labor and equipment in a manner to avoid as much as possible damage to grazing land, crops, and property.

Protection of the Existing Installations

- Safeguard all existing buildings, structures, works, pipes, cables, sewers, or other services or installations from harm, disturbance or deterioration during construction activities.
- Coordinate with local authorities to identify existing infrastructure that might not be visible.

- Repair any damage caused by the Contractor's activities, in coordination with concerned authorities.
- Take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of properties to the construction activities, and more generally to the public.
- Maintain safe access to public and private properties that might be affected by construction activities. If necessary, provide acceptable alternative means of passage or access to the satisfaction of the persons affected.
- Avoid working during night hours.

Waste from Construction Activities

- Collect and properly store and manage all solid wastes and hazardous wastes resulting from the construction activities, including construction debris and spoils, to prevent the contamination of soil and groundwater. Hazardous E-waste should be managed stored and disposed according to widely accepted guidelines. In case chemicals are present they should be stored and disposed according to their Material Safety Data Sheets (MSDSs)
- Remove unneeded excavation material from construction sites as soon as possible.
- Agree with relevant municipalities about solid waste disposal during construction.
- Carefully select waste disposal sites, to be approved by UNOPS or its implementing partner.
- 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 or debris.
- Transfer construction waste to assigned places in the selected waste disposal sites with documented confirmation.
- Properly dispose of solid waste and hazardous wastes and debris at designated permitted sites waste disposal sites allocated by the local authorities, and obtain a receipt of waste from the authorized landfill authority.

Air Quality

The Contractor shall:

- Use dust control methods, such as covers, water suppression, or increased moisture content for open materials storage piles, or controls, including air extraction and treatment through a bag house or cyclone for material handling sources, such as conveyors and bins.
- Use water suppression for control of loose materials on paved or unpaved road surfaces. Oil and oil by-products is not a recommended method to control road dust.
- Use wheel washes at quarries, ready-mix plants, construction sites, and other facilities to prevent track-out of mud, dust and dirt on to public road.
- Regularly clean road surfaces within the construction sites to remove accumulated fine material, and regularly clean transportation vehicles.
- Cover open bodied trucks handling sand, gravel or earth.
- Minimize smoke from diesel engines by regular and proper maintenance, in particular by ensuring that the engine, injection system and air cleaners are in good condition.

Hazardous and Toxic Materials

The Contractor shall take precautions relative to the conditions specified herein.

- Train workers regarding the handling of hazardous materials.
- Store hazardous materials as per the statutory provisions of the Manufactures, Storage and Import of Hazardous Chemicals Rules (1989), under the Environment (Protection) Act, 1986.

- Provide adequate secondary containment for fuel storage tanks and for the temporary storage of other fluids such as lubricating oils and hydraulic fluids.
- Use impervious surfaces for refueling areas and other fluid transfer areas.
- Train workers on the correct transfer and handling of fuels and chemicals and the response to spills.
- Provide portable spill containment and cleanup equipment on site and training in the equipment deployment.
- Deposit or discharge toxic liquids, chemicals, fuels, lubricants and bitumen into containers for salvage or subsequent removal to off-site locations.
- Treat hazardous waste separately from other waste.
- Avoid the storage or handling of toxic liquid adjacent to or draining into drainage facilities.
- Keep absorbent materials or compounds on Site in sufficient quantities corresponding to the extent of possible spills.
- Locate landfill pits for the disposal of solid waste at least 100 m from water courses, and fencing them off from local populations.
- Ensure adequate primary treatment of sanitation effluents and installing septic tanks away from village watering points.

Area Signage

- Appropriately mark hazardous areas.
- Install warning signs
- Ensure that signage is in accordance with international standards and is well known to, and easily understood by workers, visitors and the general public as appropriate.
- Demarcate work sites with safety tape, fencing or barricades, as appropriate, to prevent unauthorized access to the construction sites
- Safeguard public safety by covering holes and by installing guardrails along temporary pathways.

Health and Safety

Severe Weather and Facility Shutdown

- Design and build work place structures to withstand the expected elements for the region and designate an area designated for safe refuge, if appropriate.
- Develop Standard Operating Procedures (SOPs) for project or process shut-down, including an evacuation plan.

Lavatories and Showers

- Provide adequate lavatory facilities (toilets and washing areas) for the number of people expected to work at the construction sites, and make allowances for segregated facilities, or for indicating whether the toilet facility is “In Use” or “Vacant”.
- Provide toilet facilities with adequate supplies of hot and cold running water, soap, and hand drying devices.
- Where workers may be exposed to substances poisonous by ingestion and skin contamination may occur, provide facilities for showering and changing into and out of street and work clothes.

Potable Water Supply

- Provide adequate supplies of potable drinking water from a fountain with an upward jet or with a sanitary means of collecting the water for the purposes of drinking
- Ensure that water supplied to areas of food preparation or for the purpose of personal hygiene (washing or bathing) meets drinking water quality standards

Clean Eating Area

- Where there is potential for exposure to substances poisonous by ingestion, make suitable arrangements to provide clean eating areas where workers are not exposed to the hazardous or noxious substances.

Personal Protective Equipment (PPE)

- Identify and provide at no cost appropriate PPE to workers, the workers of subcontractors, as well as to visitors, which gives adequate protection without incurring unnecessary inconvenience to the individual.
- Ensure that the use of PPE is compulsory.
- Provide sufficient training in the use, storage and maintenance of PPE to its workers and workers of its subcontractors.
- Properly maintain PPE, including cleaning when dirty and replacement when damaged or worn out;
- Determine requirements for standard and/or task-specific PPE based on of Job specific Safety Analysis (JSA).
- Consider the use of PPE as a last resort when it comes to hazard control and prevention, and always refer to the hierarchy of hazard controls when planning a safety process.

Noise

Institute appropriate measures to reduce the exposure of workers to construction noise, including but not limited to:

- Avoid exposure to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) of more than 140 dB(C).
- Enforce the use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110 dB(A).
- Provide hearing protective devices capable of reducing sound levels at the ear to at most 85 dB(A).
- Reduce the “allowed” exposure period or duration by 50 percent for every 3 dB(A) increase in excess of 85 dB(A).
- Perform periodic medical hearing checks on workers exposed to high noise levels.
- Rotate staff to limit individual exposure to high levels.
- Install practical acoustical attenuation on construction equipment, such as mufflers.
 - Use silenced air compressors and power generators
 - Keep all machinery in good conditions.
 - Install exhaust silencing equipment on bulldozers, compactors, crane, dump trucks, excavators, graders, loaders, scrapers and shovels.
- Post signs in all area where the sound pressure level exceeds 85 dB(A).
- Shut down equipment when not directly in use.
- Provide advance notice to occupants if an activity involving high level impact noise is in close proximity to buildings.

First Aid and Accidents

- Ensure that qualified first-aid by qualified personnel is always available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work.
- Provide workers with rescue and first-aid duties with dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co- workers. Training would

include the risks of becoming infected with blood-borne pathogens through contact with bodily fluids and tissue.

- Provide eye-wash stations and/or emergency showers close to all workstations where immediate flushing with water is the recommended first-aid response.
- Provide dedicated and appropriately equipped first-aid room(s) where the scale of work or the type of activity being carried out so requires.
- Equip first aid stations and rooms with gloves, gowns, and masks for protection against direct contact with blood and other body fluids.
- Make widely available written emergency procedures for dealing with cases of trauma or serious illness, including procedures for transferring patient care to an appropriate medical facility.
- Immediately report all accidental occurrences with serious accident potential such as major equipment failures, contact with high-voltage lines, and exposure to hazardous materials, slides, or cave-ins to UNOPS.
- Immediately investigate any serious or fatal injury or disease caused by the progress of work by the Contractor, and submit a comprehensive report to UNOPS.

Communicable Diseases

The Contractor shall implement a combination of behavioral and environmental modifications to mitigate communicable diseases:

- Conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all construction site staff (including all the Contractor's employees, all subcontractors of any tier, consultants' employees working on the site, and truck drivers and crew making deliveries to the site for Works and Services executed under the Contract, concerning the risks, dangers and impact, and appropriate avoidance behavior of communicable diseases.
- Provide treatment through standard case management in on-site or community health care facilities.
- Ensure ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers.
- Promote collaboration with local authorities to enhance access of workers families and the community to public health services and ensure the immunization of workers against common and locally prevalent diseases.
- Provide basic education on the conditions that allow the spread of other diseases such as COVID-19, Lassa fever, Cholera and Ebola. The training should cover sanitary hygiene education.
- Prevent illness in immediate local communities by:
 - Implementing an information strategy to reinforce person-to-person counselling addressing systemic factors that can influence individual behavior as well as promoting individual protection, and protecting others from infection.
 - Training by health workers in disease treatment.
 - Conducting immunization programs for workers in local communities to improve health and guard against infection.
 - Providing health services.

COVID-19

In the context of the COVID-19 pandemic, Contractors shall develop and implement measures to prevent or minimize an outbreak of COVID-19, and develop procedures indicating what should be done if a worker gets sick. The measures shall include:

- Assessing the characteristics of the workforce, including those with underlying health issues or who may be otherwise at risk.

- Confirming that workers are fit for work, including temperature testing and refusing entry to sick workers.
- Considering ways to minimize entry/exit to site or the workplace, and limiting contact between workers and the community/general public
- Training workers on hygiene and other preventative measures, and implementing a communication strategy for regular updates on COVID-19 related issues and the status of affected workers.
- Treating workers who are or should be self-isolating and/or are displaying symptoms
- Assessing risks to continuity of supplies of medicine, water, fuel, food and PPE, taking into account international, national and local supply chains
- Reducing, storing and disposing of medical waste
- Adjusting work practices, to reduce the number of workers and increase social distancing
- Expanding health facilities on-site compared to usual levels, developing relationships with local health care facilities and organize for the treatment of sick workers
- Building worker accommodations further apart, or having one worker accommodation in a more isolated area, which may be easily converted to quarantine and treatment facilities, if needed
- Establishing a procedure to follow if a worker becomes sick (following WHO guidelines)
- Implementing a communication strategy with the community, community leaders and local government in relation to COVID-19 issues on the site.

Vector-Borne Diseases

Reducing the impact of vector-borne disease on the long-term health of workers is best accomplished by implementing diverse interventions aimed at eliminating the factors that lead to disease. The Contractor, in close collaboration with community health authorities, shall implement an integrated control strategy for mosquito and other arthropod-borne diseases that includes the following measures:

- Prevent of larval and adult propagation through sanitary improvements and elimination of breeding habitats close to human settlements
- Eliminate unusable impounded water
- Increase water velocity in natural and artificial channels
- Consider the application of residual insecticide to dormitory walls
- Implement integrated vector control programs
- Promote the use of repellents, clothing, netting, and other barriers to prevent insect bites
- Use chemoprophylaxis drugs by non-immune workers and collaborating with public health officials to help eradicate disease reservoirs
- Monitor and treat circulating and migrating populations to prevent disease reservoir spread
- Collaborate and exchange in-kind services with other control programs in the project area to maximize beneficial effects
- Educate project personnel and area residents on risks, prevention, and available treatment
- Monitor communities during high-risk seasons to detect and treat cases
- Distribute appropriate education materials
- Follow safety guidelines for the storage, transport, and distribution of pesticides to minimize the potential for misuse, spills, and accidental human exposure

Road safety and Traffic Safety

The Contractor shall ensure traffic safety by all project personnel during displacement to and from the workplace, and during the operation of project equipment on private or public roads. The Contractor shall adopt best transport safety practices across all aspects of project operations with the goal of

preventing traffic accidents and minimizing injuries suffered by project personnel and the public, including:

- Emphasize safety aspects among drivers.
- Improve driving skills and requiring licensing of drivers.
- Institute defensive driving training for all drivers prior to starting their job.
- Adopt limits for trip duration and arranging driver rosters to avoid overtiredness.
- Avoid dangerous routes and times of day to reduce the risk of accidents.
- Use speed control devices (governors) on trucks, and remote monitoring of driver actions.
- Require that drivers and co-passengers wear seatbelts, and duly sanction defaulters.
- Regularly maintain vehicles and use manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

Where the project may contribute to significant changes in traffic along existing roads the contractor shall:

- Commence activities that affect public motorways and highways, only after all traffic safety measures necessitated by the activities are fully operational.
- Arrange diversions for providing alternative routes for transport and/or pedestrians.
- Minimize pedestrian interaction with construction vehicles, particularly at crossing points to schools, markets, and any animal crossing points of significance, through appropriate signage, engineered footpaths or traffic slowing devices.
- Organize meaningful road accident awareness events at all roadside schools and communities within 150 meters of the road centerline, covering safe road crossing, road accident hazards from weather conditions and vehicle roadworthiness, overloading and driver alertness, dangers posed by parked and broken-down vehicles, etc.
- Collaborate with local communities and responsible authorities to improve signage, visibility and overall safety of roads, particularly along stretches located near schools or other locations where children may be present.
- Collaborate with local communities on education about traffic and pedestrian safety (e.g. school education campaigns).
- Coordinate with emergency responders to ensure that appropriate first aid is provided to all affected persons in the event of accidents.
- Use locally sourced materials, whenever possible, to minimize transport distances, and locate associated facilities such as worker camps close to project sites.
- Employ safe traffic control measures, including road signs, traffic cones, removable barriers, and flag persons to warn of dangerous conditions.

Emergencies

- Establish and maintain an emergency preparedness and response system, in collaboration with appropriate and relevant third parties including to cover: (i) the contingencies that could affect personnel and facilities of the project to be financed; (ii) the need to protect the health and safety of project workers; (iii) the need to protect the health and safety of the Affected Communities. The emergency preparedness and response system shall include:
 - Identification of the emergency scenarios.
 - Specific emergency response procedures.
 - Training of emergency response teams.
 - Emergency contacts and communication systems/protocols (including communication with Affected Communities when necessary).
 - Procedures for interaction with government authorities (emergency, health, environmental authorities).

Permanently stationed emergency equipment and facilities (e.g., first aid stations, firefighting equipment, spill response equipment, personal protection equipment for the emergency response teams).

Protocols for the use of the emergency equipment and facilities.

Clear identification of evacuation routes and muster points.

Emergency drills and their periodicity based on assigned emergency levels or tiers.

Decontamination procedures and means to proceed with urgent remedial measures to contain, limit and reduce pollution within the physical boundaries of the project property and assets to the extent possible.

Stakeholder Engagement

The Project Company will be required to undertake a process of stakeholder engagement with representative persons and communities directly affected by the activities it undertakes, including if necessary, the public disclosure of its C-ESMP. The Project Company shall also maintain throughout the Project good relations with local communities and will give these communities prior notice of plans and schedules as they might affect local people.

The stakeholder engagement process will also be applicable in the event of land acquisition associated with changes in the footprint of activities.

Labor Force Management

Labor Conditions

- Implement the measures and commitments defined in the Labor Management Procedures. A copy of the LMP can be found in the Project ESMF
- Provide all workers with terms and conditions that comply with Yemeni Labor Legislation, most particularly Decree 5/1995) and applicable International Labor Organization conventions on workplace conditions.

Insurance

- Provide insurance for call employees involved in onsite activities, as indicated by Yemen's Labor Law
- Compensate any employee for death or injury, except to the extent that liability arises from the

Grievance Mechanism for Workers

The Contractor shall put in place a Grievance Mechanism for workers and the workers of its subcontractors that is proportionate to its workforce. The GM shall be distinct from the Project level Grievance Mechanism for affected individuals and communities, and shall adhere 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 confidentially. 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 the World Bank 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. Any records on SEA shall be registered separately and under the strictest confidentiality.
- *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.

Protection from Sexual Exploitation and Abuse

- Provide repeated training and awareness raising to the workforce about refraining from unacceptable conduct toward local community members, specifically women.
- Inform workers about national laws that make sexual harassment and gender-based violence a punishable offence which is prosecuted.
- Prohibit its employees from exchanging any money, goods, services, or other things of value, for sexual favors or activities, or from engaging any sexual activities that are exploitive or degrading to any person.
- Develop a system to capture gender-based violence, sexual exploitation and workplace sexual harassment related complaints/issues.
- Adopt a policy to cooperate with law enforcement agencies in investigating complaints about gender-based violence.

Protection from Child Labor

- Verify that workers are older than 18 when hiring.
- Exclude all persons under the age of 18.
- Review and retain copies of verifiable documentation concerning the age of workers.

Code of Conduct

Contractors shall ensure that all employees, including those of subcontractors, are informed about and sign the following Code of Conduct:

CODE OF CONDUCT FOR CONTRACTOR'S PERSONNEL

We the Contractor [enter name of Contractor] have signed a contract with UNOPS for [enter description of the activities]. These activities will be carried out at [enter the Site and other locations where the activities will be carried out]. Our contract requires us to implement measures to address environmental and social risks related to the activities, including the risks of sexual exploitation and assault and gender-based violence.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the activities. It applies to all our staff, including laborers and other employees at the at all the places where the activities are being carried out. It also applies to the personnel of every subcontractor and any other personnel assisting us in the execution of the activities. All such persons are referred to as “Contractor’s Personnel” and are subject to this Code of Conduct.

This Code of Conduct identifies the behavior that we require from all Contractor’s Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behavior will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

Required Conduct

Contractor’s Personnel shall:

carry out his/her duties competently and diligently.

comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor’s Personnel and any other person.

maintain a safe working environment including by:

ensuring that workplaces, machinery, equipment and processes under each person’s control are safe and without risk to health.

wearing required personal protective equipment.

using appropriate measures relating to chemical, physical and biological substances and agents; and

following applicable emergency operating procedures.

report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health.

treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children.

not engage in any form of sexual harassment including unwelcome sexual advances, requests for sexual favors, and other unwanted verbal or physical conduct of a sexual nature with other Contractor’s or Employer’s Personnel.

not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. In Bank financed projects, sexual exploitation occurs when access to or benefit from Bank financed Goods, Works, Consulting or Non-consulting services is used to extract sexual gain.

not engage in Sexual Assault, which means sexual activity with another person who does not consent. It is a violation of bodily integrity and sexual autonomy and is broader than narrower conceptions of “rape”, especially because (a) it may be committed by other means than force or violence, and (b) it does not necessarily entail penetration.

not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage.

complete relevant training courses that will be provided related to the environmental and social aspects of the Contract, including on health and safety matters, and Sexual Exploitation and Assault (SEA).

report violations of this Code of Conduct; and

Not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the [Project Grievance [Redress] Mechanism].

Raising Concerns

If any person observes behavior that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contacting the Individual designated by the Contractor [enter name of Contact]
2. In writing at this address []

3. By telephone at []
4. In person at []
5. Calling [] to reach the Contractor's hotline and leave a message (if available)

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behavior prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

Consequences of Violating the Code of Conduct

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

For Contractor's Personnel

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [enter name of Contractor's contact person with relevant experience in handling gender-based violence] requesting an explanation.

Name of Contractor's Personnel: [insert name]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Date: (day month year): _____

A copy of the code shall be displayed in a location easily accessible to the community and project affected people. It shall be provided in languages comprehensible to the local community, Contractor's personnel (including sub-contractors and day workers), Project Company's and Project Manager's Personnel, and affected persons.]

Contractor Environmental and Social Reporting

Contractors shall monitor, keep records and report on the following environmental and social issues:

- *Safety*: hours worked, lost time injury (LTI), lost workdays, 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).
- *ESHS requirements*: noncompliance incidents with permits and national law (legal noncompliance), project commitments, or other ESHS requirements.
- *ESHS inspections and audits*: by Project Company, Independent Engineer, UNOPS and its implementing partners, or others—to include date, inspector or auditor name, sites visited and records reviewed, major findings, and actions taken.
- *Workers*: list of workers at each site, confirmation of ESHS training, indication of origin (expatriate, local, nonlocal nationals), gender, age with evidence that no child labor is involved, and skill level (unskilled, skilled, supervisory, professional, management).
- *Training on ESHS 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 Project Company 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 Contractors environmental and social practices.*
- *Deficiency and performance management:* actions taken in response to previous notices of deficiency or observations regarding ESHS performance and/or plans for actions to be taken should continue to be reported to UNOPS until it determines the issue is resolved satisfactorily.

Annex 4 Consultation Questionnaires (Samples)

استبيان حول تزويد المستشفيات الصحية بالطاقة الشمسية

	تاريخ المظلة:	
	اسم الباحثة:	رشا جمال ربيع
	اسم المستشفى:	مستشفى صائغ / عمران
(اختياري)	اسم الشخص الذي تتم مقابله:	خوادم محمد حسين
	الوظيفة والمؤهل:	مخبري / دبلوم
	الفئة العمرية:	ضع دائرة حول واحدة مما يلي : أقل من (15) ، (18-25) ، (26-45) ، (46-65) .
	تنفيذ المشروع سوف:	1
	يقلل من الكلفة المادية (الديزل) على ادارة المستشفى	2
	يمكن من تقديم خدمات صحية افضل للمجتمع .	3
	يقدم الخدمات الامنة صحيا نتيجة التعقيم المستمر.	4
	يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .	5
	يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية	6
	يوفر طاقة امنة بيئيا وصحيا .	7
	يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء	
	الاثار 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 اكثر من جهاز في وقت واحد .	4
	ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الف ترة المسائية	5
	قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة (التخلص، بطريقة غير صحيحة).	6
	احتمال تلف الالواح بالراجع من الرصاص أو لأي سبب آخر .	
	تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .	

استبيان حول تزويد المستشفيات الصحية بالطاقة الشمسية

	تاريخ العنقبة:
	اسم الباحثة:
	اسم المستشفى:
(الختياري)	اسم الشخص الذي تتم مقابله:
	الوظيفة والموئل:
	الفئة العمرية:
	1
	2
	3
	4
	5
	6
	7
	الآثار السلبية:
	1
	2
	3
	4
	5
	6
	7

اسم الباحثة: رشا صافي / سيد
 اسم المستشفى: مستشفى ٢٢ مايو / كراة
 اسم الشخص الذي تتم مقابله: سيف عبي حسن
 الوظيفة والموئل: مختبري / بنك مختبران
 الفئة العمرية: ضع دائرة حول واحدة مما يلي : أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

تنفيذ المشروع سوف :
 يقلل من الكلفة العادية (الديزل) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الأمانة صحيا نتيجة التقييم المستمر.

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

يعمل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

يوفر طاقة امنة بينيا وصحيا .

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

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 لمهمة 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 او لأي سبب آخر .

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

استبيان حول تزويد المستشفيات الصحية بالطاقة الشمسية

	تاريخ المقابلة:
	اسم الباحث:
	اسم المستشفى:
	اسم الشخص الذي تتم مقابله:
	الوظيفة والمؤهل:
	الفئة العمرية:
(اختياري)	ضع دائرة حول واحدة مما يلي : أقل من (15) ، (18-25) ، (26-45) ، (46-65) .
	تنفيذ المشروع سوف : يقلل من الكلفة المادية (الديزل) على ادارة المستشفى يمكن من تقديم خدمات صحية أفضل للمجتمع . يقدم الخدمات :أمانة صحيا نتيجة التعقيم المستمر. يمكن من استقبال المرضى في مختلف الاوقات 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
	الآثار السلبية 1- انخفاض قدرة الطاقة في اوقات المساء المتأخرة . 2- ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم . 3- قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد . 4- ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات المهمة خاصة في الف ترة المسائية 5- قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة (التخلص، بطريقة غير صحيحة). 6- احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر . 7- تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

اسم الباحث مسئول تزويد المستشفيات الصحية بالطاقة الشمسية

تاريخ المقابلة:

اسم الباحث

رشاد صالح مريد

اسم المستشفى:

مستشفى ٢٢ مايو / عمران

اسم الشخص الذي تتم مقابله

سهلي محمد أحمد

الوظيفة والمؤهل

ممرضة / دبلج

الفئة العمرية

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

(اختياري)

تنفيذ المشروع سوف:

يقلل من الكلفة العادية (الديزل) على ادارة المستشفى

يمكن من تقديم خدمات صحية افضل للمجتمع .

يقدم الخدمات الآمنة صحيا نتيجة التقييم المستمر.

يمكن من استقبال المرضى في مختلف الاوقات لتوافر 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

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الأثر 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 لمهمة 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 او لأي سبب آخر .

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

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استبيان حول تزويد المستشفيات الصحية بالطاقة الشمسية

تاريخ المقابلة:	
اسم الباحثة	رشا محمد الج / سيد
اسم المستشفى:	مستشفى ذمار العام / ذمار
اسم الشخص الذي تتم مقابله	جبارق محمد حسن
الوظيفة والموظف	جبار عام وجراحة / بك
الفئة العمرية	ضع دائرة حول واحدة مما يلي : أقل من (15) ، (18 - 25) ، (26 - 45) ، (46 - 65) .
1	<u>تنفيذ المشروع سوف :</u>
2	يقلل من الكلفة المادية (الديزل) على ادارة المستشفى
3	يمكن من تقديم خدمات صحية افضل للمجتمع .
4	يقدم الخدمات الأمانة صحيا نتيجة التعقيم المستمر.
5	يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .
6	يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية
7	يوفر طاقة امانة بينيا وصحيا .
8	يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء
9	انخفاض قدرة الطاقة في اوقات المساء المتأخرة .
10	ضرورة تقليل استخدام الطاقة لضمان استمراريتها طوال اليوم .
11	قوة الطاقة الشمسية اقل من الطاقة الكهربائية لتشغيل اكثر من جهاز في وقت واحد .
12	ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الف ترة المسائية
13	قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة (التخلص، بطريقة غير صحيحة).
14	احتمال تلف الالواح بالراجع من الرصاص أو لأي سبب آخر .
15	تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

(اختياري)

استبيان حول تزويد المستشفيات الصحية بالطاقة الشمسية

تاريخ المقابلة:	
اسم الباحثة	رشا محمد / سيد
اسم المستشفى:	مستشفى ذمار العام / ذمار
اسم الشخص الذي تتم مقابله	آدم عبده
الوظيفة والمؤهل	جديره / بن
الفئة العمرية	ضع دائرة حول واحدة مما يلي : أقل من (15) ، (18-25) ، (26-45) ، (46-65) .
1	<u>تنفيذ المشروع سوف :</u> يقلل من الكلفة المادية (الديزل) على ادارة المستشفى
2	يمكن من تقديم خدمات صحية افضل للمجتمع .
3	يقدم الخدمات الأمانة صحيا نتيجة التعقيم المستمر .
4	يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .
5	يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية
6	يوفر طاقة امنة بينيا وصحيا .
7	يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء
الآثار 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 اكثر من جهاز في وقت واحد .
4	ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الفرة المسائية
5	قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة (التخلص ، بطريقة غير صحيحة) .
6	احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر .
7	تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

(اختياري)

تاريخ المقابلة: _____
 اسم الباحث: رشام صالح ربيع
 اسم المستشفى: مستشفى ذمار العام / ذمار
 اسم الشخص الذي تتم مقابته: امرات محمد العلوحي
 الوظيفة والمؤهل: قابله / دبلوم
 اللغة الصورية: ضع دائرة حول واحدة مما يلي : أكل من (15) ، (18 - 25) ، (26 - 45) ، (46 - 65) .

(اختياري)

- تنفيذ المشروع سوف :
- 1 يقلل من الكلفة العادية (الديزل) على ادارة المستشفى
 - 2 يمكن من تقديم خدمات صحية افضل للمجتمع .
 - 3 يقدم الخدمات الأمانة صحيا نتيجة التطعيم المستمر.
 - 4 يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .
 - 5 يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية
 - 6 يوفر طاقة آمنة بيديا 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 اكثر من جهاز في وقت واحد .
 - 4 ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الف ترة المسائية
 - 5 قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة (التخلص، بطريقة غير صحيحة).
 - 6 احتمال تلف الالواح بالراجع من الرصاص أو لأي سبب آخر .
 - 7 تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

استبيان حول تزويد المستشفيات الصحية بالطاقة الشمسية

تاريخ المقابلة: _____
 اسم الباحث: د. دينا صالح ربيع
 اسم المستشفى: مستشفى زمار العام / زمار
 اسم الشخص الذي تتم مقابلاته: مشرى رزق عتيق
 الوظيفة والمؤهل: ممرضه / دبلوم ممرضة
 الفئة العمرية: ضع دائرة حول واحدة مما يلي: أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

(اختياري)

- تنفيذ المشروع سوف:
- 1 يقلل من الكلفة المالية (الدول) على ادارة المستشفى
 - 2 يمكن من تقديم خدمات صحية أفضل للمجتمع .
 - 3 يقدم الخدمات الأمانة صعبا نتيجة التقويم المستمر.
 - 4 يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة .
 - 5 يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية
 - 6 يوفر طاقة أمانة ببنيا 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 أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد .
 - 4 ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الف ترة المسائية
 - 5 قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة (التخلص، بطريقة غير صحيحة).
 - 6 احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر .
 - 7 تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

تاريخ المقابلة: _____
 اسم الباطنة: رشاد صالح ربيع
 اسم المستشفى: مستشفى الجمهوري / القاهرة / دمنهور
 اسم الشخص الذي يتم مقابله: أبو بكر سالم حسن
 الوظيفة والمؤهل: ممرض / فني كهربائي
 الفئة العمرية: ضع دائرة حول واحدة مما يلي : أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

(اختياري)

- تنفيذ المشروع صوباً :
- 1- يقلل من الكلفة المادية (الديزل) على ادارة المستشفى
 - 2- يمكن من تقديم خدمات صحية افضل للمجتمع .
 - 3- يقدم الخدمات الآمنة صحياً نتيجة التطعيم المستمر.
 - 4- يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .
 - 5- يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية
 - 6- يوفر طاقة آمنة بيئياً وصحياً .
 - 7- يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى على حد سواء
- الآثار 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 أحياناً قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الف ترة المسائية
 - 5- قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة (التخلص، بطريقة غير صحيحة).
 - 6- احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر .
 - 7- تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

تاريخ المقابلة: _____
 اسم الباحثة: رشا صالح ربيع
 اسم المستشفى: مستشفى الجمهوري / القاهرة / تكسر
 اسم الشخص الذي تتم مقابله: عمر مرزاز كامل
 الوظيفة والمؤهل: طبيب عام / بك طب
 الفئة العمرية: ضع دائرة حول واحدة مما يلي : أقل من (15) ، (18-25) ، (26-45) ، (46-65) .

(اختياري)

- تنفيذ المشروع سوف :
- 1 يقلل من الكلفة المادية (الديزل) على ادارة المستشفى
 - 2 يمكن من تقديم خدمات صحية افضل للمجتمع .
 - 3 يقدم الخدمات الأمانة صحيا نتيجة التقييم المستمر.
 - 4 يمكن 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

- الآثار 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 اكثر من جهاز في وقت واحد .
 - 4 ضعف شحن البطارية احيانا قد يؤدي الى تأجيل بعض الاستخدامات لمهمة خاصة في الف ترة المسائية
 - 5 قصر عمر البطارية و ضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي الى تلوث ا لبيئة (التخلص، بطريقة غير صحيحة).
 - 6 احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر .
 - 7 تنفيذ المشروع قد يؤدي الى حوادث نتيجة عدم اتخاذ اجراءات السلامة اللازمة .

تاريخ المقابلة:

اسم الباحث:

رشاد صالح ربيع

اسم المستشفى:

مستشفى الجوهري / القاهرة / تعز

اسم الشخص الذي تتم مقابله

أخلاق شاهر القدسي

الوظيفة والمؤهل

مخبريه / بك مخبر

الفئة العمرية

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

(اختياري)

تنفيذ المشروع سوف :

يقلل من الكلفة المادية (الديزل) على ادارة المستشفى

يمكن من تقديم خدمات صحية أفضل للمجتمع .

يقدم الخدمات الآمنة صحيا نتيجة التقييم المستمر.

يمكن من استقبال المرضى في مختلف الاوقات 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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الآثار 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

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

احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر .

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

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استبيان حول توريد المستشفيات الصحية بالطاقة الشمسية

تاريخ المقابلة:

رشاد صالح ربيع

اسم الباحث

مستشفى الجمهورية / القاهرة / مصر

اسم المستشفى:

عفراء عبدالله عبده

اسم الشخص الذي تتم مقابله

جنبة عيود / صاحب

الوظيفة والمؤهل

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

الفئة العمرية

(اختياري)

تنفيذ المشروع سوف:

يقلل من الكلفة المادية (الديزل) على ادارة المستشفى

1

يمكن من تقديم خدمات صحية افضل للمجتمع .

2

يقدم الخدمات الأمانة صحيا نتيجة التعقيم المستمر.

3

يمكن من استقبال المرضى في مختلف الاوقات لتوفر الطاقة .

4

يمثل عامل جذب واستقطاب المرضى والمحتاجين للخدمات الصحية

5

يوفر طاقة 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 المهمة خاصة في الف

4

ترة المسائية

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

5

لبينة (التخلص، بطريقة غير صحيحة).

احتمال تلف الالواح بالراجع من الرصاص أو لأي سبب آخر .

6

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

7

استبيان حول تزويد المرافق الصحية بالطاقة الشمسية

اسم الباحثة: خلود سالم عبد الله بالحيزل

اسم المنشأة: مستشفى ابن سينا

اسم الشخص الذي تم مقابلته: حسن المحمدي

الوظيفة والمؤهل: دبلوم / صياغة طبيب

تنفيذ المشروع سوف:

NO.	البيان	نعم او لا
1	يقلل من الكلفة العادية (الديزل) على إدارة المستشفى.	نعم
2	يمكن من تقديم خدمات صحية أفضل للمجتمع.	نعم
3	يقدم الخدمات الأمانة صحيا نتيجة التعقيم المستمر.	نعم
4	يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة.	نعم
5	يمثل عامل جذب لاستقطاب المرضى والمحتاجين لخدمات الصحية.	نعم
6	يوفر طاقة آمنة بينيا وصحيا.	نعم
7	يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى.	نعم

الآثار السلبية:

NO.	البيان	نعم او لا
1	انخفاض قدرة الطاقة في أوقات المساء المتأخرة.	نعم
2	ضرورة تقليل استخدام الطاقة لضمان استمراريتها طول اليوم.	نعم
3	قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد.	نعم
4	ضعف شحن البطارية أحيانا قد يؤدي إلى تأجيل بعض الاستخدامات المهمة خاصة في الفترة المسائية.	نعم
5	قصر عمر البطارية وضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي إلى تلوث البيئة (التخلص بطريقة غير صحيحة).	نعم
6	احتمال تلف الألواح بالأرجع من الرصاص أو لأي سبب آخر.	نعم
7	تنفيذ المشروع قد يؤدي إلى حوادث نتيجة عدم اتخاذ إجراءات السلامة اللازمة.	نعم

استبيان حول تزويد المرافق الصحية بالطاقة الشمسية

اسم الباحثة: خلود سالم عبد الله بالحيزل

اسم المنشأة: مستشفى ابن سينا

اسم الشخص الذي تم مقابلته: د. محمد باخلوه

الوظيفة والمؤهل: طبيب امتحاري

تنفيذ المشروع سوف:

NO.	البيان	نعم	أو لا
1	يقل من الكلفة المادية (النيزل) على إدارة المستشفى.	نعم	لا
2	يمكن من تقديم خدمات صحية أفضل للمجتمع.	نعم	لا
3	يقدم الخدمات الأمانة صحيا نتيجة التعقيم المستمر.	نعم	لا
4	يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة.	نعم	لا
5	يمثل عامل جذب لاستقطاب المرضى والمحتاجين لخدمات الصحية.	نعم	لا
6	يوفر طاقة آمنة بينيا وصحيا.	نعم	لا
7	يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى.	نعم	لا

الأثر السلبية:

NO.	البيان	نعم	أو لا
1	انخفاض قدرة الطاقة في أوقات المساء المتأخرة.	نعم	لا
2	ضرورة تقليل استخدام الطاقة لضمان استمراريتها طول اليوم.	نعم	لا
3	قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد.	نعم	لا
4	ضعف شحن البطارية أحيانا قد يؤدي إلى تأجيل بعض الاستخدامات المهمة خاصة في الفترة المسائية.	نعم	لا
5	قصر عمر البطارية وضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي إلى تلوث البيئة (التخلص بطريقة غير صحيحة).	نعم	لا
6	احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر.	نعم	لا
7	تنفيذ المشروع قد يؤدي إلى حواث نتيجة عدم اتخاذ اجراءات السلامة اللازمة.	نعم	لا

استبيان حول تزويد المرافق الصحية بالطاقة الشمسية

اسم الباحث: خالد سالم عبد الله باقحيزل

اسم المنشأة: مستشفى ابن سينا

اسم الشخص الذي تم مقابلته: بخلاء صقران

الوظيفة والمؤهل: استشاري / المبرد الحري

تنفيذ المشروع سوف:

NO.	البيان	نعم او لا
1	يقلل من الكلفة المادية (الديزل) على إدارة المستشفى.	نعم
2	يمكن من تقديم خدمات صحية أفضل للمجتمع.	نعم
3	يتم الخدمات الآمنة صحياً نتيجة التقييم المستمر.	نعم
4	يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة.	نعم
5	يمثل عامل جذب لاستقطاب المرضى والمحتاجين لخدمات الصحية.	نعم
6	يوفر طاقة آمنة بينياً وصحياً.	نعم
7	يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى.	نعم

الأثر السلبية:

NO.	البيان	نعم او لا
1	انخفاض قدرة الطاقة في أوقات المساء المتأخرة.	نعم
2	ضرورة تقليل استخدام الطاقة لضمان استمراريتها طول اليوم.	نعم
3	قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد.	نعم
4	ضعف شحن البطارية أحياناً قد يؤدي إلى تأجيل بعض الاستخدامات المهمة خاصة في الفترة المسائية.	نعم
5	قصر عمر البطارية وضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي إلى تلوث البيئة (التخلص بطريقة غير صحيحة).	نعم
6	احتمال تلف الألواح بالرجوع من الرصاص أو لأي سبب آخر.	نعم
7	تنفيذ المشروع قد يؤدي إلى حوالت نتيجة عدم اتخاذ إجراءات السلامة اللازمة.	نعم

استبيان حول تزويد المرافق الصحية بالطاقة الشمسية

اسم الباحثة: خالد سالم عبد الله باحيزل

اسم المنشأة: مستشفى ابن سينا

اسم الشخص الذي تم مقابلته: انتصار صانور

الوظيفة والمؤهل: استشاري / البورد العربي

تنفيذ المشروع سوف:

NO.	البيان	نعم أو لا
1	يقلل من الكلفة المادية (الديزل) على إدارة المستشفى.	نعم
2	يمكن من تقديم خدمات صحية أفضل للمجتمع.	نعم
3	يقدم الخدمات الآمنة صحياً نتيجة التعقيم المستمر.	نعم
4	يمكن من استقبال المرضى في مختلف الأوقات لتوفر الطاقة.	نعم
5	يمثل عامل جذب لاستقطاب المرضى والمحتاجين لخدمات الصحية.	نعم
6	يوفر طاقة آمنة بيئياً وصحياً.	نعم
7	يساهم في تحقيق الراحة النفسية للعاملين في المستشفى والمرضى.	نعم

الآثار السلبية:

NO.	البيان	نعم أو لا
1	انخفاض قدرة الطاقة في أوقات المساء المتأخرة.	نعم
2	ضرورة تقليل استخدام الطاقة لضمان استمراريتها طول اليوم.	نعم
3	قوة الطاقة الشمسية أقل من الطاقة الكهربائية لتشغيل أكثر من جهاز في وقت واحد.	نعم
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5	قصر عمر البطارية وضرورة التخلص منها نتيجة انتهاء صلاحيتها قد يؤدي إلى تلوث البيئة (التخلص بطريقة غير صحيحة).	نعم
6	احتمال تلف الألواح بالراجع من الرصاص أو لأي سبب آخر.	نعم
7	تنفيذ المشروع قد يؤدي إلى حوادث نتيجة عدم اتخاذ إجراءات السلامة اللازمة.	نعم