Republic of Yemen

United Nations Office for Project Services

Yemen Emergency Electricity Access Project - Phase 2 (P178347)

Environmental and Social Management Plan

Supply and Installation Solar Power Systems to 83 Facilities
10 Schools and 73 Healthcare Facilities in 10 Governorates

9 June 2023

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Abbreviations

BoQs	Bill of Quantities
C-ESMP	Contractor Environmental and Social Management Plan
CoC	Code of Conduct
CoP	Code of Practice
EHS	Environmental, Health and Safety
E&S	Environmental and Social
ESF	Environmental and Social Framework
ESHS	Environment, Social, Health, and Safety
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
ESSO	Environmental and Social Safeguards Officer
FLAP	Forced Labor Action Plan
GBV	Gender Based Violence
GM	Grievance Mechanism
HSSE	Health, Safety, Social and Environment
km	Kilometer
kW	Kilowatt
kWh	kilowatt hour
LMP	Labor Management Procedures
MSF	Médecins Sans Frontières
OHS	Occupational Health and Safety
PPE	Personal Protective Equipment
PV	photovoltaic
SEA	Sexual Exploitation and Abuse
SH	Sexual Harassment
SEP	Stakeholder Engagement Plan
SMP	Security Management Plan
TPM	Third Party Monitoring
UNOPS	United Nations Office for Project Services
YEEAP	Yemen Emergency Electrical Access Project

Summary Sheet

Subproject name	Supply and Installation of Solar Power Systems to 83 Facilities
Subproject location	73 Healthcare facilities and 10 schools located in 54 districts across 10 governorates
Estimated Start/Completion Date	1 July 2023 to 31 December 2023

1. Introduction

Yemen Emergency Electrical Access Project Phase 2 (YEEAP 2; P178347), hereinafter the Project, is a World Bank financed project implemented in the Republic of Yemen by the United Nations Office for Project Services (UNOPS). YEEAP 2 is a follow-up to the Yemen Emergency Electricity Access Project (P163777). YEEAP 2 has been approved by the WB in June 2022 and declared effective on 6 of October 2022 with Project Development Objective to improve access to electricity in rural and peri-urban areas within Yemen and plan for the restoration of the Yemen power sector.

Under subcomponent 1.2 of the Project, UNOPS will engage solar suppliers and installers to provide solar energy systems to critical service facilities to address the humanitarian crisis in rural and peri-urban areas across Yemen.

This subproject aims to supply and install solar power systems to 83 facilities, and it is implemented under subcomponent 1.2 of the Project. The targeted facilities under this subproject are 10 schools and 73 healthcare facilities (details below) located in the rural and peri-urban areas of the country.

Project Environmental and Social Management Framework (ESMF)[1] was prepared by the UNOPS to meet the requirements of the World Bank's Environmental and Social Framework (ESF), UNOPS requirements and the national laws and regulations. For YEEAP 2 UNOPS has also prepared the following instruments: (i) a Stakeholder Engagement Plan (SEP), (ii), a Labor Management Procedures (LMP), (iii) a Security Management Plan (SMP), and (v) a GBV/SEA/SH Prevention and Response Action Plan.

Subproject screening was performed following the Project ESMF requirements and the screening table is available in annex 1. The current Environmental and Social Management Plan (ESMP) for this subproject has been prepared following the Project ESMF requirements and guidance included in sections 5 and 6. This ESMP structure is determined based on ESMF guidance included in section 6.3.1 of the ESMF.

2. Subproject Description

2.1. Overview

Building on the success of YEEAP 1 where solar power systems supplied to the critical service facilities contribute significantly to maintaining the services across the healthcare and education center, this effort will continue under YEEAP 2 in which 83 facilities, second rollout, have been selected as priority to be supplied with solar power systems. Additional facilities will be selected and supported under the Project during its lifetime in which dedicated ESMPs will be prepared for any upcoming batches. The facilities under this subproject are public, currently operational and were selected based on the continuous communication and coordination with the official authorities in the country as well as the partners in the country including WHO, UNICEF and MSF.

[1] YEEAP ESMF is available in the link https://documents1.worldbank.org/curated/en/099925102162242198/pdf/P1783470ESMF020220020100v40yap.pdf

Detailed assessment of each facility under this subproject has been performed by UNOPS in coordination with the facilities management to evaluate the needs, determine the factors and requirements that should be included in the system design of each facility. Such assessment of each facility has been carried out by qualified Engineers in which the facility status, existing/expected power consumption, access, operational arrangements, system components location and such details are agreed with the facilities management. An integrity test has been performed by UNOPS during the assessment (structural integrity assessment is a process to determine how reliable an existing structure can carry current and future loads and fulfill the task for a given time period) for the building rooftop during selection of targeted facility and the mounting structure is designed to tolerate wind speed of up to 120 km/hr.

Following the detailed assessment of facilities, solar system design and Bill of Quantity (BOQ) was prepared for each facility under the subproject in which the fire and safety aspects were incorporated. Solar system design has been verified and reviewed to meet the applicable standards in which multiple review levels were introduced to ensure all safety aspects are met, as indicated in section 5.1.1.

The intervention will be entirely implemented within the existing facilities boundaries and it will be limited to supply, install, commission, start-up and operate the solar power system and the connection to the existing electrical network of each facility. It is expected that the work will be performed simultaneously in the facilities in which close follow-up of contractors work plans will be performed by UNOPS engineers.

The sites can be prepared and made ready before the photovoltaic (PV) system components installation, while the system components are imported. The following, among other things, will be included in the preparation process; installing the earthing; laying of cables and mounting structures. The PV panels mounting structure are in the form of pre-fabricated parts and no welding will take place in the site, the mounting structure in the facilities will be fixed on 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.

Once all system components are installed, tested, commissioned and all contractor work are completed in each facility, the whole system will be handed over to facilities management in which they will be fully responsible for the system operation. Training sessions, under full supervision of UNOPS, will be conducted by the contractor as part of the contract scope targeting facility workers to ensure their full understanding and ability to manage such operations. Furthermore, technical support will be provided to the facilities from the UNOPS team during the project lifetime.

2.2. Facilities Summary

The subproject includes 83 facilities, 10 schools and 73 healthcare facilities, distributed across 10 governorates as detailed in table 1 below. All facilities are located in rural and peri-urban areas. A summary of the location, coordinates and system capacity are available under section 2.2.1 for healthcare facilities and section 2.2.2 for schools. Full details about the facilities location, layout, components drawing, and photos are included in annex 7.

Table 1 Distribution of targeted facilities across governorates

	Abyan	AdDhale'	Al Mahwait	Al-Hudaydah	Amran	Dhamar	Hajjah	Lahj	Sana'a	Taiz	**Total**
HC Facilities	6	5	7	11	14	6	3	4	5	12	**73**
School	3	-	-	-	-	-	-	3	-	4	**10**
Total	**9**	**5**	**7**	**11**	**14**	**6**	**3**	**7**	**5**	**16**	**83**

2.2.1. Healthcare facilities summary

The healthcare facilities under the subproject are 73 in which 61 Health Centers and 12 District Hospitals are included and distributed across 10 governorates. The number of workers and average number of patients per month in each facility as obtained from the facilities management records are detailed in the below table. Total number of workers in the targeted facilities is 1,223 (686 males and 537 females). Accumulative average number of patients / month in all targeted facilities is 94,330 in which 41,727 are males and 52,603 are females. The planned system generation capacity in each facility is meant to cover all premises and the main power consumption requirements. The system capacity and components details what will be installed in each facility, as extracted from the relevant drawings and BOQ, Total number of solar panels that will be installed in all facilities is 1,740, 550 W each, with an approximate power generation capacity of 957 kW.

Table 2 Healthcare facilities summary

No	Facility Name	Coordinates	Governorate	District	Number of workers		Number of patients / month[2]			System capacity kW	Number of solar panels	Panels installation location
					M	F	M	F	Total			
1.	Al-Ahad Rural Hospital	14.258517,43.650083	Dhamar	Wusab Al Safil	30	7	2,000	3,711	5,711	22.00	40	Building Roof
2.	Bait Al Ba'adani Health Center	14.2802,43.59508333	Dhamar	Wusab Al Safil	6	5	100	200	300	8.80	16	Building Roof
3.	Jabal Al-Sharq Rural Hospital	14.63705, 43.955433	Dhamar	Jabal Al Sharq	38	7	2,000	2,200	4,200	22.00	40	Building Roof
4.	Al-Hadhar Health Center	14.695633, 43.972933	Dhamar	Jabal Al Sharq	5	3	540	660	1,200	6.60	12	Building Roof
5.	Ethmed Ya'ar Health Center	14.5667833, 44.19345	Dhamar	A'ans	3	1	100	150	250	6.60	12	Building Roof
6.	Ma'abar Health Center	14.7969833, 44.3005	Dhamar	Gahran	10	14	1,000	2,000	3,000	13.20	24	Building Roof
7.	Sayan R.Hospital	15.175933,44.330267	Sana'a	Sanhan	28	28	2,000	2,800	4,800	22.00	40	Building Roof
8.	Al-Dhaba'at Health Center	15.3652,44.36341667	Sana'a	Sanhan	5	6	150	250	400	8.80	16	Building Roof
9.	Masiab Health Center	15.343583,43.988283	Sana'a	Bani Matar	8	2	300	400	700	8.80	16	Building Roof
10.	Khalaqa Health Center	15.49815, 43.93115	Sana'a	Hamdan	7	4	800	1,400	2,200	8.80	16	Building Roof

[2] Average number of patients per month, facilities management records

No	Facility Name	Coordinates	Governorate	District	Number of workers		Number of patients / month[2]			System capacity kW	Number of solar panels	Panels installation location
					M	F	M	F	Total			
11.	Al-Manar Hospital	15.147338,43.943637	Sana'a	Al-Hayma	31	17	2,818	3,008	5,826	17.6	32	Building Roof
12.	Al-Orqoup Health Center	15.464316, 43.492541	Al Mahwait	Jabal Al Mahwait	10	14	185	315	500	8.80	16	Building Roof
13.	Oslah Health Center	15.519992, 43.742916	Al Mahwait	Al Tawilah	3	4	30	50	80	4.40	8	Building Roof
14.	Al-Sha'afel Al-Sofla'a Health Center	15.455293, 43.282871	Al Mahwait	Al Khabt	3	4	285	715	1,000	4.40	8	Building Roof
15.	Bait Al Shama'a Health Center	15.406791, 43.452977	Al Mahwait	Hufash	3	2	40	90	130	6.60	12	Building Roof
16.	Juma'at Saria Health Center	15.312179, 43.516078	Al Mahwait	Bani Saad	4	7	200	500	700	8.80	16	Building Roof
17.	Al-Thawarih Health Center	15.531989, 43.774560	Al Mahwait	Al Tawilah	3	3	60	90	150	4.40	8	Building Roof
18.	Al Hajaf Health Center	15.522229, 43.375014	Al Mahwait	Al Khabt	4	5	180	260	440	6.60	12	Building Roof
19.	Bani Al-Awam Health Center	15.57392, 43.58284	Hajjah	Bani Al Awam	13	10	878	862	1,740	17.60	32	Building Roof
20.	Nisa Health Center	15.83534, 43.62068	Hajjah	Al Maghrabah	6	4	302	412	714	6.60	12	Building Roof
21.	Maternity and Childhood Center in Al-Dhahir	16.002418, 43.303615	Hajjah	Aslem	11	10	625	715	1,340	8.80	16	Building Roof
22.	Al Qanawis Hospital for Maternity	15.491989, 43.132394	Al-Hudaydah	Al Qanawis	18	15	2,480	2,520	5,000	72.6	132	Building Roof
23.	Al-Hasiah Health Center	14.705974, 43.438896	Al-Hudaydah	Al Mansoriah	3	1	85	115	200	6.60	12	Building Roof
24.	Al-Radhiah Health Center	14.655926, 43.364170	Al-Hudaydah	Al Mansoriah	3	1	335	415	750	6.60	12	Building Roof
25.	Al-Moqar Health Center	14.215301, 43.462179	Al-Hudaydah	Zabid	6	2	350	650	1,000	8.80	16	Building Roof

No	Facility Name	Coordinates	Governorate	District	Number of workers		Number of patients / month[2]			System capacity kW	Number of solar panels	Panels installation location
					M	F	M	F	Total			
26.	Al-Morshidiah Health Center	14.176426, 43.441421	Al-Hudaydah	Zabid	3	1	230	270	500	6.60	12	Building Roof
27.	Al-Maslobah Health Center	15.359650, 43.163665	Al-Hudaydah	Al Mighlaf	3	1	235	265	500	6.60	12	Building Roof
28.	Al-Mahjam Health Center	15.300947, 43.139017	Al-Hudaydah	Al Mighlaf	3	1	240	260	500	4.40	8	Building Roof
29.	Al-Moghidifiah Health Center	15.422581, 42.960661	Al-Hudaydah	Al Monirah	3	1	280	320	600	6.60	12	Building Roof
30.	Dir Al-Quraiti Health Center	15.403251, 43.164683	Al-Hudaydah	Azzidiah	5	3	320	380	700	8.80	16	Building Roof
31.	Mahal Khabal Health Center	15.379619, 43.218528	Al-Hudaydah	Azzidiah	3	1	130	200	330	4.40	8	Building Roof
32.	Al-Kizabah Health Center	15.511956, 43.086533	Al-Hudaydah	Al Qanawis	3	1	175	225	400	4.40	8	Building Roof
33.	Thula'a Rural Hospital	15.57745, 43.90444	Amran	Thula’a	18	27	1,100	1,375	2,475	41.80	76	Building Roof
34.	Bait Heba Health Center	15.56228, 43.84004	Amran	Thula’a	5	3	143	175	318	6.60	12	Building Roof
35.	Hamda Health Center	15.83514, 43.9686	Amran	Raydah	6	4	434	367	801	6.60	12	Building Roof
36.	Kant Health Center	15.84257, 44.15564	Amran	Kharif	6	1	142	126	268	6.60	12	Building Roof
37.	Al Ma'amra Health Center	16.3271, 43.94603	Amran	Houth	6	2	467	490	957	6.60	12	Building Roof
38.	Wadia'a Health Center	16.14246, 43.9378	Amran	Bani Suraem	7	4	350	250	600	4.40	8	Building Roof
39.	Al-Subaie Health Center	16.113, 44.04164	Amran	Bani Suraem	6	3	492	400	892	6.60	12	Building Roof
40.	Marhaba Health Center	16.05387, 44.10241	Amran	Thebin	5	2	240	217	457	6.60	12	Building Roof
41.	Al-Hayzi Health Center	16.00088, 44.02874	Amran	Khamer	10	2	195	223	418	6.60	12	Building Roof
42.	Al-Shatba Health Center	15.96457,44.0558	Amran	Thaibin	9	4	140	100	240	6.60	12	Building Roof

No	Facility Name	Coordinates	Governorate	District	Number of workers		Number of patients / month[2]			System capacity kW	Number of solar panels	Panels installation location
					M	F	M	F	Total			
43.	Qayfan Health Center - Al Ghanaya	16.14188, 43.60041	Amran	Suwayr	7	1	385	265	650	6.60	12	Building Roof
44.	Al-Ghoul Health Center	16.21642, 43.68825	Amran	Shaharah	5	2	165	224	389	8.80	16	Building Roof
45.	Jarman Health Center	16.36445, 43.79752	Amran	Al-Ashah	11	7	884	954	1,838	13.20	24	Building Roof
46.	Qa'a Health center	16.4123, 43.77355	Amran	Al-Ashah	7	2	264	332	596	6.60	12	Building Roof
47.	Radfan Hospital	13.52657,44.85286	Lahj	Radfan	81	40	2,785	3,329	6,114	72.60	132	Building Roof
48.	Al-Ashoob Health Center	13.18251,44.14663	Lahj	Al-Maqaterah	3	6	442	783	1,225	6.60	12	Building Roof
49.	Motherhood and Childhood Health Center	13.60189,44.98448	Lahj	Habeel Jaber	0	7	60	610	670	6.60	12	Building Roof
50.	Thi Nakheb Health Center	13.83495,45.30431	Lahj	Laboos	2	2	444	287	731	4.40	8	Building Roof
51.	Al-Ahyook Health Center	13.08559,43.72584	Taiz	Al-Wazeaiah	5	3	725	673	1,398	6.60	12	Building Roof
52.	Al-Dharaifah Health Center	13.14343,43.85916	Taiz	Al-Wazeaiah	10	1	399	503	902	6.60	12	Building Roof
53.	Al-Dhabab Health Center	13.53737,43.94791	Taiz	Saber Al-Mawadem	4	9	62	152	214	6.60	12	Building Roof
54.	Al-Wajeeh Health Center	13.49645,44.03837	Taiz	Al-Mesrah	3	8	107	116	223	6.60	12	Building Roof
55.	Al-Ram Health Center (Al-Haj Ali Derhim	13.276511, 44.266308	Taiz	Hayfan	5	8	130	235	365	41.80	76	Building Roof
56.	Al-Sa'eed Wa'lan Health Center	13.34696,44.2584	Taiz	Hayfan	4	8	120	186	306	6.60	12	Building Roof
57.	Al-Shaheed Abdul Jalil Hospital	13.7614670,43.7988927	Taiz	Shara'b Ar Rawnah	9	12	1,346	1,362	2,708	52.80	96	Building Roof

No	Facility Name	Coordinates	Governorate	District	Number of workers		Number of patients / month[2]			System capacity kW	Number of solar panels	Panels installation location
					M	F	M	F	Total			
58.	Al-Qohaim Health Center	13.7110894,43.8224918	Taiz	Shara'b Ar Rawnah	8	10	120	209	329	13.20	24	Building Roof
59.	Maternity and Childhoods (Ibn Al-Nafis) Health Center	13.4431477,43.7055871	Taiz	Maqbanah	4	3	792	432	1,224	8.80	16	Building Roof
60.	Al-Zawiay Mirab Health Center	13.7344646,43.7214744	Taiz	Maqbanah	6	3	250	500	750	13.20	24	Building Roof
61.	Al-Hussain Health Center	13.7110060,43.9243370	Taiz	At Ta'iziyah	3	2	209	241	450	8.80	16	Building Roof
62.	Al-Shawkani Health Center	13.7455694,44.1048023	Taiz	At Ta'iziyah	6	10	193	209	402	6.60	12	Building Roof
63.	Al-Shaeeb Hospital (Al_Shohda'a Althalatha)	13.837466, 44.865611	Ad-Dhale'e	Al-Shaeeb	45	12	1,775	2,457	4,232	41.8	76	Building Roof
64.	Al-Robat Health Center	13.833119, 44.915707	Ad-Dhale'e	Al-Shaeeb	5	7	247	220	467	6.6	12	Building Roof
65.	Aden Hamadah Health Center	13.670751, 44.642795	Ad-Dhale'e	Al-Azariq	11	6	422	408	830	6.6	12	Building Roof
66.	Al-Dobiat Health Center	13°36'58"N 44°46'43"E	Ad-Dhale'e	Aldhalee	11	10	500	700	1,200	8.8	16	Building Roof
67.	Al-Hussain Health Center (Alhussain Rural Hospital)	13°47'24"N 44°46'05"E	Ad-Dhale'e	Alhussain	17	5	800	1,300	2,100	17.6	32	Building Roof
68.	Maternity and Childhood Health Center -Khanfar	13.358611, 45.703056	Abyan	Khanfar	6	22	2,305	2,493	4,798	22	40	Building Roof
69.	Al-Qoud Health Center	13.090556, 45.358889	Abyan	Khanfar	5	22	230	212	442	8.8	16	Building Roof
70.	Shoqrah Rural Hospital	13.358611, 45.703056	Abyan	Khanfar	23	47	1,200	1,800	3,000	52.8	96	Building Roof
71.	Al-Magel Health Center	13.806018, 45.781152	Abyan	Lawder	7	4	160	190	350	6.6	12	Building Roof

No	Facility Name	Coordinates	Governorate	District	Number of workers		Number of patients / month[2]			System capacity kW	Number of solar panels	Panels installation location
					M	F	M	F	Total			
72.	Al-Sorah Health Center	13.659002, 45.850722	Abyan	Lawder	9	13	800	500	1,300	6.6	12	Building Roof
73.	Maternity and Childhoods Health Center -Ahwar	13.516144, 46.713805	Abyan	Ahwar	2	8	250	590	840	17.6	32	Building Roof
	Total				**686**	**537**	**41,727**	**52,603**	**94,330**	**957**	**1,740**	

2.2.2. Schools summary

Total number of schools under the subproject are 10; 5 primary schools, 4 secondary schools and 1 both. The supported schools are distributed across 3 governorates and 6 districts. The total number of students and workers[3] in each facility, as obtained from the facilities management, are detailed in the below table. Total number of workers across all facilities is 303 (146 males and 157 females) and the total number of students is 7,947 (3,939 males and 4,008 females).

The planned power generation capacity in each facility meant to cover all facility premises and the total power consumption requirements. The system capacity and components details that will be installed in each facility as extracted from the relevant drawings and BOQ are included in the below table. Total number of solar panels that will be installed in all facilities is approximately 136 with 550 W each, with an approximate total power generation capacity of 75 kW.

Table 3 Schools summary

No	Facility Name	Gender	Coordinates	Governorate	District	Number of workers		Number of students		System capacity kW	Number of solar panels	Panels installation location
						M	F	M	F			
1.	Labozah School	Mixed	13.01575,44.88688	Lahj	Tuban	3	38	576	695	13.20	24	Building Roof
2.	Ba'r Naser School	Mixed	12.97965,44.93318	Lahj	Tuban	27	26	972	772	8.80	16	Building Roof
3.	AL-Khansa School	Girls school	13.01398,44.95444	Lahj	Tuban	0	33	0	547	8.80	16	Building Roof
4.	Al-Wahdah School	Mixed	13.13615,43.86973	Taiz	Al-Wazeaiah	9	9	312	204	6.60	12	Building Roof

[3] The numbers in the table represent the total number of students and workers in the targeted schools.

No	Facility Name	Gender	Coordinates	Governorate	District	Number of workers		Number of students		System capacity kW	Number of solar panels	Panels installation location
						M	F	M	F			
5.	Al-Sha'ab School	Mixed	13.48328,43.47126	Taiz	Mawza'a	11	1	162	108	4.40	8	Building Roof
6.	Al-Noor School	Mixed	13.29395,43.44337	Taiz	Al-Makha'a	20	9	546	204	6.60	12	Building Roof
7.	Al-Esha'a School	Mixed	13.56753,43.48609	Taiz	Al-Makha'a	26	9	968	485	6.60	12	Building Roof
8.	Mogma'a Al-Zahra'a	Girls school	13.517642, 46.714236	Abyan	Ahwar	11	27	0	724	6.60	12	Building Roof
9.	Hanad School	Mixed	13.517718, 46.714221	Abyan	Ahwar	21	3	206	159	6.60	12	Building Roof
10.	Al-Sorah School	Mixed	13.957617, 46.225027	Abyan	Moudyah	18	2	197	110	6.60	12	Building Roof
	Total					**146**	**157**	**3,939**	**4,008**	**74.8**	**136**	

2.3. Scope of Work

Contractor scope of work under the subproject include the following main elements, full details are available in the BoQ that is prepared for each facility. The number of contractors that will be involved in the subproject implementation is not known at this stage and it will depend on the tender evaluation results. BoQ includes the complete specification, capacity, number, cables work and related electrical work. Annex 2 provides summary details of the design, contractor work requirements that are considered for this subproject. Once system components have arrived into the targeted facilities, it will be immediately installed by the contractors.

2.3.1. Electrical Works

- Solar PV Module; supply, install, test, and commission of solar panels High efficiency not less than 550 W should be either mono-crystalline or polycrystalline.
- Solar Off-Grid Inverter Supply; install, test, and commissioning of single-phase inverter.
- Charge Controller Supply; install, test, and commissioning of charge controller, efficiency not less than 92 %, rated.
- Solar Battery Supply; install, test, and commissioning of Battery bank voltage 48 volts with built in battery rack. Batteries shall be Gel type; the rating shall be calculated @ 10 hours discharge rate.
- Ventilation system; supply, install, test and commissioning for the battery room ventilation system which includes exhaust/inlet fans and Air Conditioning system.
- Earthing system; supply, install, test and commissioning earthing for all system components.
- Equipment expected to be used includes; small electrical generator, drill, grinder and electrical hand tools.

2.3.2. Fire Alarm System

- Supply and install 4 Zones Conventional Fire alarm system panel including all requirements from fire resistant cable, testing and proper labeling with complete diagrams & documentation. This includes the provision of smoke detectors, heat detectors, and alarm systems.
- Supply and install of 9 kg CO2 and Powder fire extinguishers.

2.3.3. Structural Works

- Solar panels steel structure mounting supplying, fabricating, delivering at site, hoisting and fixing in position, including all temporary staging and supporting work in accordance with the design, drawing prepared for each facility.
- Equipment expected to be used includes; mobile crane/hiab for lifting, mobile concrete mixer (rarely used), drill, and hand tools.

2.3.4. Capacity Building and Training

The training program by contractor shall be provided to the facility workers including those in charge of the system operation and light maintenance. Training should include the following elements:

- System safety and Operation: System description including system features, components and their functions, system software and interface; Running PV system safely; System operating procedures; System operating characteristics; System limitations; On-site system operation.
- System Maintenance: System and components and simple troubleshooting; On-site inspection and operation and maintenance; Schedule of maintenance, safety checks and procedures; Types of alarms and notifications.
- Energy Efficiency: Energy efficiency best practices and energy efficient alternatives; Customized basic energy management session for each site to all users on which appliances they can run using the solar system; Printed leaflet should be available in Arabic presenting system on/off operation, simple troubleshooting and basic maintenance.

2.3.5. System Warranty

- System maintenance and after sales services for 1 year including the provision of necessary equipment and components to run the system safely.
- Troubleshooting for the solar system for any malfunction during the maintenance period and performing the maintenance visit or for any emergency request by the end users.

2.3.6. Typical System Components

Figure 1 below illustrates a simplified diagram on the typical system components that include the main elements. Detailed drawings have been prepared for each facility including all system components and installation locations.

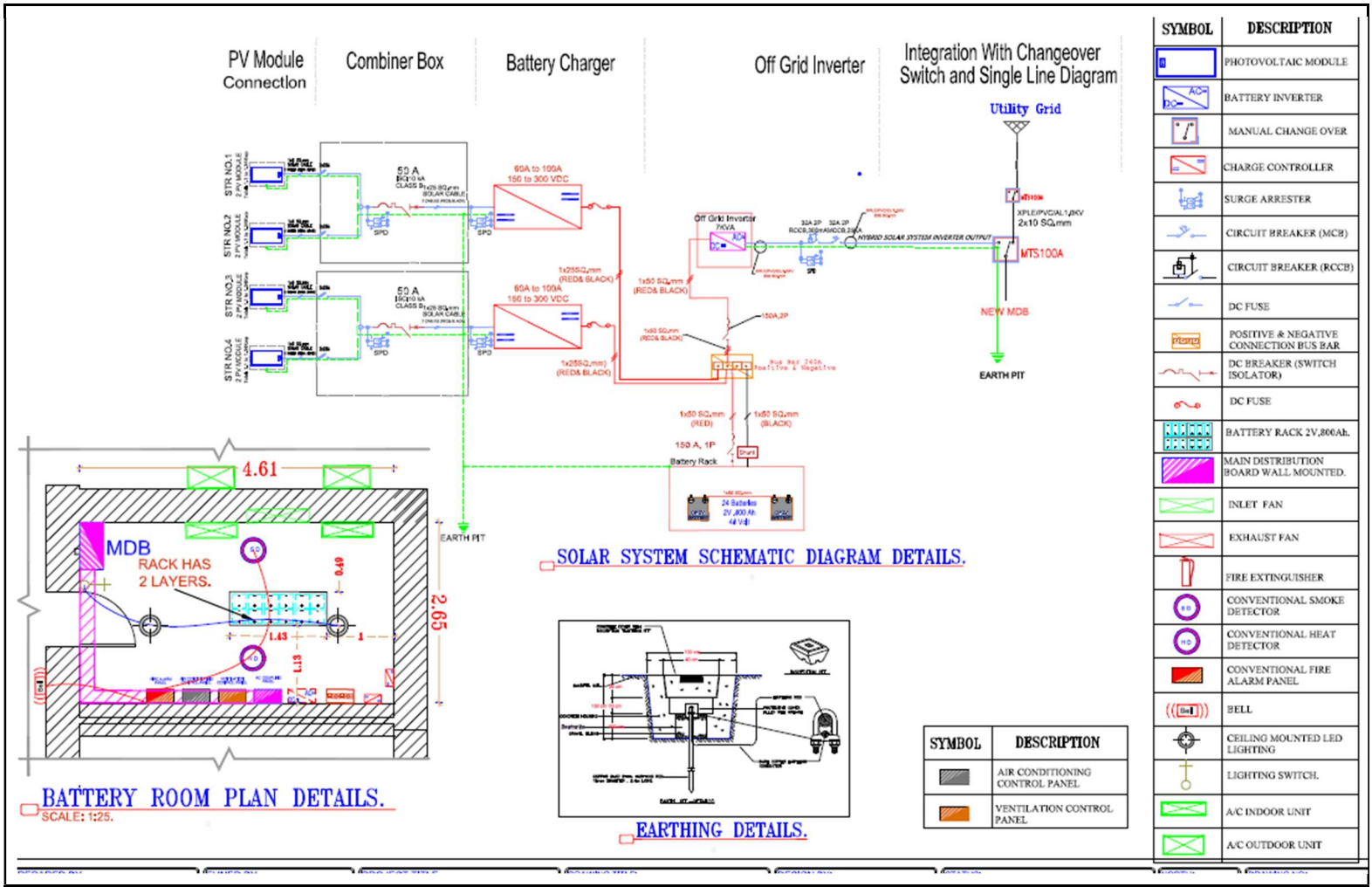


Figure 1 typical solar system components

2.3.7. Work Implementation Arrangements

The contractor work and system installation will be entirely performed within the targeted facilities boundaries, public facilities. The solar panels will be installed at the roofs of the buildings and battery rooms locations have been identified by UNOPS engineers in coordination with the facilities managements.

Estimated number of contractor workers in each facility that will be involved in system installation, testing, commissioning and start-up is 10 workers, work will take place in stages in each facility, and the estimated total number of workers in all facilities under the subproject is approximately 850. The

installation period and actual work within each facility under the subproject is between 7 to 10 working days. Approximately 3 workers required for system installation in each facility are unskilled and semiskilled responsible for the manual handling, installation and transportation of materials. Approximately 7 skilled workers are required in each facility responsible for the supervision, electrical work, and training and maintenance activities. It is expected that women workers will not be involved in the contractor's works at the facility level as the work is taking place mainly in rural areas.

It is expected that contractor workers will leave the work areas at the end of each workday to their houses, for those living in the same districts, rest of the workers will be accommodated in the nearest hotels at the districts centers. Contractor will be responsible for managing and providing the workers with such arrangements. Following UNOPS guidance[4], workers accommodation design and equipment should strive to offer workers a maximum of privacy with a minimum area of 4 square meter per person should be provided.

3. Environmental and Social Baseline

In 2014, before the conflict erupted, only about 66 percent of the population in the Republic of Yemen had access to public electricity (another 12 percent had access to private electricity solutions), the lowest level in the region. Rural and peri-urban areas, which account for approximately two-thirds of Yemen's estimated 30 million population, suffered disproportionately from a lack of access to modern energy, with rural electricity access rates of only 53 percent.[5]

The collapse of electricity and fuel supplies has also severely affected employment and household incomes in rural and peri-urban areas, due to the dependence on agriculture and energy-intensive groundwater extraction for irrigation. It has also increased dependency on scarcely available and expensive liquid fuels. Where the electricity cost in the northern governorates of Yemen is relatively high where such power supply and generation is commercial with no support from the government, the electricity cost in southern governorates remain supported by the government with affordable prices. This resulted in intermittent supply of electricity in the southern governorates with stable and continuous electrical supply in northern governorates.

On 2 October 2022, the UN-mediated truce in Yemen came to an end despite the efforts made to reach an extension agreement. The overall security condition within the country remains stable without conflict escalation post the truce end. The truce had first come into effect on 2 April 2022 and was renewed twice for two-month periods, in June and August. Among other things, it provided for a halt to offensive military operations. Overall, the 1 year of truce brought several tangible benefits to the Yemeni population, including improved access to humanitarian aid, greater economic opportunities, and a significant reduction in violence and casualties countrywide. The selected facilities under this subproject are located in safe locations away from any conflict areas with safe access for contractors and workers in place. UNOPS will closely follow the security conditions across the selected facilities before and during implementation in which the SMP requirements and actions will be applied.

Healthcare Sector in Yemen[6]

Availability of functioning health infrastructure, such as hospitals and primary care centers, has dwindled under the weight of conflict, with a significant share of the population having challenges with access to health care. Currently, only 50% of health facilities are fully functional and over 80% of the population faces significant challenges in reaching food, drinking water and access to health care services. Shortages

[4] The requirements are aligned with the Guidance Note by IFC and the EBRD on Workers' Accommodation in which the following is stated for minimum requirement per person: Usual standards range from 10 to 12.5 cubic metres (volume) or 4 to 5.5 square metres (surface).
[5] Date sourced from YEEAP2 ESMF
[6] Yemen-Health-Sector-Policy-Note-Sep2021

of human resources, equipment, and supplies are severely hindering healthcare provision. Furthermore, conflict has exacerbated health challenges and resulted in weak governance for the healthcare sector.

Difficulties in the provision of health service are reflected through worsening health outcomes. Reporting on the health status of Yemenis points to deteriorating health conditions as a result of years of conflict. These include high levels of child malnutrition, low immunization rates and outbreaks of communicable diseases. Maternal and child health are particularly affected by the worsening situation, with latest estimates pointing to one mother and six newborns dying every two hours. Additionally, conflict has also taken a direct toll on the health of the population and is now estimated to be the third main cause of death in Yemen, following ischemic heart disease and neonatal disorders.

Decreased external funding for health, coupled with unprecedented challenges such as COVID-19, raise uncertainty about the future of health services in Yemen. Yemen's health system is extremely reliant on external funding and the provision of health services is primarily done through implementing organizations, with a weak health system and an overreliance on development partners executing vertical health programs.

Solar PV in Yemen[7]

With more than 8 years of conflict in the country, the crisis resulted in boosting the PV market in Yemen where PV has penetrated the market with a high growth rate, with access to PV systems reaching around 50% of households in rural areas and 75% in urban areas, translating to over one billion USD private sector driven investment in PV systems for residential sector alone over the past five years, with huge untapped potential in many other sectors. This has a positive impact on Yemeni society, not only by improving energy access during the conflict time but also by enhancing socio-economic conditions in both urban and rural areas. PV technology has reached many houses and farms, as well as some health centers and schools. This situation coupled with the dramatic reduction in PV technology prices have opened the doors for a newly emerging market with unique experiences in how the growth occurred and how the labor skills were gained and developed to serve the market needs.

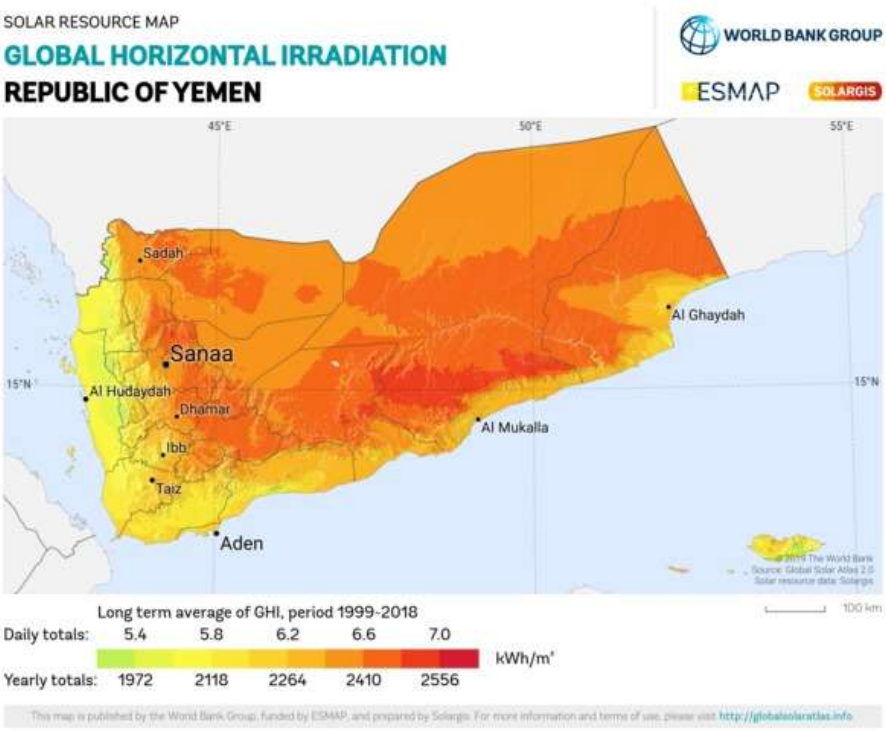
PV systems have been installed for several essential public services. For example:

1. Healthcare Facilities: The health facilities have suffered from partial or complete blackouts during recent periods. Several large hospitals have minimized their dependence on the national grid by installing diesel generators where the fuel was supplied by the government or international organizations. Other hospitals have installed solar PV systems for lighting, especially for the emergency departments. There are cases where health facilities have installed solar PV systems for their necessary loads such as keeping vaccinations and medicines when low temperature storage is needed.

2. Schools: The total number of schools in Yemen is around 17 thousand (16,961 schools in 2011 records). Scattered information has revealed some initiatives to build schools in many areas around Yemen, however data about most of them are neither available nor organized. The number of schools that use solar energy is estimated to be less than 10% of the total schools in Yemen. In the Sana'a city that contains 370 schools, UNICEF has the largest initiatives for the solar electrification of schools. The reported project is to install solar PV in 100 schools; the first phase of the project has accomplished 70 of them (Ministry of Education, 2016). Other PV-implementing schools in Sana'a are either supported by individual initiatives from the school staff or the community served by the school.

Figure 2 Global Horizontal Irradiation in Yemen

[7] Majority of this content extracted from Project ESMF page 25 and 26



Subproject supported facilities

Total facilities under this subproject are 83 facilities, 10 schools and 73 healthcare facilities, distributed across 10 governorates as detailed in table 1 and illustrated in figure 3. All facilities are public and located in 54 districts for which summary of the location, coordinates, estimated number of beneficiaries (as per facilities management data) and system capacity are available under section 2.2.1 for healthcare facilities and section 2.2.2 for schools.

The planned support and solar system installation under this subproject shall meet the required power consumption within the targeted facilities. Additional details on the location, buildings layout, photos and drawings as well as the proposed locations for systems installation for each facility are included in annex 7. Targeted facilities under this subproject are located in rural or peri urban areas in which the majority of those facilities are not supplied with reliable electricity sources in continuous basis. Majority of the residents around the facilities are the poor with high percentage in dire need. Residents are mainly relying on the agriculture as a main source of income. While the staff salaries are being paid regularly for facilities located in the southern and eastern governorates, the salaries in the northern governorates are not regularly paid in which the facilities management are providing incentives to their staff.

Total number of workers in the healthcare facilities under this subproject is 1,223 (686 males and 537 females) while the cumulative average number of patients / month is 94,330 in which 41,727 are males and 52,603 are females.

Total number of workers in the schools covered by this subproject is 303 (146 males and 157 females) while the total number of students is 7,947 (3,939 males and 4,008 females).

While no related GBV/SEA/SH issues came to the Project attention within the targeted facilities and minor potential risk level is expected, included below the environmental and social details across the subproject targeted areas categorized by governorate (Points A to J hereinafter). The estimated population at the governorate level is indicated along with the estimated populations at the districts targeted under the subproject. The population indicated below is a 2023 estimation based on the Yemen Central Statistical Office (CSO) 2004 census, while the IDP is determined based on 2021 estimated figures.

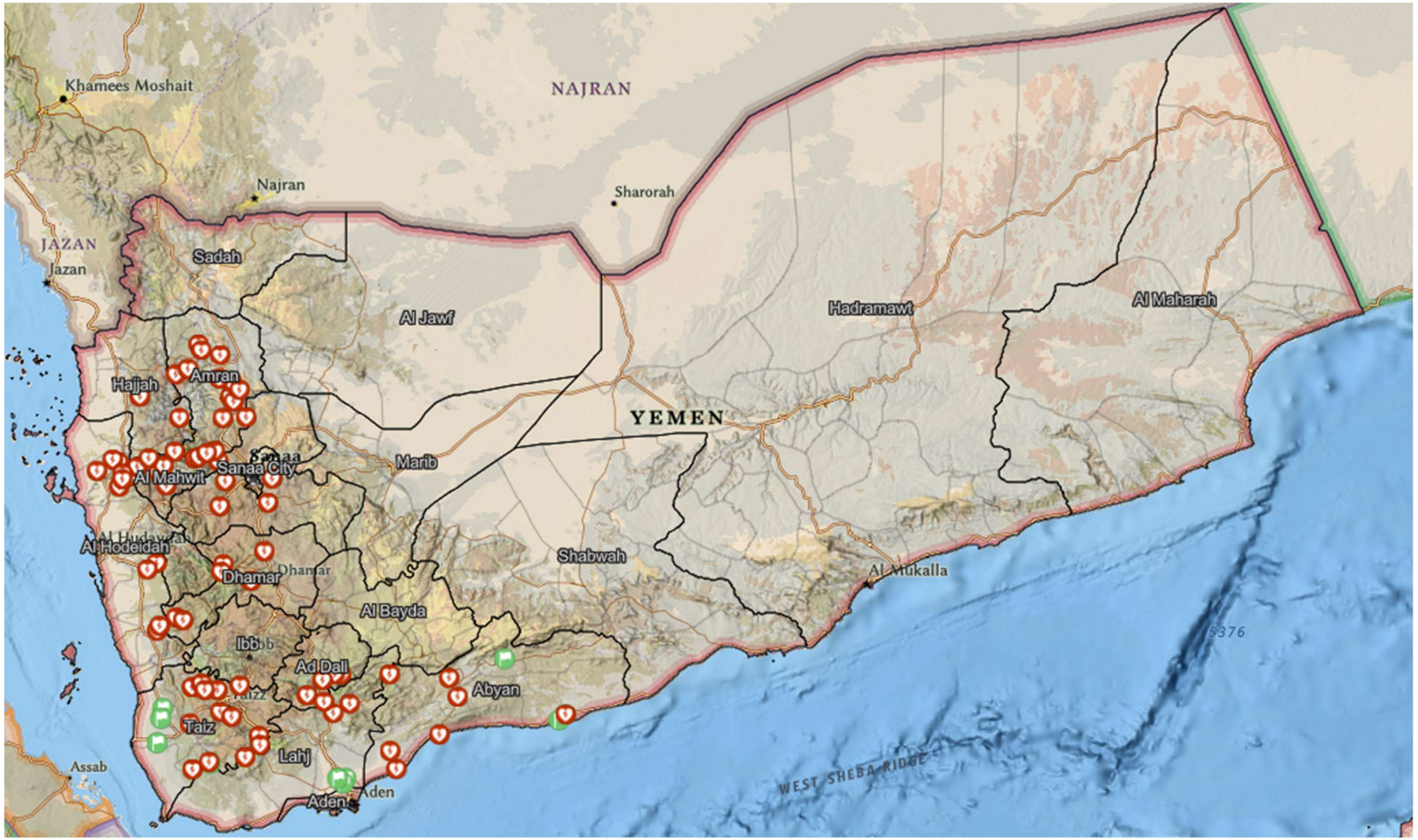


Figure 3[8] distribution of targeted subproject facilities across the country Healthcare facility School

[8] GIS Map developed by UNOPS for the use in this ESMP, online link as follow:
https://unops-yemen.maps.arcgis.com/apps/dashboards/f9c091269a9a4c1880e2bb266b4525f6

A. Abyan

Abyan Governorate is located in the southern part of the country and borders Aden. It is 427 kilometers south of Sana'a. The governorate is located on the coast of the Arabian Sea and consists of 11 districts. Zinjibar is the governorate capital.

According to OCHA (Humanitarian Response Plan for Yemen 2018), there are nearly 500,000 people in need of assistance in Abyan. Fifty-eight percent of them are in dire need. Health services in the governorate are available through healthcare facilities that rely mainly on support from international organizations. The services provided are very limited and insufficient to meet the needs of the population. With regard to education, 69 schools have been damaged in the war in Abyan, according to OCHA (An Overview of the Humanitarian Needs in Yemen 2018). However, teachers were being paid regularly, as Abyan was one of the governorates receiving regular salary payments. Overall, education in Abyan appears to be stable and continues to function, with funding from local authorities and a number of donors.

9 facilities will be supported under this subproject in the governorate; 5 health centers, 1 hospital and 3 schools. The supported facilities are distributed across 4 districts namely Ahwar, Khanfar, Lawder, and Moudyah.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
Abyan governorate	62,009	664,732	326,466	338,266
Districts (Ahwar, Khanfar, Lawder, and Moudyah)	41,800	397,854	194,042	203,8012

Temperature [9]

In the targeted districts under the subproject, the summers are long, hot, oppressive, arid, and mostly cloudy and the winters are warm, muggy, windy, and mostly clear. Over the course of the year, the temperature typically varies from 24°C to 36°C and is rarely below 22°C or above 37°C.

Rainfall

The sliding 31-day quantity of rainfall in subproject areas does not vary significantly over the course of the year, staying within 3 millimeters of 5 millimeters monthly average throughout the year.

Wind

The average hourly wind speed in targeted districts 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 4.1 meters per second. The windiest month of the year is January, with an average hourly wind speed of 5.4 meters per second. The calmer time of year lasts for 5.4 months, from April 29 to October 10. The calmest month of the year is June, with an average hourly wind speed of 2.9 meters per second.

Solar Energy

[9] Temperature, rainfall, wind and solar energy sourced from https://weatherspark.com/y/103679/Average-Weather-in-Zinjib%C4%81r-Yemen-Year-Round

The brighter period of the year in Abyan lasts for 2.5 months, from February 22 to May 4, with an average daily incident shortwave energy per square meter above 6.7 kWh. The brightest month of the year is March, with an average of 7.1 kWh. The darker period of the year lasts for 2.8 months, from June 14 to September 6, with an average daily incident shortwave energy per square meter below 5.2 kWh. The darkest month of the year is July, with an average of 4.8 kWh.

B. AdDhalea

AdDhalea governorate is one of the governorates established after Yemeni unification in 1990. It is located between Ibb and Lahj in the south-central part of the Republic of Yemen and is 250 kilometers from the capital Sana'a. The governorate is divided into nine administrative districts, and the city of AdDhalea is the governorate capital.

According to OCHA's 2018 Humanitarian Response Plan for Yemen, there are nearly 500,000 people in need of assistance in the governorate; 53% of them are in dire need. Health services, for example, are provided by the main public hospital in the city of AdDhalea and a number of hospitals and health centers in the districts supported by the central government, the local authority, and some international donors. However, the services provided do not meet the increasing needs of the population in light of internal displacement and associated crowding and malnutrition. Recently, the government built a new hospital in the governorate and efforts are ongoing to furnish and operate it in cooperation with donors. With regard to education, 83 schools have been damaged by the war. Teachers were being paid regularly as AdDhalea is in the list of governorates receiving regular salary payments. Education in AdDhalea was generally stable and continuing in those schools left intact by fighting, but has been disrupted by displacement and destruction elsewhere. A number of schools damaged by fighting have been rehabilitated, yet overall, the governorate is experiencing overcrowding in classrooms caused by the loss of facilities coupled with ongoing displacement.

5 facilities will be supported under this subproject in the governorate; 3 health centers, 2 hospitals. The supported facilities are distributed across 4 districts namely Al-Azariq, Al-Shaeeb, Aldhalee, and Alhussain.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
AdDhalea governorate	180,548	894,975	423,957	471,018
Districts (Al-Azariq, Al-Shaeeb, Aldhalee, and Alhussain)	67,693	360,106	167,928	192,178

Temperature [10]

In AdDhalea the summers are long, hot, and overcast; the winters are short, cool, and mostly clear; and it is dry year-round. Over the course of the year, the temperature typically varies from 11°C to 31°C and is rarely below 9°C or above 34°C. The hot season lasts for 3.9 months, from May 13 to September 10, with an average daily high temperature above 30°C. The hottest month of the year in Dhalie is June, with an average high of 31°C and low of 20°C.

Rainfall

The rainy period of the year lasts for 1.5 months, from July 25 to September 9, with a sliding 31-day rainfall of at least 13 millimeters. The month with the most rain in AdDhalea is August, with an average rainfall of

[10] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/103127/Average-Weather-in-Dhalie-Yemen-Year-Round

15 millimeters. The rainless period of the year lasts for 10 months, from September 9 to July 25. The month with the least rain is November, with an average rainfall of 3 millimeters.

Wind

The average hourly wind speed experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 7.3 months, from October 4 to May 12, with average wind speeds of more than 2.8 meters per second. The windiest month of the year is March, with an average hourly wind speed of 3.3 meters per second. The calmer time of year lasts for 4.7 months, from May 12 to October 4. The calmest month of the year is August, with an average hourly wind speed of 2.4 meters per second.

Solar Energy

The brighter period of the year in AdDhallea lasts for 2.5 months, from February 22 to May 4, with an average daily incident shortwave energy per square meter above 6.7 kWh. The brightest month of the year in Ja'ār is March, with an average of 7.1 kWh. The darker period of the year lasts for 2.8 months, from June 14 to September 6, with an average daily incident shortwave energy per square meter below 5.2 kWh. The darkest month of the year is July, with an average of 4.8 kWh.

C. AlMahwit

AlMahwit Governorate is located 113 kilometers to the northwest of the capital Sana'a, between Sana'a and Al-Hodeidah governorates. It is divided into nine administrative districts, with Mahweet City as the capital.

According to OCHA's 2018 Humanitarian Response Plan for Yemen, there are nearly 500,000 people in need of assistance in the governorate. Forty-nine percent of them are in dire need. Most hospitals and health centers in the governorate are still operational, but are reduced to providing services at a minimum level due to the absence of sufficient local and central funding. Health facilities now rely heavily on donor support, yet funding is very limited and the services provided are insufficient to meet the needs of the population. According to OCHA, 33 schools in the governorate were damaged by the war. Salaries of teachers are not being paid regularly in the governorate.

7 facilities will be supported under this subproject in the governorate, all are health centers. The supported facilities are distributed across 5 districts namely Al Khabt, Al Tawilah, Bani Saad, Hufash Jabal Al Mahwait.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
AlMahwit governorate	40,481	820,590	402,680	417,910
Districts (Al Khabt, Al Tawilah, Bani Saad, Hufash Jabal Al Mahwait)	22,968	387,479	192,626	194,853

Temperature [11]

The summers are short, warm, arid, and mostly cloudy and the winters are cold, dry, and mostly clear. Over the course of the year, the temperature typically varies from 5°C to 27°C and is rarely below 2°C or above 29°C.

[11] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/102672/Average-Weather-in-A%C5%A3-%C5%A2aw%C4%ABlah-Yemen-Year-Round

The warm season lasts for 2.1 months, from May 16 to July 20, with an average daily high temperature above 25°C. The hottest month of the year is June, with an average high of 27°C and low of 14°C. The cool season lasts for 3.0 months, from November 19 to February 20, with an average daily high temperature below 21°C. The coldest month of the year is December, with an average low of 5°C and high of 20°C.

Rainfall

The sliding 31-day quantity of rainfall does not vary significantly over the course of the year, staying within 2 millimeters of 3 millimeters monthly average throughout the year.

Wind

The average hourly wind speed experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 2.1 months, from June 18 to August 20, with average wind speeds of more than 2.8 meters per second. The windiest month of the year is July, with an average hourly wind speed of 3.2 meters per second. The calmer time of year lasts for 9.9 months, from August 20 to June 18. The calmest month of the year is May, with an average hourly wind speed of 2.4 meters per second.

Solar Energy

The brighter period of the year lasts for 1.4 months, from May 22 to July 1, with an average daily incident shortwave energy per square meter above 7.0 kWh. The brightest month of the year is June, with an average of 7.2 kWh. The darker period of the year lasts for 2.1 months, from November 19 to January 22, with an average daily incident shortwave energy per square meter below 6.1 kWh. The darkest month of the year is December, with an average of 5.8 kWh.

D. AlHudaydah

AlHudaydah governorate is located in the far west of the Republic of Yemen along the Red Sea coast. It is 226 kilometers west of the capital city of Sana'a. The governorate is divided into 26 districts, and the city of AlHudaydah is the governorate's capital. Al-Hodeidah port, alongside Aden port, is one of the main commercial ports of the country.

According to OCHA 2.65 million people are in need of assistance in the governorate in 2019. Eleven health facilities in the governorate have closed, and large numbers of doctors have left the governorate due to lack of salary payments and the deteriorating security situation. Even nominally functioning health facilities were working at minimum capacity. Health services provided in hospitals and health centers rely mainly on support by donor organizations. AlHudaydah is one of the governorates where teachers' salaries were not being paid regularly for several years, though some salary payments resumed in 2019. In addition, at least 21 schools have been damaged by the war.

11 facilities will be supported under this subproject in the governorate; 10 health centers and 1 hospital. The supported facilities are distributed across 6 districts namely Al Mansoriah, Al Mighlaf, Al Monirah Al Qanawis, Azzidiah and Zabid.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is included below:

	Total IDP	Estimated Population	Total Females	Total Males
AlHudaydah governorate	562,957	3,244,192	1,584,780	1,659,412
Districts (Al Mansoriah, Al Mighlaf, AlMonirah Al Qanawis, Azzidiah and Zabid)	119,254	852,036	415,365	436,671

Temperature [12]

The summers are long, hot, and partly cloudy; the winters are warm and mostly clear; and it is oppressive and dry year-round. Over the course of the year, the temperature typically varies from 22°C to 35°C and is rarely below 20°C or above 37°C.

The hot season lasts for 4.7 months, from May 18 to October 8, with an average daily high temperature above 34°C. The hottest month of the year is July, with an average high of 35°C and low of 31°C.The cool season lasts for 3.3 months, from December 3 to March 12, with an average daily high temperature below 30°C. The coldest month of the year is January, with an average low of 22°C and high of 28°C.

Rainfall

The rainy period of the year lasts for 3.7 months, from July 1 to October 24, with a sliding 31-day rainfall of at least 13 millimeters. The month with the most rain is August, with an average rainfall of 30 millimeters. The rainless period of the year lasts for 8.3 months, from October 24 to July 1. The month with the least rain is December, with an average rainfall of 2 millimeters.

Wind

The windier part of the year lasts for 6.6 months, from October 13 to May 1, with average wind speeds of more than 3.3 meters per second. The windiest month of the year is March, with an average hourly wind speed of 3.7 meters per second. The calmer time of year lasts for 5.4 months, from May 1 to October 13. The calmest month of the year is May, with an average hourly wind speed of 3.0 meters per second.

Solar Energy

The brighter period of the year lasts for 2.0 months, from March 6 to May 5, with an average daily incident shortwave energy per square meter above 6.6 kWh. The brightest month of the year is April, with an average of 6.8 kWh. The darker period of the year lasts for 2.1 months, from November 21 to January 25, with an average daily incident shortwave energy per square meter below 5.7 kWh. The darkest month of the year is December, with an average of 5.4 kWh.

E. Amran

The governorate of Amran is one of the governorates established after Yemeni unification. It is located 50 kilometers to the north of Sana'a city between Sana'a governorate and Sa'adah along the central highlands. It is divided into 20 administrative districts. The city of Amran is the governorate capital.

There are nearly 900,000 people in need of assistance in Amran, 44% of whom are in dire need. Public hospitals and health centers provide limited health services to the population with support from international donors. Support from the local authority is very limited. Available health services are insufficient to meet the needs of the population, especially following the influx of many IDPs to the governorate. With regard to education, the war damaged 32 schools in Amran and teachers' salaries are not being paid. Education increasingly relies on fee funding. UNICEF and the Social Fund for Development have contributed to the rehabilitation of damaged schools. UNICEF also furnished a number of large tents for use as classrooms.

14 facilities will be supported under this subproject in the governorate; 13 health centers, and 1 hospital. The supported facilities are distributed across 10 districts namely Al-Ashah, Bani Suraem, Houth, Khamer, Kharif, Raydah, Shaharah, Suwayr, Thaibin, and Thula'a

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

[12] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/102289/Average-Weather-in-Al-%E1%B8%A8udaydah-Yemen-Year-Round

	Total IDP	Estimated Population	Total Females	Total Males
Amran governorate	274,601	1,264,754	631,949	632805
Districts (Al-Ashah, Bani Suraem, Houth, Khamer, Kharif, Raydah, Shaharah, Suwayr, Thaibin, and Thula'a)	97,764	560,611	279,866	280,745

Temperature [13]

In Amran, the summers are short, warm, arid, and mostly cloudy and the winters are cool, dry, and mostly clear. Over the course of the year, the temperature typically varies from 6°C to 29°C and is rarely below 3°C or above 30°C.

The warm season lasts for 2.5 months, from May 19 to August 1, with an average daily high temperature above 27°C. The hottest month of the year is June, with an average high of 29°C and low of 16°C. The cool season lasts for 3.2 months, from November 8 to February 14, with an average daily high temperature below 23°C. The coldest month of the year is December, with an average low of 6°C and high of 21°C.

Rainfall

The sliding 31-day quantity of rainfall in Amran does not vary significantly over the course of the year, staying within 2 millimeters of 3 millimeters monthly average throughout the year.

Wind

The average hourly wind speed in Amran experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 2.0 months, from June 23 to August 22, with average wind speeds of more than 2.5 meters per second. The windiest month of the year is July, with an average hourly wind speed of 3.1 meters per second. The calmer time of year lasts for 10 months, from August 22 to June 23. The calmest month of the year is December, with an average hourly wind speed of 2.0 meters per second.

Solar Energy

The brighter period of the year lasts for 1.6 months, from May 15 to July 1, with an average daily incident shortwave energy per square meter above 7.1 kWh. The brightest month of the year is June, with an average of 7.4 kWh.

The darker period of the year lasts for 2.1 months, from November 19 to January 23, with an average daily incident shortwave energy per square meter below 6.2 kWh. The darkest month of the year is December, with an average of 5.9 kWh

F. Dhamar

Dhamar governorate is located 100 kilometers to the south of the capital Sana'a and shares borders with Sana'a and Raymah governorates in its north, Al-Hodeidah in its west, and Ibb and Al-Dhalea in its south. The governorate is divided into 12 administrative districts, with Dhamar City as the capital of the governorate.

With regard to the humanitarian situation, there are nearly 400,000 people in need of assistance in Dhamar. Forty-eight percent of them are in dire need. Health services are provided by public hospitals and health centers. However, these facilities provide only basic services and they are insufficient to meet the needs of the population. International donors make their work possible. With respect to education, 192 schools in Dhamar have been damaged by the war, a relatively high number compared to other

[13] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/103142/Average-Weather-in-Dham%C4%81r-Yemen-Year-Round

governorates. Dhamar is also one of the governorates where teachers' salaries are not being paid regularly,65 which has disrupted education.

Total of 6 facilities will be supported under this subproject in the governorate; 4 health centers and 2 hospitals. The supported facilities are distributed across 4 districts namely A'ans, Gahran, Jabal Al Sharq and Wusab Al Safil.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
Dhamar governorate	196,242	2,351,203	1,180,436	1,170,767
Districts (A'ans, Gahran, Jabal Al Sharq and Wusab Al Safil)	72,136	763,576	385,845	377,732

Temperature [14]

The summers are short, warm, arid, and mostly cloudy and the winters are cool, dry, and mostly clear. Over the course of the year, the temperature typically varies from 4°C to 27°C and is rarely below 1°C or above 29°C.

The warm season lasts for 1.8 months, from May 20 to July 14, with an average daily high temperature above 26°C. The hottest month of the year is June, with an average high of 27°C and low of 12°C. The cool season lasts for 3.3 months, from October 28 to February 9, with an average daily high temperature below 22°C. The coldest month of the year is December, with an average low of 4°C and high of 21°C.

Rainfall

Rain falls throughout the year in Dhamar. The month with the most rain is August, with an average rainfall of 10 millimeters. The month with the least rain is November, with an average rainfall of 2 millimeters.

Wind

The windier part of the year lasts for 5.6 months, from May 20 to November 6, with average wind speeds of more than 2.9 meters per second. The windiest month of the year is July, with an average hourly wind speed of 3.2 meters per second. The calmer time of year lasts for 6.4 months, from November 6 to May 20. The calmest month of the year is December, with an average hourly wind speed of 2.6 meters per second.

Solar Energy

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 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 is December, with an average of 6.2 kWh.

G. Hajjah

Hajjah governorate is located 123 kilometers northwest of Sana'a, due north of Al-Hodeidah, between Amran to the east and the Red Sea to the west. It borders the Kingdom of Saudi Arabia and is divided into 31 administrative districts.

[14] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/103142/Average-Weather-in-Dham%C4%81r-Yemen-Year-Round

With regard to the humanitarian situation and according to OCHA (Humanitarian Response Plan for Yemen 2018), there are nearly 1.9 million people in need of assistance in Hajjah. Sixty-three percent of them are in dire need.

3 facilities will be supported under this subproject in the governorate; all are health centers. The supported facilities are distributed across 3 districts namely Al Maghrabah, Aslem, and Bani Al Awam.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
Hajjah governorate	577,960	2,480,486	1,212,872	1,267,614
Districts (Al Maghrabah, Aslem, and Bani Al Awam)	22,817	287,489	141,215	146,274

Temperature [15]

The summers are long, sweltering, humid, arid, and partly cloudy and the winters are short, warm, dry, and mostly clear. Over the course of the year, the temperature typically varies from 17°C to 39°C and is rarely below 15°C or above 40°C.

The hot season lasts for 4.7 months, from May 12 to October 3, with an average daily high temperature above 37°C. The hottest month of the year is June, with an average high of 39°C and low of 27°C. The cool season lasts for 2.9 months, from November 27 to February 25, with an average daily high temperature below 32°C. The coldest month of the year is January, with an average low of 18°C and high of 30°C.

Rainfall

The sliding 31-day quantity of rainfall does not vary significantly over the course of the year, staying within 2 millimeters of 3 millimeters monthly average throughout the year.

Wind

The average hourly wind speed experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 2.0 months, from June 23 to August 24, with average wind speeds of more than 2.8 meters per second. The windiest month of the year is July, with an average hourly wind speed of 3.1 meters per second. The calmer time of year lasts for 10 months, from August 24 to June 23. The calmest month of the year is October, with an average hourly wind speed of 2.4 meters per second.

Solar Energy

The brighter period of the year lasts for 1.6 months, from May 26 to July 12, with an average daily incident shortwave energy per square meter above 6.9 kWh. The brightest month of the year is June, with an average of 7.1 kWh. The darker period of the year lasts for 2.2 months, from November 18 to January 25, with an average daily incident shortwave energy per square meter below 5.8 kWh. The darkest month of the year is December, with an average of 5.5 kWh.

H. Lahj

Lahj governorate is located on the southwestern coast of the Republic of Yemen, north and west of Aden. It is 337 kilometers from the capital city of Sana'a. The governorate is divided into 15 administrative districts with the city of Al-Houta as its capital.

[15] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/102706/Average-Weather-in-Khayr%C4%81n-Yemen-Year-Round

There are nearly 900,000 people in need of assistance in Lahj, 62% of whom are in dire need. Hospitals and health centers provide health services in the governorate, but the services are insufficient to meet the needs of the population. The health facilities are working on a very low budget provided by the local authority and with support from international donors. Education has also been disrupted by the conflict, with 50 schools in Lahj damaged in the war. Teachers, however, were being paid regularly. The local authority and international organizations are supporting education in Lahj, ensuring a measure of stability and continuity.

Total of 7 facilities will be supported under this subproject in the governorate; 3 health centers, 1 hospital and 3 schools. The supported facilities are distributed across 5 districts namely Al-Maqaterah, Habeel Jaber, Laboos, Radfan, and Tuban.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
Lahj governorate	79,163	1,150,474	564,161	586,313
Districts (Al-Maqaterah, Habeel Jaber, Laboos, Radfan, and Tuban)	43,611	379,674	186,363	193,311

Temperature [16]

The summers are long, sweltering, arid, and overcast and the winters are short, comfortable, dry, and mostly clear. Over the course of the year, the temperature typically varies from 16°C to 36°C and is rarely below 14°C or above 38°C.

The hot season lasts for 4.1 months, from May 12 to September 17, with an average daily high temperature above 34°C. The hottest month of the year is June, with an average high of 36°C and low of 25°C. The cool season lasts for 2.8 months, from November 29 to February 21, with an average daily high temperature below 29°C. The coldest month of the year is January, with an average low of 16°C and high of 28°C.

Rainfall

The sliding 31-day quantity of rainfall does not vary significantly over the course of the year, staying within 3 millimeters of 6 millimeters monthly average throughout the year.

Wind

The average hourly wind speed experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 7.3 months, from October 3 to May 13, with average wind speeds of more than 3.1 meters per second. The windiest month of the year is November, with an average hourly wind speed of 3.5 meters per second. The calmer time of year lasts for 4.7 months, from May 13 to October 3. The calmest month of the year is August, with an average hourly wind speed of 2.8 meters per second.

Solar Energy

The brighter period of the year lasts for 2.9 months, from February 20 to May 15, with an average daily incident shortwave energy per square meter above 6.8 kWh. The brightest month of the year is March, with an average of 7.2 kWh. The darker period of the year lasts for 1.8 months, from July 1 to August 27,

[16] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/103115/Average-Weather-in-%E1%B8%A8ab%C4%ABl-al-Jabr-Yemen-Year-Round

with an average daily incident shortwave energy per square meter below 5.4 kWh. The darkest month of the year is July, with an average of 5.1 kWh.

I. Sana'a

Sana'a governorate surrounds the capital city of Sana'a and is divided into 16 administrative districts.

According to OCHA's 2018 Humanitarian Response Plan for Yemen, there are nearly 1.1 million people in need of assistance in Sana'a governorate. Thirty percent of them are in dire need. There are 12 public hospitals and a number of health centers in the governorate. These health facilities continue to operate, relying on support from international donors, with a small portion of their expenses covered by local government support. The services provided by health facilities are accessible to all people free of charge, but available capacities are not sufficient to meet the growing needs. With regard to education, 93 schools in Sana'a governorate were damaged by the war and Sana'a is one of the governorates where teachers are not receiving their salaries regularly. This has disrupted education in most districts of the governorate.

Total of 5 facilities will be supported under this subproject in the governorate; 3 health centers and 2 hospitals. The supported facilities are distributed across 4 districts namely Al-Hayma, Bani Matar, Hamdan and Sanhan.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
Sana'a governorate	107,522	1,522,586	745,373	777,214
Districts (Al-Hayma, Bani Matar, Hamdan and Sanhan)	72,263	872,126	420,780	451,346

Temperature [17]

The summers are short, hot, arid, and mostly cloudy and the winters are cool, dry, and mostly clear. Over the course of the year, the temperature typically varies from 10°C to 32°C and is rarely below 7°C or above 34°C.

The hot season lasts for 2.1 months, from May 18 to July 20, with an average daily high temperature above 31°C. The hottest month of the year is June, with an average high of 32°C and low of 20°C. The cool season lasts for 3.0 months, from November 17 to February 18, with an average daily high temperature below 26°C. The coldest month of the year is December, with an average low of 10°C and high of 25°C.

Rainfall

The sliding 31-day quantity of rainfall does not vary significantly over the course of the year, staying within 2 millimeters of 4 millimeters monthly average throughout the year.

Wind

The average hourly wind speed experiences mild seasonal variation over the course of the year. The windier part of the year lasts for 2.0 months, from June 20 to August 20, with average wind speeds of more than 2.5 meters per second. The windiest month of the year is July, with an average hourly wind speed of 2.9 meters per second. The calmer time of year lasts for 10 months, from August 20 to June 20. The calmest month of the year is May, with an average hourly wind speed of 2.0 meters per second.

Solar Energy

[17] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/102676/Average-Weather-in-Maf%E1%B8%A9aq-Yemen-Year-Round

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 1.5 months, from May 12 to June 27, with an average daily incident shortwave energy per square meter above 6.9 kWh. The brightest month of the year is June, with an average of 7.1 kWh. The darker period of the year lasts for 2.0 months, from November 21 to January 20, with an average daily incident shortwave energy per square meter below 6.1 kWh. The darkest month of the year is December, with an average of 5.9 kWh.

J. Taiz

Taiz governorate is located in the central and southwestern part of Yemen, 256 kilometers south of the capital city Sana'a along the Red Sea coast overlooking the Bab Al-Mandab. The governorate is the most populous in Yemen and divided into 23 administrative districts, with the city of Taiz as the capital.

According to OCHA's 2018 Humanitarian Response Plan for Yemen, there were nearly 600,000 people in need of assistance in Taiz, 65% of whom were in dire need. In the health sector, the war, the disruption of salaries, and cuts to the operational budget of the governorate have been a source of major challenges to the provision of health services. Many healthcare centers have been closed. There are still a number of hospitals and health centers in operation, but the services they provide are insufficient and do not meet the needs of the population. Most rely on donor support. Due to the decline in health services and a scarcity of clean drinking water, there have been major epidemics of infectious diseases such as cholera threatening the lives of many in the governorate.

Taiz has seen the highest number of schools damaged by the war, with at least 334 schools damaged. Teachers within the governorate are being paid regularly. Regular salary payments have allowed a measure of continuity and stability in education in some of Taiz's districts, while the disruption has been more severe in others. According to some estimates, 468 out of 1,624 schools in the governorate (28%) have had to close, depriving nearly 250,000 students of education. Some schools have reopened in several areas recently as a result of the truce and regular salary payments for teachers.

16 facilities will be supported under this subproject in the governorate; 10 health centers, 2 hospitals and 4 schools. The supported facilities are distributed across 9 districts namely Al-Makha'a, Al-Mesrah, Al-Wazeaiah, At Ta'iziyah, Hayfan, Maqbanah, Mawza'a, Saber Al-Mawadem and Shara'b Ar Rawnah.

Population

2023 Estimated population in the governorate and the targeted districts under the subproject is below:

	Total IDP	Estimated Population	Total Females	Total Males
Taiz governorate	444,740	3,262,271	1,780,917	1,481,754
Districts (Al-Makha'a, Al-Mesrah, Al-Wazeaiah, At Ta'iziyah, Hayfan, Maqbanah, Mawza'a, Saber Al-Mawadem and Shara'b Ar Rawnah)	196,646	1,344,772	731,424	613,348

Temperature [18]

The summers are long, warm, and overcast; the winters are short, cool, windy, and mostly clear; and it is dry year-round. Over the course of the year, the temperature typically varies from 12°C to 29°C and is rarely below 9°C or above 31°C.

[18] Temperature, rainfall, wind and solar energy sourced from: https://weatherspark.com/y/103129/Average-Weather-in-Al-%E2%80%98Ayn-Yemen-Year-Round

The warm season lasts for 4.1 months, from May 7 to September 10, with an average daily high temperature above 27°C. The hottest month of the year is June, with an average high of 29°C and low of 19°C. The cool season lasts for 2.6 months, from November 30 to February 17, with an average daily high temperature below 22°C. The coldest month of the year is January, with an average low of 12°C and high of 21°C.

Rainfall

The rainy period of the year lasts for 5.8 months, from April 5 to September 29, with a sliding 31-day rainfall of at least 13 millimeters. The month with the most rain is August, with an average rainfall of 29 millimeters. The rainless period of the year lasts for 6.2 months, from September 29 to April 5. The month with the least rain is December, with an average rainfall of 4 millimeters.

Wind

The average hourly wind speed experiences significant seasonal variation over the course of the year. The windier part of the year lasts for 1.8 months, from June 30 to August 24, with average wind speeds of more than 3.8 meters per second. The windiest month of the year is July, with an average hourly wind speed of 4.6 meters per second. The calmer time of year lasts for 10 months, from August 24 to June 30. The calmest month of the year is September, with an average hourly wind speed of 2.8 meters per second.

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 2.4 months, from February 22 to May 2, with an average daily incident shortwave energy per square meter above 6.8 kWh. The brightest month of the year is March, with an average of 7.1 kWh. The darker period of the year lasts for 2.3 months, from June 29 to September 9, with an average daily incident shortwave energy per square meter below 5.5 kWh. The darkest month of the year is July, with an average of 5.1 kWh.

4. Environmental and Social Risks and Impacts

While significant positive environmental and social impacts will result from this subproject, there are also minor and temporary negative risks and impacts. Such negative risks and impacts can be included under two main categories as explained in sections 4.1 and 4.2 below. The first category is related to the facilities status, system design and operation while the second category is related to the contractors works and systems installation at the targeted facilities. The estimated risk level of the subproject is moderate and it involves temporary and minor impacts resulting from the contractor works and system installation and operation. Such moderate risks level is mainly linked with the workers occupational health and safety in which workers injuries might be resulted from the implementation activities such as risks from working at height and electrical shocks. Temporary impacts related to the potential temporary nuisance to the hospital patients and workers that could be resulted from the contractor activities.

4.1. Facility Status, System Design and Operation

Potential risks and impacts associated with the facilities selection, system design and operation include:

- Facilities existing condition and electrical connection in which inadequate connection within the facilities might be overloaded with the planned power supply.
- Potential noncompliance of facilities structures with the building local regulations.
- Buildings' structures that might be affected and overloaded by the solar panel structure.
- Roof capacity and adequacy to withstand the solar panel structures.
- System power generation capacity and potential inadequacy to meet the power consumption requirements in the targeted facilities.
- Solar system components including PV panels and structure capacity to withstand the weather

conditions such as wind and rain.

- Although rare, design flaws, component defects, and faulty installation can cause solar rooftop or battery fires.
- Poor solar system components.
- Generated waste at the end of system components lifetime and improper handling or disposal.
- Fires within the different solar system components, wirings and equipment.
- Electrocution and personnel injuries during the system operation.

4.2. Contractor Work and System Installation

Environmental Risk and Impacts

- Solid waste production during contractor work that could pollute the environment including domestic waste from workers and waste from installation works.
- Hazardous substances that could be used and improperly disposed of such as the e-waste, battery waste, and hydrocarbons used for electrical generator/vehicles that could cause soil pollution
- Dust generation and ambient air pollution resulted from drilling, concrete mixing and minor excavations.
- Noise resulted from the contractor activities and powered tools operations.

Social Risk and Impacts

- Forced labor at the solar system components supply chain and production.
- Damage of existing installation as a result of contractor work.
- Security risks and social conflicts.
- Restricted access of local communities and beneficiaries to the facilities due to contractor work.
- Lack of worker's awareness and knowledge on social issues on gender, SEA/SH and GBV.
- Child labor during the contractor work at targeted facilities.
- Community health and safety and exposure to critical activities by the contractor (lifting, excavation, electrical work, work at height).
- Communities exposure to diseases and COVID-19 transmission.

Occupational Health and Safety Risks and Impacts

- Improper working conditions for contractor workers such as lack of insurance, improper workers GM system, lack of training, inadequate competencies, lack of sanitation/hygiene premises and lack of appropriate accommodation.
- Poor emergency response system and risks of fires. Absence of proper emergency response arrangements such as the first aid equipment, transportation means and firefighting means.
- Working at height impacts including injuries caused by falling from heights or falling objects.
- Lifting operations impacts resulted in personnel injuries from failure of lifting equipment during the lifting of structures and equipment. Mountain structures and other equipment need to be lifted to the roofs including the solar panels. Lifting using mobile crane or hiab
- Road accidents during workers and materials transportation.
- Slip, trip and fall as a result of poor site housekeeping and management.
- Electricity work impacts including electrocution/electric shock, fire and burns.
- Exposure to dust resulting from the minor civil work, drilling and minor excavations.
- Workers exposure to hazardous substances and wastes (E0waste) such as batteries, cables etc.
- Manual handling that could result in serious injuries.
- Workers infected by COVID-19 or other diseases.

- Exposure to sharp objects and heat.
- Working in extreme weather conditions such as wind, cold or hot weather.

5. Risks and Impacts Management and Monitoring

5.1. Facilities Status, System Design and Operation

5.1.1. Life and Fire Safety Measures

Life and Fire Safety Measures have been considered by UNOPS during the various stages of this subproject as below:

- **Life and Fire Safety Measures - Assessment Stage and Facilities Selection**

This stage has been already completed by UNOPS for all facilities under this subproject in which the following took place:

  - Appropriate selection and determination of the system capacity, components and accessories required for the facilities considering the estimated power consumption.
  - Identify the location of system components in safe and adequate areas in coordination with facilities management.
  - Detailed assessment of facilities conducted by UNOPS engineers to ensure integrity and readiness for the system installation and operation.
  - Location of panels, batteries and associated system components selected by UNOPS engineers after detailed evaluation of the facility premises in coordination with the facility management and workers.

- **Life and Fire Safety Measures - System Specifications and Design**

This stage has been completed by UNOPS for all facilities under this subproject **in which the following took place:**

  - UNOPS ensured that high quality equipment and cables standard outdoor and indoor are applied.
  - Ensure that high quality circuit breakers, cables, and alarm systems are included in the system design.
  - Ensure that the system design and capacity is compatible with the facility consumptions and expected needs.
  - Include in the design the safety aspects and protection including overload, short circuits, alarm and ventilation systems.
  - Mounting structure designed to withstand the expected weather conditions and the building's structure capable of being loaded with the mounting structures and panels.
  - The system design includes various safety aspects including the selection of materials, appropriate load and equipment specification following the international standards, design requirements and guidelines are included in annex 2.

- **Life and Fire Safety Measures - System Installation and Operation**

UNOPS will ensure the **following** will take place during the contractor work, system installation, test, **commissioning, startup and handover:**

  - Ensure all components are meeting the design criteria.
  - Close monitoring of the contractor work and ensure the system specifications and installation are meeting the subproject requirements.
  - Earthing system testing and installation.
  - Ventilation system provision, installation and operation within the battery compartment rooms.
  - Detection and fire alarm system installation, test and operation within the battery compartment rooms.

- Fire extinguishers to be delivered and installed as part of the subproject scope.
- Compartmentation to prevent or slow down the spread of fire and smoke will be applied in the battery room.
- Emergency response actions to be developed and introduced to facilities management.
- Solar System Monitoring Unit installation to detect any malfunction and shut down the solar system and record the system faults log.
- Access to system components and battery areas will be restricted to authorized personnel only.
- Conduct comprehensive training for the staff and technicians responsible for the operation on the safety aspects as well as the appropriate operation and maintenance. Contractor work includes detailed training to be conducted to the facilities workers on the safe operation and maintenance as explained in the section 2.3 with close follow up monitoring and evaluation by UNOPS. All training materials and trainers qualifications shall be reviewed and approved by UNOPS
- Training sessions that will be conducted with the facilities include detailed explanation on the system components waste generation and recycling requirements. Continued support will be maintained to the facilities by UNOPS during the Project lifetime.
- Complete set of the system documentations, as built drawings with detailed information on the various operation and maintenance activities as well as the waste management process will be handed over to the facilities management.
- PV solar system code of practice (CoP) is available in annex 3 in which the various aspects related to the system operation and management of batteries is included.
- The system will be fully handed over to the facilities management and local authorities once the system is installed, commissioned, started and tested. Facilities management will be fully responsible for the system operation and assignment of staff responsible for system operation. Support including preventive maintenance will be continued during the system warranty period (1 year).
- Product warranty of the system components vary between 1 to 10 years in which the facilities management will be provided with detailed information on the recycling/disposal options at each components end of life.

5.1.2. Management of System Generated Waste

The main components of an off-grid solar product include PV solar modules, batteries (lithium-based or lead acid), lamps (mainly LED), control units with circuit-board-mounted electronic controls, cables, metal frames and fixtures, and appliances (TVs, radios, fans, etc.) (GOGLA, 2019). [19], [20] After becoming waste, the components of the off-grid solar products are grouped according to fractions such as metal, glass, plastics, paper and cardboard, and cables. Figure 4 provides an overview of fractions of off-grid solar products and the waste components (GOGLA, 2019)[21].

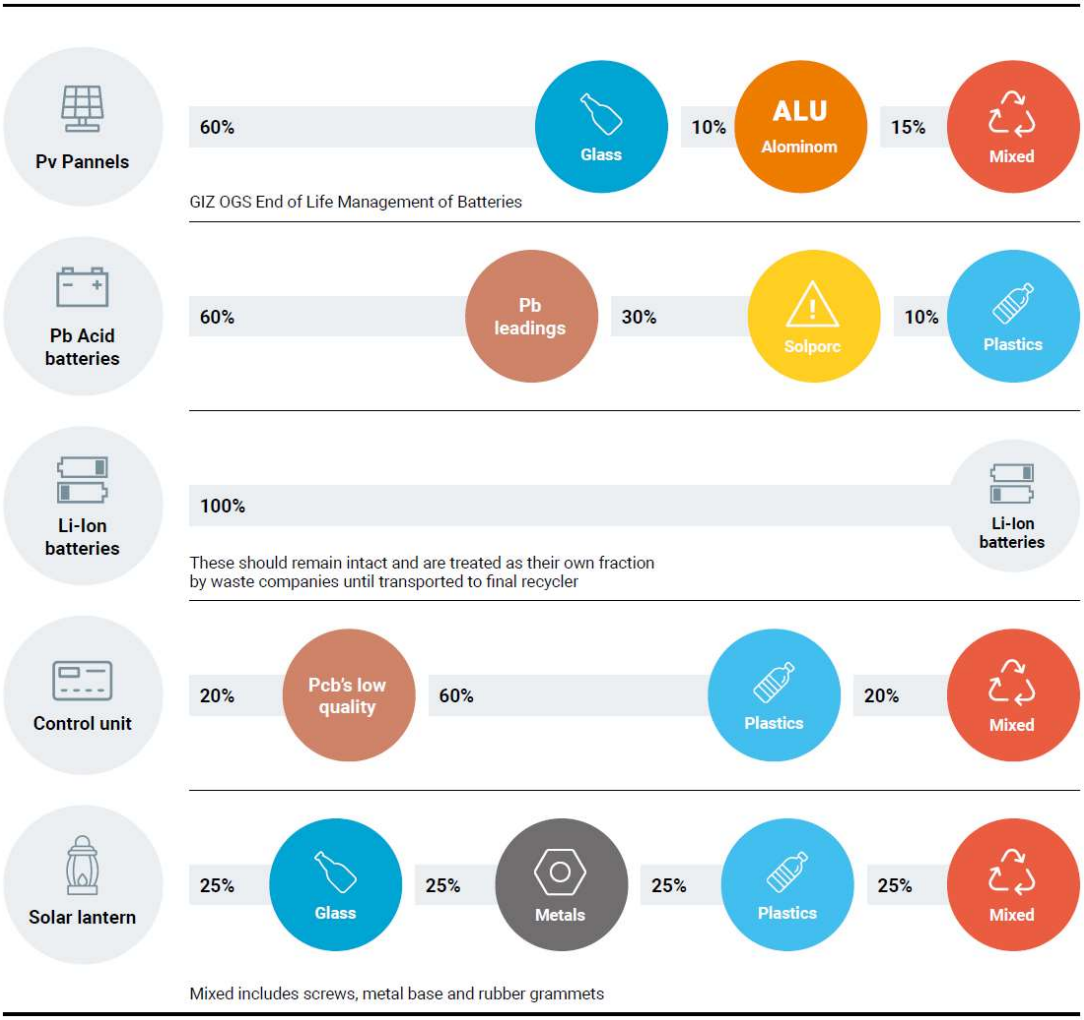
Detailed explanation on the actions needed to manage the various solar system components will be included in the training and awareness sessions that will be provided to the facilities by the contractors as detailed in table 4 hereinafter with continuous support from the UNOPS during the Project lifetime.

[19] GOGLA (2019a). E-waste Toolkit Module 1 Briefing Note: Technical introduction to recycling of off-grid products. www.gogla.org/e-waste/introductionto-recycling

[20] GOGLA is a global association for the off-grid solar energy industry. It chairs an E-waste Circularity Working Group with GOGLA members, companies, investors, manufacturers, universities, and research institutes, which acts as a consultation group for developing learning output and sector guidance, through particular themes (repairability, standardized product labelling for disposal), and sharing best practices, problems, and solutions.

[21] The text and figure 4 are extracted from the Project ESMF page 35.

Figure 4 the waste components of off-grid solar (GOGLA, 2019)



5.1.3. Project Grievance Mechanism

UNOPS has established a GM system for the YEEAP 2 to enable beneficiaries to communicate their concerns regarding the planned activities and what improvement is needed in the scope.

Multiple access points to the GM system are provided for beneficiaries to voice their concerns. These access points will be advertised in Arabic at all supported facilities under this subproject. Such information will be put on the sign boards on each facility, and include GM contact information including toll free number, landline, mobile SMS, email and website:

Address:	Haddah Street, former European Union Office Building, Sana'a
Toll Free Number:	8000190
Landline:	01 504914 and 01 504915
SMS and WhatsApp:	739888388
Email:	grm-yemen@unops.org
Website:	www.unops.org

Grievances received by UNOPS will be registered by gender, age, and location in a dedicated register. Grievances will be tracked, investigated and promptly resolved within 28 days of its submission. When a complaint requires an urgent response, as in the case of an emergency, UNOPS will address it as quickly as logistically possible. Further details of the project GM are included in the Project SEP.

5.1.4. GBV/SEA/SH

Although with low magnitude and occurrence probability due to the cultural aspects in the country as well as the limited work intervention under the subproject, UNOPS has already taken the following steps in regards the GBV/SEA/SH issues in which it will be maintained during the subproject implementation:

- During the stakeholder engagement activities including the meetings with the potential contractors, the project GBV SEA/SH Prevention and Response Action Plan has been discussed. The consultations highlighted how the GBV GMs is intended to be secured, and confidential with a focus on a survivor-centered approach.
- The GBV GMs will follow dedicated channels separate from the project GM channels to ensure full confidentiality.
- UNOPS has developed visibility materials to promote awareness for SEA/SH in local language (Arabic) the materials and messages used are adapted to be suitable for the Yemen context and sensitivity of the subject.
- Project GM focal point received specialized training about SEA/SH cases and the way to deal with it using Victim centered approach
- UNOPS has in place protocol for GM in how to deal with SEA/SH cases with a referral pathway to specialized service providers where needed as included in the GBV prevention and response action plan.
- UNOPS is conducting regular refresher awareness sessions for Project Personnel and retainers' sites engineers on the GBV/SEA/SH.
- UNOPS has prepared risk assessment tools for GBV and will require contractors to fill out a checklist on GBV/SEA/SH and to prepare a code of conduct for their workers/staff.
- As part of the YEEAP GBV SEA/SH prevention and response 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. Hence, UNOPS developed a contractors' action plan template, which covers key priority areas. Moreover, UNOPS conducted an induction session for contractors with a focus on how contractors will prepare their own GBV SEA/SH prevention and response plans (GBV Action Plans) using the developed template. In addition, in depth training sessions will follow and will continue during the project life cycle.

5.2. Forced Labor in the System Components Supply Chain

Reference to the Project LMP and Forced Labor Action Plan (FLAP) where specific actions are included to prevent any forms of forced labor during the Project implementation, the following will be included in the bidding and contracting documents of this subproject:

(i) The bidders applying to any of UNOPS tenders shall provide UNOPS with a declaration form on forced labor prevention, declaration form is available in annex 4. Such a declaration form will be requested from the bidders who will apply for the bid, UNOPS will not deal with any supplier or manufacturer unless they apply for the bids.

(ii) The Contractor shall comply with all applicable laws concerning terms of employment and conditions of work, and any collective agreements to which it is party.

(iii) The Contractor shall not engage, directly or indirectly, in "Forced Labor," i.e., by exacting work or service from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily.

(iv) The Contractor shall not engage, directly or indirectly, in "Trafficking in Persons," i.e., by recruiting, transporting, transferring, harboring or receiving persons by threat or use of force or other forms of coercion, abduction, fraud, deception, or abuse of power.

(v) Whenever Forced Labor or Human Trafficking occur in the Contractor's operations, including in its

supply chain, the Contractor shall, as soon as reasonably practicable, take all reasonable action to address or remove these occurrences, including where relevant, by addressing any practices of other entities in its supply chain.

(vi) Failure by the Contractor to abide by the provisions of these requirements shall entitle the UNOPS to terminate the Contract or any other contract with the United Nations immediately upon notice to the Contractor, without any liability for termination charges or any other liability of any kind.

5.3. Contractor Works and System Installation in Targeted Facilities

Contractors Obligations

The bidders for this subproject will be requested as part of their offers to outline the principles and the methodology that they will use to meet ESHS requirements. The quality of the provided data, as well as past environmental and social performance, and capacity to meet ESHS requirements, will be considered when selecting contractors.

Once the contract is awarded, the Contractor shall prepare and submit to UNOPS for approval a Contractor Environmental and Social Management Plan (C-ESMP), including the following sections or sub plans:

- ESHS training
- Site management
- Occupational Safety and Health
- Road safety and Traffic Safety
- Emergency Preparedness and Response
- Labor force management, Workers Grievance Mechanism and Code of Conduct
- Stakeholder Engagement
- Contractor Environmental and Social Reporting
- Solar PV System Management and Users Awareness

Contractor Shall

- Include in the C-ESMP a detailed explanation of how the contractor's performance will meet the ESHS requirements as defined in the contract bidding documents.
- Include in the C-ESMP an organization chart of the personnel assigned to environmental and social management.
- 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.
- Prepare GBV/SEA/SH prevention and response action plan.
- Fully implement the requirements of solar system CoP available in annex 3.

UNOPS will also require that contractor to:

- Inspect existing facilities and apply all safety measures to reduce the risk of any injury to the workers during installation or the users during operation, subject to written approval by the UNOPS engineer provided before implementation of work.
- Contractor work and implementation period in the schools and healthcare facilities to be arranged in coordination with the facilities managements and UNOPS engineers.
- Workers' presence and site work in the supported schools to be performed during the schools and students off days (vacations, official holidays, summer breaks,..etc).
- Install ladders, scaffolds or external access points at the facilities require such additional access points following the design and BoQ requirements.
- 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 UNOPS permit to work system (Permit to Work is a system used to ensure the activities are performed safely. Any planned activities by the contractor shall be detailed in a dedicated form that will allow the associated hazards and mitigation measures to be identified and analyzed prior any approval of such activities), method of statement to ensure all tasks are well prepared to follow all necessary safety mitigation and prevention measures.
- Provide safety training to all workers including working at height, lifting operations, electrical shock safety and permit to work before commencing any work
- Provide fully insulated PPE, isolated installation tools, instruments, and equipment.
- 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 lifelines.
- The contractor shall sign the UN/UNOPS CoC and all contractor personnel shall sign and comply with the personnel CoC, annex 5 includes a sample personnel CoC. The contractors must also comply with the project LMP, including the establishment and maintenance of a grievance redress mechanism for workers. The mitigation measures and monitoring plan for contractor work is available in table 4 in which close follow up and monitoring shall take place during implementation to ensure compliance.

Grievance Mechanism for Workers

Once contracts are awarded, the Contractor shall put in place a Grievance Mechanism for its workers and the workers of its subcontractors that is proportionate to its workforce. The GM for workers provided under ESS2 and outlined in the LMP shall be distinct from the Project level Grievance Mechanism for affected individuals and communities provided under ESS10 and presented in the SEP. The GM for workers 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 confidentiality. While procedures may specify that complaints should first be made to the workers' line manager, there should also be the option of raising a grievance first with an alternative manager, for example, a human resource (personnel) manager.
- *Non-retribution. Procedures* should guarantee that any worker raising a complaint will not be subject to any reprisal.
- *Reasonable timescales*. Procedures should allow for time to investigate grievances fully, but should aim for swift resolutions. The longer a grievance is allowed to continue, the harder it can be for both sides to get back to normal afterwards. Time limits should be set for each stage of the process, for example, a maximum time between a grievance being raised and the setting up of a meeting to investigate it.
- *Right of appeal.* A worker should have the right to appeal to the UNOPS or national courts if he or she is not happy with the initial finding.
- *Right to be accompanied*. In any meetings or hearings, the worker should have the right to be accompanied by a colleague, friend or union representative.

- *Keeping records*. Written records should be kept at all stages. The initial complaint should be in writing, if possible, along with the response, notes of any meetings and the findings and the reasons for the findings.
- Any records on SEA shall be registered separately and under the strictest confidentiality.

he actions and mitigation measures that should take place by the contractor at each facility during the solar system ost of mitigation measures implementation in each facility is included in section 5.5 which should be fully covered by the e subproject and BoQ items cost.

risks mitigations and monitoring plan

on Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
n arrangement		
f the site and maintain safe workers' access. facilities and apply all safety measures to reduce the risk of any injury n or the users during operation, subject to written approval by the e implementation of work. ation period in the schools and healthcare facilities to be arranged in anagements and UNOPS engineers. k in the supported schools to be performed during the schools and d access for workers to the work areas to be maintained. nguage. e, fencing or barricades, as appropriate, to prevent unauthorized ring holes and by installing guardrails along temporary pathways or er the buildings roof or work areas arrangements with the facility management and to avoid/limit any tion. nd private properties that might be affected by Project activities. If alternative means of passage or access to the satisfaction of the Work during the peak of services provisions needs to be avoided.	- Safety and security of work location - Unauthorized personnel presence in or around the work areas - Separate access for workers is available and maintained. - Public access availability - Number of public grievances on the facility work disturbance - Presence of signs and barriers around the work area	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
1.2. Protection of existing installations		
- Safeguard all existing buildings, structures, works, pipes, cables, sewers, or other services or installations from harm, disturbance or deterioration during activities. - Coordinate with facilities management to identify existing infrastructure that might not be visible - Repair any damage caused by the Contractor's activities, in coordination with concerned authorities. - Install retaining nets to hold falling debris during activities where needed.	- Number of incompliances related to the work area conditions. - Separate access for workers is available and maintained. - Facility operation is continued - Number of grievances related to damage of existing installations	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
1.3. Waste from contractor activities		
- Collect and properly manage all solid wastes resulting from subproject activities. - Perform waste segregation and the generated waste from the activities shall not be mixed with the facility generated waste. - Reduce waste generation and recycle all waste that can be recycled. - Properly dispose of solid waste and debris at designated permitted waste disposal sites allocated by the local authorities. - Remove all debris and waste after work completion. - Separate wastes per type (solid, hazardous and E-wastes) and properly handle and store and dispose hazardous wastes and E-wastes according to their material safety data sheets (MSDSs) properly store solid waste in designated areas and regularly collect them and dispose them in authorized areas. - All types of wastes must be properly labelled. - Minimize littering of roads by ensuring that vehicles are licensed and loaded in such a manner as to prevent falling off or spilling of materials, and by sheeting the sides and tops of all vehicles	- Waste accumulation in and around the work area - Lack of waste bins and segregation means - Public grievances and complaints on waste accumulation - Presence of a receipt of waste from the authorized landfill authority - Waste is properly labelled by type	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)
1.4. Hazardous substances handling including batteries, hydrocarbons, and e-waste		
- Train workers regarding the handling of hazardous materials - Label using easily understandable symbols, and provide material safety data sheets, for chemical substances and mixtures according to the Globally Harmonized System (GHS) of classification and labeling of chemicals - Store hazardous materials as per the statutory provisions of the Manufacturer's guidelines	- Workers training records - Appropriate storage is maintained for hazardous substances - Batteries are not installed directly on the ground and is stored in	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
- Treat hazardous waste separately from other waste - Keep absorbent materials or compounds on Site in sufficient quantities corresponding to the extent of possible spills - Ensure batteries are stored away from soil in insulated areas and well ventilated to avoid soil and potential groundwater and surface water contamination - Ensure the generator is installed along with its fuel in a well ventilated area, insulated from the soil/concrete base and away from any runoff zones. - -Install fire extinguishers in batteries room. - Select disposal sites of solid waste in coordination with the relevant authorities	ventilated room - Fire extinguisher present in battery room	
2. Occupational Health and Safety		
2.1. Working at heights		
The contractor shall implement fall prevention and protection measures whenever a worker is exposed to the hazard of falling more than two meters, or through an opening in a work surface. The Contractor shall: - Install guardrails with mid-rails and toe boards at the edge of any fall hazard area - Train workers on the proper use of ladders and scaffolds - Install 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 - Train workers in the use, serviceability, and integrity of the necessary PPE - Include rescue and recovery plans, and equipment to respond to workers after an arrested fall	- Workers training records - Workers awareness - Near misses or injuries resulted from work at height - Number of incompliances related to work at height areas protection - Availability of PPE related to work at height	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)
2.2.Slip, trip and fall		
- Implement good house-keeping practices, such as the sorting and placing loose materials or debris in established areas away from footpaths - Clean up excessive waste debris and liquid spills regularly - Locate electrical cords and ropes in common areas and marked corridors - Ensure that workers use slip retardant footwear - Restrict access, barricade or implement any equivalent measure to limit workers access to areas	- Site cleanliness, tidiness and overall condition - Access restriction maintained to authorized personnel - Record of worker injuries	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
where sharp or hard objects exist The excavation activities are limited to earthing pits preparation, manual excavation, with maximum depth of 50 cm, for such work the contractor shall: - Protect any excavation area with adequate barriers and signs - Ensure any excavation activities are coordinated with the facilities management - Ensure no underground installation under any excavated area		
2.3. Manual handling and transportation of materials		
- Avoid manual handling activities to the extent possible. - Reduce the load risk by using lighter weights or more stable containers. - Inform workers on proper lifting techniques to avoid back injuries - Reorganize the activity to further reduce the risk on the individual(s). - Utilize mechanical lifting aids or equipment as appropriate. - Ensure appropriate rest breaks with water provision during the working day and training for workers. - Provide PPE to the workers on a regular basis (e.g. gloves, foot protection, and non-slip footwear)	- Availability and implementation of the mechanical lifting - Workers injuries due to manual handling -	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.4. Working on electrical appliances and equipment		
- Apply electrical isolation prior to the work on any electrical equipment - Workers shall use electrical PPE including the appropriate gloves and face protection. - Carry out tests prior the implementation of any work on electrical equipment - Ensure all equipment or tools used in the activities implementation are maintained, certified and in good condition. - Ensure all connections and equipment are secured. - Apply earthing when using the portable electrical equipment. - Only authorized and certified workers shall implement electrical related activities. - Provision of training to all workers on the electrical risks, impacts and mitigation measures. - Avoid working in rainy seasons.	- Workers qualification - Workers training on electrical hazards, risks and impacts - Number of incidents related to the work on electrical appliances. - Electronic PPE distribution record	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
2.5. Equipment and machines operation resulted in injuries or damage		
- All equipment, machines and tools used for contractor work shall be tested and certified prior to any use or installation at sites.	- Number and type of Incidents and injuries related to	UNOPS engineer / HSSE officer (weekly)

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
- All equipment, machinery and vehicles introduced by the contractor shall be fully checked, inspected and tested in addition to be provided with the necessary safety requirements. - Daily checklist shall be performed for all equipment, machinery, tools and vehicles - Drivers and operators need to be experienced, licensed and certified. Regular training, Tool Box talks and awareness shall be provided	equipment/machinery - Maintenance records - Workers qualification - Training / awareness records - Equipment checks records	Contractor Supervisor (Daily)
2.6. Noise and air pollution exposure (Drilling, electrical generations, grindings are all source of noise**)**		
- The use of hearing protection should be enforced actively for any noisy work. - Rotate staff to limit individual exposure to high levels of noise or dust. - Use low noise generation air compressors and power generators where needed. - Post signs in all areas where the noisy work is implemented. - 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. - Dust generation to be controlled using water spraying or physical barriers where feasible - Ensure work is conducted during daytime. - Ensure equipment used is properly maintained - Avoid working during bad weather conditions	- Nuisance environment - Number of Public and facility users complaints - Number of Workers grievances - Ear protection availability and workers adherence - Medical records	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)
2.7. Hot work		
For any works that involve hot work such as grinding, drilling or any related electrical work, the contractor shall - Provide proper eye protection such as goggles and/or a full-face eye shield, heat resistant gloves, for all personnel involved in any hot work operations. Additional methods may include the use of barrier screens around the specific workstation (a solid piece of light metal, canvas, or plywood - Work area to be restricted to authorized personnel. - All equipment and tools shall be tested and certified and inspected daily. - Workers on the powered tools or equipment need to be competent and well trained.	- Number of incidents and injuries related to hot work - Powered tools inspection - Workers qualification	UNOPS engineer / HSSE officer (weekly)

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
2.8. Lack of or inadequate personal protective equipment use / provision		
- 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, including helmets, safety boots, gloves, goggles, safety jackets, and masks, as well as body coverall, gloves, respirators with filters, and goggles where necessary. - 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. - Determine requirements for standard and/or task-specific PPE based on specific Safety Analysis. - 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	- Number of workers not complying with the PPE requirements - PPE distribution records - Training records on the PPE usage	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)
2.9. Covid-19 transmission among workers and communities		
- Ensure face masks are available and used by all workers. - Ensure awareness sessions are conducted on COVID-19 with all workers. - Ensure availability of hygiene kits, soap, clean water - Isolate any workers developing any COVID-19 symptoms.	- Number of awareness session on the COVID-19 - Number of workers with COVID-19 infections	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)
2.10. Provision of water and sanitation premises for the workers		
- Coordinate with the facilities management to ensure the availability of adequate lavatory facilities (toilets) for the number of people expected to work at the sites. - Workers are not allowed to use the sanitation premises of the facilities without prior agreement and approval of the facility management and users. - Ensure that water supplied meets drinking water quality standards	- Sanitation premises availability - Number of complaints from the facilities and workers on the hygiene and sanitation conditions - Drinking water quality tests	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
3. Labor Force Management		
3.1. Labor and working conditions		
- Provide all workers with terms and conditions that comply with Yemeni labor legislation, LMP and applicable regulations. - Hire workers through transparent process and recruitment offices, where feasible, and avoid hiring "at the gate" to discourage spontaneous influx of job seekers - Put in place workplace processes for workers to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health. - Ensure that children and minors are not employed directly or indirectly on the subproject, and keep registration and proof of age for all employees on-site. - Avoid all forms of forced or compulsory labor, i.e., all work or service which is exacted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily. - Develop and adopt a Gender Action Plan following the Project requirements and template	- Workers grievances mechanism availability - Number of grievances from workers and type and number of solved complaints - Appropriate working conditions are provided - Adopt Code-of-Conduct - Training sessions conducted and number of workers trained - Number of workers grievances - Contractor GBV actions plan prepared and adopted	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (daily)
3.2. Insurance		
- Provide insurance for all employees involved in the subproject as indicated by Yemen's Labor Law - Contractor shall provide all workers with insurance cover and compensation for any death or injury.	- Workers insurance record - Number of workers grievances	UNOPS engineer / HSSE officer (at the start of the work)
3.3. Grievance mechanism for workers		
- The Contractor shall put in place a Grievance Mechanism for its workers and the workers of its subcontractors that is proportionate to its workforce.	- Visible mechanism channels - Register of grievances with the resolutions - Number of grievances received, resolved or pending solutions	UNOPS engineer / HSSE officer (weekly)
3.4. Child labor prevention		
- Verify that workers are older than 18 when hiring and exclude all persons under the age of 18.	- Number of child labors cases	UNOPS engineer /

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
- Review and retain copies of verifiable documentation concerning the workers age	- Workers register with age documentary records	HSSE officer (weekly)
3.5. Sexual harassment, abuse, gender-based violence, and discrimination		
- Provide regular 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 in any sexual activities that are exploitative or degrading to any person.	- Training records on the GBV/SEA/SH - Grievances received from public through the project GM system - Facility users complaints - Contractor GBV/SEA/SH prevention and response action plan is in place and implemented.	UNOPS engineer / HSSE officer (weekly)
3.6. Code of Conduct		
- The Contractor shall ensure that all employees, including those of subcontractors, are informed about and sign the personnel Code of Conduct.	- Number of workers trained on CoC - Percentage of workers signed CoC	UNOPS engineer / HSSE officer (weekly)
4. Road safety and traffic safety		
- Ensure all work activities are not affecting the traffic and vehicles movement in the facility - Emphasize safety aspects among drivers including maintaining speed limit - Improve driving skills and requiring licensing of drivers - Institute defensive driving training for all drivers prior to starting their job - Avoid dangerous routes and times of day to reduce the risk of accidents - 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. - Ensure coverage of the tracks to prevent materials from falling	- Vehicle maintenance records. - Drivers qualification evaluated - Number of training and trainees on the traffic management - Traffic incidents at the work area	UNOPS engineer / HSSE officer (weekly) Contractor Supervisor (Daily)
5. Emergency Preparedness and Response		
- 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.	- First aid kits distribution records - Emergency response plan	UNOPS engineer / HSSE officer (weekly)

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
- Details of nearest hospital is present on site for the subprojects located at schools premises - 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. - Reporting any major incidents injuries to the WBG within 48 hours - 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 proper medical facilities. - Immediately report all accidental occurrences with serious accident potential such as major equipment failures, exposure to hazardous materials, slides, 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. - 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 under the subproject; (ii) the need to protect the health and safety of 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 ○ Training of workers on the actions to be taken in emergency situations ○ Emergency contacts and communication systems/protocols (including communication with Affected Communities when necessary) ○ Procedures for interaction with responsible 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	availability - Drills records - Training records on the emergency preparedness	Contractor Supervisor (Daily)

Mitigation Measures and Contractor Obligations	Monitoring	
	Parameters	**Responsibility**
6. Stakeholders Engagement		
- As part of the overall Project Stakeholder Engagement, the Contractor shall undertake a process of stakeholder engagement before and during the work execution with facilities representative persons and communities directly affected by the activities it undertakes. - The Contractor shall maintain throughout the implementation good relations with local communities, through regular meetings with the community leasers/representatives and local officials, and will give these communities prior notice of plans and schedules as they might affect local people.	- Stakeholders engagement activities records, outcomes	UNOPS engineer / HSSE officer (weekly)
7. Solar System Management		
- Ensure that solar PV systems are installed by qualified and experienced trades people, in order to avoid or minimize electrocution and other health and safety issues associated with working with hazardous materials - The Contractor shall build awareness and provide training to beneficiaries and users of facilities with the aim of improving their understanding of the environmental and health issues associated with the battery life cycle, including end-of-life management; most particularly: ○ The safe handling of batteries including installation, removal, transport, storage and disposal ○ The environmental and health aspects of poor battery disposal ○ Information on the environmental and health issues associated with the highly toxic content of batteries and explanation as to why they must be stored, transported and disposed of The Contractor shall train beneficiaries on the following measures before they handle batteries: - Prohibit unauthorized access to battery areas - Consult battery owners' manuals for instructions on battery handling and hazard identification - Wear personal protective equipment (PPE) such as chemical splash goggles and a face shield - Place protective rubber boots on battery cable connections to prevent sparking on impact if a tool does accidentally hit a terminal - Ensure that all metal tools (spanners, socket wrench drivers, etc.) that will come in contact with the battery terminals have metal handles taped with electrical tape or are protected by other means to help prevent inadvertent short circuits - Clean the battery terminals with a plastic brush because wire brushes can create static and sparks - Cover maintenance tools with several layers of electrical tape to avoid sparking - Replace batteries with a new one if they show signs of damage to the terminals, case or cover	- Presence of qualified staff among the contractors - Effectiveness and implementation of training sessions the facility workers - Facility workers awareness and knowledge on the system operation, maintenance and applicable precautions	UNOPS engineer / HSSE officer (weekly) and after work completion

5.4. Contractor Environmental and Social Reporting

The Contractor shall report major work-related incidents, accidents or loss of life to UNOPS **within 24 hours** of their occurrence. Incidents to be reported by UNOPS to WBG within 48 of occurrence.

The Contractor shall monitor, keep records and report to UNOPS on weekly and monthly basis on the following environmental and social issues:

- Safety: 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 activities: those undertaken and completed, progress against implementation schedule, and key work fronts (work areas).
- ESHS requirements: noncompliance incidents with permits and national law (legal noncompliance), commitments, or other ESHS requirements.
- ESHS inspections and audits: by the Contractor—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 activities—to include date, location, impacts, and actions taken.
- Stakeholder engagement: highlights, including formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
- Details of any security risks: details of risks the Contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
- Worker grievances: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.

5.5. ESMP Implementation Budget

The contractors shall cover the cost of their workers, training, and PPE provision and mitigation measures implementation as part of the overall subproject implementation cost. Estimated budget is available below.

Table 5 Estimated budget

Item	Cost per facility US$	Cost for all facilities US$
Travel of UNOPS team to the subproject areas for monitoring and supervisory (covered by UNOPS)	200	16,600
Mitigation measures implementation estimated cost	700	58,100
Total	**900**	**74,700**

6. Consultation Details

Various levels of consultations were conducted under the subproject and it includes the local authorities, facilities management and other stakeholders including workers, community leaders and communities neighboring the facilities. The consultation on the system components, installation process, requirements and timeframe took place with the facilities management and involved workers by the Project Engineers during the assessment stage. Moreover, further consultations conducted by the Project Female Social Facilitators in February and March 2023 targeting the workers, neighboring communities and facilities users. The process includes one to one discussions, community meetings and interviews with the staff and communities within the targeted health and educational facilities. Feedback was collected by questionnaires and the interviews started with a brief explanation of the nature and objective of the subproject and potential impacts with proposed mitigation measures.

Available in sections 6.1 and 6.2 the consultation participants' breakdown across the facilities while the participants summary is available in table 6 below. Annex 6 includes the list of questionnaires used along with samples of the consultation records.

Table 6 Consultation Participants Summary

Type	Management / Workers		Patients / Visitors		Neighbors / Communities		Total Consulted		
	M	F	M	F	M	F	M	F	Total
Healthcare facilities (73)	235	143	92	131	90	66	417	340	757
Schools (10)	24	25	-	-	17	7	43	30	73
Total (83 facilities)	259	168	92	131	107	73	460	370	830

Close coordination was made with the facilities management, local officials and community leaders to ensure all affected parties are involved in the consultation including women and neighboring communities. The topics covered during the consultations include:

- Inform participants about the activities to be undertaken and the subproject timetable.
- Document and address local beneficiaries' concerns, expectations and feedback.
- Ensure full participation of subproject beneficiaries both females and males and provide them with awareness on the GM contact channels, anonymous complaints and escalation of grievances if not satisfied with the resolution and action taken.
- Discuss the subproject positive impacts that the subprojects will have and the potential negative impacts and proposed prevention and mitigation measures.
- Explore the participants feedback on potential negative impacts.
- Provide awareness to the participants on their rights to raise any concerns related to the subproject' implementation during the various phases.

The participants have emphasized the importance of providing high quality system components in addition to maintaining the operation of services during the system installation. The participants appreciated the support of supplying and installing solar systems in their facilities that will result in a sustainable and clean source of energy and the improved quality of health and educational services. All safety mitigation measures were discussed in detail with the consulted persons. Summary of the main outcomes from the consultation activities at health facilities and schools are:

- The importance of accelerating the implementation process of the solar system installation to serve the communities.

- The solar power generation capacity needs to meet the facilities consumption to ensure full operation of the equipment/devices within the facilities to better serve the communities.
- The system and generation capacity need to meet the maximum power consumption rates at the facility during the various seasons.
- It will be necessary to select appropriate and high quality system components including the solar panels and batteries that can operate for a long time with minimum malfunction.
- Close coordination needs to be maintained between contractors, UNOPS and the facility management during the various stages of subproject implementation.
- All contractor work and workers' access need to be authorized by the facilities management.
- Adequate access for contractors workers to the work areas shall be provided to avoid any disturbance of the facilities operation. Such access needs to be fully controlled.
- The contractor work should not be allowed during the schools working hours or the peak hours of health facilities.
- Importance of providing after sales services and technical support to the facilities on the system operation and maintenance.
- Training is needed for facilities workers on safe operation and maintenance of the solar system.
- The system installation will provide psychological comfort for the workers and users and will improve the cleanliness and sanitation level.
- The installation of solar power would allow the introduction of new equipment and services within the health facilities.
- The power availability would allow the schools to use advanced learning technologies.

The participants in the consultation including the facilities management were assured that all their concerns and requests were taken in consideration and will be closely followed during the subproject implementation and system installation.

6.1. Consultation Participants Breakdown – Table 7 Health Facilities

No	Facility Name	Governorate	Management Workers		Patients / Visitors		Neighbors / Communities[22]		Total Consulted		
			M	F	M	F	M	F	M	F	Total
1.	Al-Ahad Rural Hospital	Dhamar	6	2	1	2	1	1	8	5	13
2.	Bait Al Ba'adani Health Center	Dhamar	4	2	1	3	1	1	6	6	12
3.	Jabal Al-Sharq Rural Hospital	Dhamar	4	3	1	3	1	1	6	7	13
4.	Al-Hadhar Health Center	Dhamar	3	2	2	3	-	-	5	5	10
5.	Ethmed Ya'ar Health Center	Dhamar	2	1	2	3	1	1	5	5	10
6.	Ma'abar Health Center	Dhamar	3	2	2	2	1	-	6	4	10
7.	Sayan R.Hospital	Sana'a	4	4	1	2	-	1	5	7	12
8.	Al-Dhaba'at Health Center	Sana'a	5	2	1	2	1	1	7	5	12
9.	Masiab Health Center	Sana'a	3	1	2	2	1	2	6	5	11

[22] Majority of consulted individuals under this category are community leaders or representatives.

No	Facility Name	Governorate	Management Workers		Patients / Visitors		Neighbors / Communities[22]		Total Consulted		
			M	F	M	F	M	F	M	F	Total
10.	Khalaqa Health Center	Sana'a	3	2	2	1	1	1	6	4	10
11.	Al-Manar Hospital	Sana'a	3	2	2	-	2	1	7	3	10
12.	Al-Orqoup Health Center	Al Mahwait	3	2	1	2	2	-	6	4	10
13.	Oslah Health Center	Al Mahwait	3	3	2	2	3	-	8	5	13
14.	Al-Sha'afel Al-Sofla'a Health Center	Al Mahwait	3	2	-	3	1	1	4	6	10
15.	Bait Al Shama'a Health Center	Al Mahwait	3	1	1	3	1	1	5	5	10
16.	Juma'at Saria Health Center	Al Mahwait	3	3	1	2	1	1	5	6	11
17.	Al-Thawarih Health Center	Al Mahwait	3	2	1	3	-	1	4	6	10
18.	Al Hajaf Health Center	Al Mahwait	2	3	2	1	1	1	5	5	10
19.	Bani Al-Awam Health Center	Hajjah	4	3	1	3	2	-	7	6	13
20.	Nisa Health Center	Hajjah	4	2	1	2	-	2	5	6	11
21.	Maternity and Childhood Center in Al-Dhahir	Hajjah	4	2	-	2	1	2	5	6	11
22.	Al Qanawis Hospital for Maternity	Al-Hudaydah	3	2	3	-	2	-	8	2	10
23.	Al-Hasiah Health Center	Al-Hudaydah	2	1	1	3	-	1	3	5	8
24.	Al-Radhiah Health Center	Al-Hudaydah	3	2	1	2	-	1	4	5	9
25.	Al-Moqar Health Center	Al-Hudaydah	4	2	1	2	1	1	6	5	11
26.	Al-Morshidiah Health Center	Al-Hudaydah	2	1	1	3	1	-	4	4	8
27.	Al-Maslobah Health Center	Al-Hudaydah	3	2	1	2	1	1	5	5	10
28.	Al-Mahjam Health Center	Al-Hudaydah	3	1	1	2	1	1	5	4	9
29.	Al-Moghidifiah Health Center	Al-Hudaydah	3	1	1	2	1	1	5	4	9
30.	Dir Al-Quraiti Health Center	Al-Hudaydah	5	-	1	3	-	1	6	4	10
31.	Mahal Khabal Health Center	Al-Hudaydah	3	1	2	2	1	1	6	4	10
32.	Al-Kizabah Health Center	Al-Hudaydah	3	1	2	2	1	1	6	4	10
33.	Thula'a Rural Hospital	Amran	4	3	1	3	1	1	6	7	13

No	Facility Name	Governorate	Management Workers		Patients / Visitors		Neighbors / Communities[22]		Total Consulted		
			M	F	M	F	M	F	M	F	Total
34.	Bait Heba Health Center	Amran	3	1	-	4	1	1	4	6	10
35.	Hamda Health Center	Amran	4	2	1	2	1	1	6	5	11
36.	Kant Health Center	Amran	4	1	2	1	1	1	7	3	10
37.	Al Ma'amra Health Center	Amran	5	1	1	2	1	1	7	4	11
38.	Wadia'a Health Center	Amran	4	2	2	2	1	-	7	4	11
39.	Al-Subaie Health Center	Amran	3	2	1	2	1	1	5	5	10
40.	Marhaba Health Center	Amran	4	1	1	2	1	1	6	4	10
41.	Al-Hayzi Health Center	Amran	6	1	1	2	1	1	8	4	12
42.	Al-Shatba Health Center	Amran	2	2	1	3	1	1	4	6	10
43.	Qayfan Health Center - Al Ghanaya	Amran	4	1	1	2	1	1	6	4	10
44.	Al-Ghoul Health Center	Amran	4	3	1	2	1	1	6	6	12
45.	Jarman Health Center	Amran	5	3	1	2	1	1	7	6	13
46.	Qa'a Health center	Amran	4	2	1	1	1	2	6	5	11
47.	Radfan Hospital	Lahj	3	5	2	1	1	-	6	6	12
48.	Al-Ashoob Health Center	Lahj	4	2	2	2	3	2	9	6	15
49.	Motherhood and Childhood Center	Lahj	-	3	3	3	1	-	4	6	10
50.	Thi Nakheb Health Center	Lahj	3	2	1	2	1	1	5	5	10
51.	Al-Ahyook Health Center	Taiz	3	1	1	-	1	-	5	1	6
52.	Al-Dharaifah Health Center	Taiz	2	1	1	1	-	-	3	2	5
53.	Al-Dhabab Health Center	Taiz	3	3	3	2	-	-	6	5	11
54.	Al-Wajeeh Health Center	Taiz	3	2	1	-	1	-	5	2	7
55.	Al-Ram Health Center -Al-Haj Ali Dermim	Taiz	4	2	1	3	1	-	6	5	11
56.	Al-Sa'eed Wa'lan Health Center	Taiz	3	3	2	2	5	1	10	6	16
57.	Al-Shaheed Abdul Jalil Hospital	Taiz	5	3	1	1	1	-	7	4	11

No	Facility Name	Governorate	Management Workers		Patients / Visitors		Neighbors / Communities[22]		Total Consulted		
			M	F	M	F	M	F	M	F	Total
58.	Al-Qohaim Health Center	Taiz	3	2	1	1	-	1	4	4	8
59.	Maternity and Childhoods (Ibn Al-Nafis) Health Center	Taiz	3	2	-	3	7	3	10	8	18
60.	Al-Zawiay Mirab Health Center	Taiz	4	2	2	1	6	5	12	8	20
61.	Al-Hussain Health Center	Taiz	2	1	1	1	-	-	3	2	5
62.	Al-Shawkani Health Center	Taiz	2	2	2	-	3	-	7	2	9
63.	Al-Shaeeb Hospital (Al_Shohda'a Althalatha)	Ad-Dhale'e	3	3	2	1	1	1	6	5	11
64.	Al-Robat Health Center	Ad-Dhale'e	2	2	3	2	-	1	5	5	10
65.	Aden Hamadah Health Center	Ad-Dhale'e	2	2	-	1	3	-	5	3	8
66.	Al-Dobiat Health Center	Ad-Dhale'e	3	1	2	2	-	-	5	3	8
67.	Al-Hussain Health Center (Alhussain Rural Hospital)	Ad-Dhale'e	2	2	1	1	1	-	4	3	7
68.	Maternity and Childhood Health Center -Khanfar	Abyan	4	1	-	-	-	1	4	2	6
69.	Al-Qoud Health Center	Abyan	3	2	-	1	4	3	7	6	13
70.	Shoqrah Rural Hospital	Abyan	2	1	1	-	2	-	5	1	6
71.	Al-Magel Health Center	Abyan	1	3	1	1	1	2	3	6	9
72.	Al-Sorah Health Center	Abyan	2	2	-	-	-	1	2	3	5
73.	Maternity and Childhoods Health Center	Abyan	2	3	1	-	2	2	5	5	10
	Total		235	143	92	131	90	66	417	340	757

6.2. Consultation Participants Breakdown - Table 8 Schools

No	Facility Name	Governorate	Management / workers		Communities / Neighbors		Total Consulted		
			M	F	M	F	M	F	Total
1.	Labozah School	Lahj	3	2	1	-	4	2	6
2.	Ba'r Naser School	Lahj	2	2	2	-	4	2	6

No	Facility Name	Governorate	Management / workers		Communities / Neighbors		Total Consulted		
			M	F	M	F	M	F	Total
3.	AL-Khansa School	Lahj	-	5	3	4	3	9	12
4.	Al-Wahdah School	Taiz	3	1	2	-	5	1	6
5.	Al-Sha'ab School	Taiz	2	2	1	-	3	2	5
6.	Al-Noor School	Taiz	4	1	1	-	5	1	6
7.	Al-Esha'a School	Taiz	3	-	1	1	4	1	5
8.	Mogma'a Al-Zahra'a School	Abyan	-	4	2	-	4	2	6
9.	Hanad School	Abyan	3	4	2	1	5	5	10
10.	Al-Sorah School	Abyan	4	4	2	1	6	5	11
Total			24	25	17	7	43	30	73

Annex 1 Subproject Environmental and Social Screening Form

Subproject name	Supply and Installation of Solar Power Systems to 83 Facilities
Subproject location	73 Healthcare facilities and 10 schools located in 54 districts across 10 governorates
Subproject Risk Level	Moderate
Was the site visited beforehand	Yes
Estimated Start/Completion Date	1 July 2023 to 31 December 2023
Observations/Comments	Indicated in the conclusion below
ESSO Name	Ayad Omar
Project Manager Name	Ziad Jaber

Questions	Answer		Due Diligence / Action
	Yes	No	
Is the subproject likely to generate large to medium scale adverse risks and impacts on human populations or the environment?		X	An ESIA and ESMP must be prepared
What is the nature of these risks and impacts and what standards must an ESIA and ESMP would have to take into account	NA		
Does the subproject involve civil works including the rehabilitation of buildings?		X	
Is the subproject located in the vicinity of any known cultural heritage sites?		X	
Does the subproject have adverse risks and impacts on human populations or the environment that are not likely to be significant, do not involve activities that have a high potential for harming people or the environment, and are located away from environmentally or socially sensitive areas.	X		A proportionate ESMP must be prepared
Does the subproject have potential adverse risks to and impacts on human populations or the environment that are likely to be minimal or negligible?	X		The SEP, LMP, and the GBV SEA/SH Prevention and Response Plan

Conclusion

- ***Minor work will be implemented within the existing facilities.***
- ***Estimated risk associated with the subproject implementation is moderate.***
- ***The ESMP preparation is required for the subproject. Project SEP, LMP, FLAP, GBV/SEA/SH Action plan are applicable on this intervention.***

Annex 2 Design Requirements and Guidelines

UNOPS is carrying out the assessment and design works for the PV solar power system within the targeted facilities under the subproject as per the below guidance. Such requirements are added in the current ESMP as a reference while the final and approved documents are included separately as part of the subproject technical documents.

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.

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 Junction Box(s) and combiner box(s).
2. Cable selection schedule and voltage drop calculations.
3. Mounting Structure system (layout, fixation, and analysis).
4. Structural calculation report for the design of the mounting structure.
5. Schematic diagram for the proposed new Main Distribution Board (MDB).
6. Outdoor LED Lighting fixtures layout.

Design Guidelines:

Design Parameters and Assumptions

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

- Average solar irradiance will be considered in the design which is 5.5 [kWh/m2/day]
- Total system loss caused by temperature, azimuth (system orientation), dust, inverter inefficiency, cable loss is considered to be 40 %
- The design system voltage shall be 48 VDC (for the battery bank);
- 0.5 autonomy days for the battery bank sizing;
- 50 % depth of discharge for the battery bank;
- Battery round trip efficiency (RTE) is 85 %;
- Standard maintenance free VRLA batteries will be used in the project GEL type, no more than four (04) strings shall be paralleled;
- The maximum power for the inverter sizing will be considered as follow in table
- MPPT charge controllers (CC) will be used in the project as they have a higher efficiency than standard PWM CC and it allow more flexibility in the design and selection

Technical Specifications

PV Modules

- The PV array(s) should be constructed with the minimum shading effect;
- It should be comprising of either mono-crystalline or polycrystalline;
- Module capacity with minimum 500 Wp.
- The module type must conform with CE and IEC 61215, IEC 61730, IEC 61701 or equivalent standards;
- Module conversion efficiency should be equal to or greater than 19.5 % under STC;

- The PV manufacturer should be approved as tier-1;
- The PV module shall perform satisfactorily in humidity up to 100% with temperature between – 40 oC to +85 Co;
- The rated output power of any supplied module shall have tolerance of 0-5 W;
- The module shall be provided with a junction box with IP67;
- The supplied module DC voltage should be not less than 600 VDC;
- The modules shall have individual serial numbers in addition to nameplate;
- The product warranty should be at least 10 years.

Mounting Structure

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

Solar Inverter/Charger

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

Storage Battery(s)

- Batteries shall be Gel type OPzV 2V cell, the rating shall be calculated @ 10 Hr discharge rate;
- Battery cyclic life shall be at least 2500 cycles at 50% depth of discharge (DOD), batteries shall be tested in accordance with IEC 61427 standard;
- Reliable performance at high operating temperatures of up to 50° C;
- The battery bank shall consist of no more than 3 strings in parallel;
- Battery bank voltage shall be 48 volts;
- Wires connected to batteries shall utilize appropriately sized and rated lugs or terminals and proper hardware; batteries shall be installed in a secured, well-ventilated powerhouse, or in an outdoor rated enclosure.
- One brand can be used for the entire project;
- The operating temperature for the battery shall be -20°C to +55 °C;
- Product warranty shall be 2 years; warranty certificates shall be provided by the manufacturer.

Charge Controller

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

DC Junction Box

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

Data Logging and Monitoring System

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

Cables and Wires

- All cables shall be marked properly according to approved design so that cable can be easily traced and identified;
- All outdoor exposed wiring to be protected from UV radiation and physical damage, all cabling above ground should be suitably mounted inside cable trays with proper covers, while underground cables should be housed inside PVC conduit with 50 % clearance;
- DC cable: Should be TUV certified with double insulating material and jacket, made of copper, stranded type, the insulation is also flame retardant;
- PV array to battery circuit(s) to be sized for maximum 3% voltage drop at rated array power (Imp);
- AC cable: Armored cables in conduit shall be used for underground installations, while XLPE cables shall be used for indoor for indoor/outdoor installation;
- AC cables shall be sized for maximum 3% voltage drop at maximum load;
- Cable ends connections are to be made through suitable lugs or terminals, crimped properly and with use of cable glands.

Battery Box

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

Distribution enclosure with MCB breakers

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

LED Light

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

LED Outdoor Light

- LED outdoor light shall withstand all the weather and working conditions and corrosive environment;
- LED light 30 W outdoor light;
- Lamp luminous efficacy: not less than 100 Im/w;
- Voltage rating: 220 VAC, ±15%, 50 Hz ±2%;
- Working life time: not less than 30,000;
- The color temperature range: 5000K – 6500K;
- The LED lamps outdoor designed with IP 65 protection;
- Operating Temperature range: up to 60°C;
- Certification: All related certificates shall be provided such CE, RoHS;
- Wall Mounted type;
- Warranty: at least two years.

Fire Extinguisher

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

Earthing and Lightning System

- Each array structure of the PV modules should be grounded properly;
- lighting arrester should be provided;
- All metal casing/shielding of the system and its components should be thoroughly grounded;

- Earth resistance should be tested in presence of the UNOPS representative by a calibrated earth tester, the earth resistance should not be more than 5 Ohm.
- Earthing installation in accordance with the IEE Wiring regulations, BS 7671
- All conductive materials shall be copper.
- The size of conductor shall be according to table 54.7 of IEE – BS 7671 – IEC 60365-5-54.

System Commissioning

- The contractor shall provide a time plan and test procedure for the process of commissioning;
- The contractor shall prepare a commissioning report and carry out all needed test procedures of commissioning. The commissioning process should be witnessed and approved by UNOPS;
- Such testing should include the following tests as minimum:
  - Cable insulation and continuity test: such tests should be carried before commending installation;
  - System earthing test;
  - Battery testing which includes the following:
  - Ensure that batteries are fully charged by measuring the terminal voltage, if not batteries should be charged before carrying out testing and commissioning;
  - Battery Inspection and Cleaning: A visual inspection should be done to assess the general condition of the system's batteries. Check for any electrolyte leak, cracks in the batteries, or corrosion at the terminals or connectors;
  - Terminals and connections: ensure that all terminals and connections are tight and make sure that the same cross section is used for jumpers, measure the negative and positive pole cable length to ensure that it's equal.
  - Module testing which includes the following:
  - Checking the cleanness of surface area of the module as it should be free of any dirt and dust;
  - PV modules Visual Inspection: A visual inspection of the modules should be done to check for defects in the modules such as cracks, chips, delamination, fogged glazing, and discoloration, this should be done for the front glass and back sheet;
  - PV modules connector and cable Inspection: Check the sealing gels of the junction box to ensure it have no crack or crevice;
  - Ensure that all modules have been tested before shipping by double checking the flash reports;
  - DC voltage measurement: This can be done either on the modules or on combiner box level;

System Warranty, after Sales Services

- Bidders shall include in their offers system maintenance for 1 year, bidders shall provide necessary equipment and components to run the system safely;
- Bidders shall also carry out periodic preventive maintenance visits at least one visit each 3 months, the scope and nature of such visits shall be consulted and agreed with UNOPS engineers, bidders are entitled to provide a signed checklist by the end-user.
- The preventive maintenance shall but it shall include the following as minimum:
  - Battery System: A visual inspection should be done to assess the general condition of the system's batteries. Check for any electrolyte leak, cracks in the batteries, or corrosion at the terminals or connectors. Ensure that all terminals and connections are tight.
  - PV Modules: Checking the cleanliness of the surface (glass) area of the module. A visual inspection of the modules should be done to check for defects such as cracks, chips, delamination, fogged glazing, and discoloration. Check the sealing gels of the junction box to ensure it has no crack or crevice.
  - DC voltage measurement: This can be done either on the modules level or on combiner box level.
  - Charge Controller/ Inverter: Ensuring that all components are free of dust, if not, a dry cloth should be used to wipe away any accumulated dirt/dust; A visual inspection should be done to ensure that all the indicators such as LED lights are working and a check on the tightening of the bolts both DC and AC.

- Electrical Panels: Wiring installations should be checked for any cracks, breaks or deterioration in the insulation/conduits, inspect connections for any corrosion and/or burning. Switches should not spark when turned on or off.
- Combiner Boxes and fuses Box: must check strings fuses using a multimeter (continuity test on each fuse) to insure no blown fuse exist, check the tightening of the bolts of the fuse holders should be checked as per manufacturer manual, visual check of the cables and fuse holders;
- AC Panels: After switching off loads and inverters, check the functionality of the RCDs and RCBOs by bushing the test button and noticing the breaker open, check the tightening of all cable bolts as per manufacturer manual, visual check of all cables and breakers.

- The bidder shall assign a service technical personnel (local focal point) to provide satisfactory and uninterrupted services during the maintenance period, bidder shall respond within 2 days from the date of the intimation of fault, caring out system maintenance and troubleshooting, carrying out preventive maintenance protocols and procedures, update the system software and interface when needed, and keep records and activities log.
- It's the bidder's sole responsibility to establish sufficient inventory of spare parts to run the system without interruption during maintenance period.
- The bidder shall provide necessary labels highlighting warranty details and phone numbers to call in case of problems.

Final Completion

- The contractor shall complete any required document or list, clean up the construction site and remove any temporary structures, equipment or services, and construction debris;
- Copies of all final approvals and certifications shall be provided to UNOPS.
- The contractor shall provide three (3) hard copy sets and one soft copy of the final Project as-built documentation.

Annex 3 Solar PV Systems (Code of Practice)

Installation

The contractor shall:

- Ensure that solar PV systems are installed by qualified and experienced trades people, in order to avoid or minimize electrocution and other health and safety issues associated with working with hazardous materials

Life and Fire Safety

The Contractor shall install life and fire safety measures as instructed by UNOPS following the BoQ and technical specifications.

Beneficiary and User Awareness

The Contractor shall build awareness and provide training to beneficiaries and users of facilities with the aim of improving their understanding of the environmental and health issues associated with the battery life cycle, including end-of-life management; most particularly:

- The safe handling of batteries including installation, removal, transport, storage and disposal
- The environmental and health aspects of poor battery disposal
- Information on the environmental and health issues associated with the highly toxic content of batteries and explanation as to why they must be stored, transported and disposed of in specific ways

Safe Handling of Batteries

The Contractor shall train beneficiaries on the following measures before they handle batteries:

- Prohibit unauthorized access to battery areas
- Consult battery owners' manuals for instructions on battery handling and hazard identification
- Wear personal protective equipment (PPE) such as chemical splash goggles and a face shield
- Wear acid-resistant equipment such as gauntlet style gloves, an apron, and boots
- Do not tuck pant legs into boots because spilled acid can pool in the bottom of your boots and burn your feet
- Place protective rubber boots on battery cable connections to prevent sparking on impact if a tool does accidentally hit a terminal
- Ensure that all metal tools (spanners, socket wrench drivers, etc.) that will come in contact with the battery terminals have metal handles taped with electrical tape or are protected by other means to help prevent inadvertent short circuits
- Clean the battery terminals with a plastic brush because wire brushes can create static and sparks
- Cover maintenance tools with several layers of electrical tape to avoid sparking
- Replace batteries with a new one if they show signs of damage to the terminals, case or cover

Chemical Hazards

Lead Acid: Sulfuric acid (electrolyte) in lead-acid batteries[23] is highly corrosive and acid exposure can lead to skin irritation, eye damage, respiratory irritation, and tooth enamel erosion. The Contractor shall train beneficiaries to follow the following measures to minimize risk:

- Never lean over a battery while boosting, testing or charging it
- If acid splashes on your skin or eyes, immediately flood the area with cool running water for at least 15 minutes and seek medical attention immediately

[23] UNOPS will use gel lead-acid batteries, which are significantly safer than traditional lead-acid batteries, because they are sealed in a plastic encasement with a valve that removes excess pressure.

- Always practice good hygiene and wash your hands after handling a battery and before eating
- Wash your hands properly if you handle the lead plates in a battery to avoid exposure to lead. Signs of lead exposure include mood swings, loss of appetite, abdominal pain, difficulty sleeping, fatigue, headaches and loss of motor coordination.
- The chemical reaction by-products from a battery include oxygen and hydrogen gas. These can be explosive at high levels. Overcharging batteries can also create flammable gasses. For this reason, it is very important to store and maintain batteries in a well-ventilated work area away from all ignition sources and incompatible materials. Cigarettes, flames or sparks could cause a battery to explode.
- Disconnect the battery cables before working on a battery. Be careful with flammable fluids when working on a battery-powered system. The electrical voltage created by batteries can ignite flammable materials and cause severe burns. Workers have been injured and killed when loose or sparking battery connections ignited gasoline and solvent fumes during system maintenance.
- Before making wiring changes to the system, disconnect the battery, either through opening the circuit breaker or over-current device, or by disconnecting the cables. Adding distilled water or cleaning terminals can be done without disconnecting.

Safe Movement of Batteries

The Contractor shall inform beneficiaries of the following measures regarding the safe movement of batteries:

- Lifting and moving batteries must be undertaken with care to avoid personal and environmental harm
- Proper lifting techniques must be used to avoid back injuries
- Because battery casings can be brittle and break easily, they must be handled carefully to avoid an acid spill
- Batteries must be properly secured and upright when handled or transported in a vehicle

Management and Disposal of Used Batteries

The Contractor will be requested to propose to UNOPS a Battery Management Plan that details the options on how batteries can be collected, transported, stored, recycled or disposed of. More specifically it can include:

- Arrangements can be made with after sales service centers for the maintenance and reconditioning of batteries.
- Identify potential centers or dealers authorized by local authorities to safely collect, store, transport and re export used and end-of-life batteries from beneficiary facilities.
- Outline how the contractor will include the end-user in the reverse-supply-chain management through training.

Annex 4 Forced Labor Declaration Form

Part 1 - Forced Labor Performance Declaration

[The following table shall be filled in by the Bidder, each member of a Joint Venture, each Subcontractor/ supplier/ manufacturer providing solar panels and/or solar panel components proposed by the Bidder]

Bidder's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member's or Subcontractor's/supplier's/manufacturer's Name: *[insert full name]*
RFQ No. and title: *[insert RFQ number and title]*
Page *[insert page number]* of *[insert total number]* pages

Forced Labor Performance Declaration Evaluation and Qualification Criteria
We: ☐ (a) have not been suspended or terminated, and/or other contractual remedies applied including calling of performance security by an employer, for reasons of breach of forced labor obligations in the past five years. *[if (a) is declared, state N/A for (b) below]* ☐ (b) have been suspended or terminated, and/or other contractual remedies applied including calling of performance security by an employer, for reasons of breach of forced labor obligations in the past five years. Details are provided below: Year – Contract identification calling – Name of Employer – Reasons for suspension or, termination, and/or other contractual remedies applied including performance security ☐ (c) [*If (b) above is applicable, attach evidence demonstrating that adequate capacity and commitment to comply with Forced Labor obligations.]*

We declare that all the information and statements made in this Form are true, and we accept that any misrepresentation contained in this Form may lead to our disqualification by the Employer and/or sanctions by the UNOPS.

Name of the Bidder/ JV member/ Subcontractor/ supplier/ manufacturer _____

Name of the person duly authorized to sign on behalf of the Bidder/ JV member/ Subcontractor/ supplier/manufacturer _____

Title of the person signing on behalf of the Bidder/ JV member/ Subcontractor/ supplier/ manufacturer_____

Signature of the person named above_____

Date signed _____ day of _____, _____

Countersignature of authorized representative of the Bidder (for forms submitted by a JV member, Subcontractor/ supplier/ manufacturer):

Signature: _____

Date signed _____ day of _____, _____

Part 2 - Forced Labor Declaration

Date: _____ RFQ No.: _____

Alternative No.: _____

Contract Title:

_____

To:

We, the undersigned, declare that, if awarded the Contract, we, including our Subcontractors and suppliers/ manufacturers, are required to comply with the contractual Forced Labor obligations. In this regard, we:

(a) accept that there will be no Forced Labor among the staff, employees, workers and any other persons employed or engaged by us;

(b) accept that staff, employees, workers and any other persons employed or engaged, will be hired under employment conditions that meet the contractual obligations set out in the Contract;

(c) will include in our contracts with Subcontractors/ suppliers/ manufacturers of *[solar panels] [solar panel components]* obligations to prevent Forced Labor among the staff, employees, workers and any other person employed or engaged by the Subcontractor/ supplier/ manufacturer;

(d) will include in our contracts with Subcontractors/ suppliers/ manufacturers of *[solar panels] [solar panel components]*, that the Subcontractors/ suppliers/ manufacturers include an obligation to prevent Forced Labor in all contracts that they execute with their suppliers/ manufacturers of [solar panel][solar panel components];

(e) will monitor our Subcontractors/ suppliers/ manufacturers of *[solar panels][solar panel components]* on implementation of obligations to prevent Forced Labor among the staff, employees, workers and any other person employed or engaged by them;

(f) will require our Subcontractors to monitor their suppliers/ manufacturers of *[solar panels][solar panel components]* on implementation of obligations to prevent Forced Labor among the staff, employees, workers and any other person employed or engaged by them;

(g) will require our Subcontractors/ suppliers/ manufacturers to immediately notify us of any incidents of Forced Labor;

(h) will immediately notify the Employer any incident of Forced labor on the site, or premises of Subcontractors/ suppliers/ manufacturers of *[solar panels] [solar panel components]*;

(i) will include in periodic progress reports submitted in accordance with the contract sufficient details on our, including our Subcontractors/ suppliers/ manufacturers , compliance with Forced Labor obligations; and we

(j) confirm that the Subcontractors/ suppliers/ manufacturers for *[solar panels][solar panel components]* for this contract are (or likely to be):

[Provide each firm's name, address, primary contact, e-mail address, and the link to the firm's website]

OR

confirm that you have not yet finalized the Subcontractors/ suppliers/ manufacturers of solar panels/components, but when known the firm/s name(s), address(es), primary contact(s), e-mail address(es) and website link(s) will be provided to the Employer, prior to signing the contract, with documentation demonstrating compliance with forced labor obligations to the Employer for approval].

THEN

If (c) above is applicable, attach evidence of how these contract obligations are/will be made.

If (d) above is applicable, attach evidence of how these contract obligations are/will be made.

If (e) above is applicable, please attach evidence of how this monitoring/due diligence is/will be undertaken (such as your inspection protocols, use of inspection agents, frequency of inspections, examples of previous factory/labor inspection reports etc.).

If (f) above is applicable, please attach evidence of how this monitoring/due diligence is/will be undertaken by Subcontractors (such as their inspection protocols, use of inspection agents, frequency of inspections, examples of previous factory/labor inspection reports etc.).

We declare all the information and statements made in this Form are true, and we accept that any misrepresentation contained in this Form may lead to our disqualification by the Employer and/or sanctions by the UNOPS.

Name of the Bidder***** _____

Name of the person duly authorized to sign the Bid on behalf of the Bidder****** _____

Title of the person signing the Bid _____

Signature of the person named above _____

Date signed _____ day of _____, _____

*****: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

******: Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid

[Note: In case of a Joint Venture, the Forced Labor Declaration must be in the name of all members to the Joint Venture that submits the Bid.]

Annex 5 Personnel Code of Conduct Sample Form

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

Code of Conduct sample is available below in which the contractor shall adopt and include all provisions in their own Code of Conduct:

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 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:

1. carry out his/her duties competently and diligently;
2. 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;
3. maintain a safe working environment including by:
4. ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
5. wearing required personal protective equipment;
6. using appropriate measures relating to chemical, physical and biological substances and agents;
7. following applicable emergency operating procedures.
8. 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;
9. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
10. 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;
11. 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;

12. 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.
13. not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;
14. 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);
15. report violations of this Code of Conduct; and
16. 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 Grievance mechanism for Contractor's Personnel or the project's Grievance 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 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 affected people. It shall be provided in languages comprehensible to the local community, Contractor's personnel (including subcontractors and day workers), and affected persons.

Annex 6 Consultation and Records Samples

The questionnaire lists used during consultation in healthcare facilities and schools are available in points 1 and 2 of this annex. Samples of consultation questionnaires and records filled are included in point 3 of this annex.

1. Healthcare Facilities Questionnaire

المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية استبيان حول تزويد المراكز الصحية والمستشفيات بالطاقة الشمسية					
اسم الباحثة			التاريخ		
اسم المنشأة الصحية		المديرية		المحافظة	

يجري تنفيذ المشروع الممول من البنك الدولي في اليمن عبر مكتب الأمم المتحدة لخدمات المشاريع (يونوبس). من أهداف المشروع الرئيسية توفير الطاقة المطلوبة لتشغيل المستشفيات والمراكز الصحية الحكومية في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناجمة عن استخدامه. سينتج عن هذا التدخل تحسين الخدمات الصحية في المرافق وتوفير الكهرباء بشكل مستمر والتغلب على العوائق المتعلقة بتوفر الوقود و تذبذب أسعاره.

وعلى ضوء ما تقدم تم ترشيح المرفق الصحي المذكور تفاصيله أعلاه كأحد المشاريع الفرعية والتي سيتم فيها توفير منظومة طاقة شمسية بغرض توفير الكهرباء وخدمة سكان المنطقة.

وعليه يرجى إكمال الاستبيان أدناه لما فيه المصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)							
الاسم							
الجنس	☐ ذكر	☐ انثى	الفئة العمرية	☐ اقل من 15	☐ 15 إلى 24	☐ 25 إلى 46	☐ أكثر من 46
العنوان	القرية.....العزلة.....المديرية.....						
المهنة		رقم الهاتف (اختياري)					

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط, ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
.1	استخدام الطاقة الشمسية سيقلل من الكلفة المادية المستخدمة لتوفير الكهرباء المتمثلة في قيمة الوقود (الديزل) أو قيمة فاتورة الكهرباء			
.2	يساعد استخدام الطاقة الشمسية في ديمومة توفير الطاقة الكهربائية اثناء انقطاع المشتقات النفطية أو ارتفاع أسعارها وبالتالي يساهم في تقديم الخدمات الصحية في جميع الأوقات			
.3	يساعد استخدام الطاقة الشمسية كمصدر للكهرباء في الحفاظ على البيئة والحد من التلوث			
.4	تساهم الطاقة الكهربائية في توفير الخدمات الصحية بشكل آمن وتشغيل الأجهزة وتوفير الإضاءة المطلوبة			
.5	توفير الطاقة الكهربائية عبر منظومات الطاقة الشمسية يساعد في تشغيل المنشأة بشكل كامل بكافة معداتها المتواجدة وكذلك سيساهم في إدخال أجهزة وخدمات جديدة			
.6	سيساهم المشروع في التخفيف من معاناة المرضى والسكان بشكل عام في المنطقة وكذلك تخفيف المعاناة المتمثلة في التنقل لمسافات كبيرة من أجل الحصول على الخدمات الصحية			

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط, ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
.7	تنفيذ المشروع سيساهم في رضا المجتمع بشكل عام وبالتالي يجري دعمه من كافة فئات المجتمع			
.8	أي آثار إيجابية أخرى تتوقعها.....			

رقم	المخاوف المتوقعة من تنفيذ التدخل المخطط, ما مدى موافقتك على ما يلي:	نعم	لا	لا أعرف
.1	من الممكن أن ينتج عن أعمال المقاول وحركة العمال ازعاج المستخدمين للمرفق أو تقييد حركة الموظفين والمرضى والنساء وبالتالي يجب وضع مداخل منفصلة لعمال المقاول وترتيب الأعمال مع إدارة المرفق			
.2	من الممكن عدم كفاية المنظومة لتشغيل المرفق بشكل كامل وكذلك قد تنخفض القدرة الكهربائية خلال أوقات المساء أو أثناء وجود عوامل مناخية تمنع شحن البطاريات بشكل كامل			
.3	قد تتلف البطاريات المستخدمة وتؤدي الى تقليل القدرة الكهربائية المطلوبة لتشغيل الأجهزة في المرفق			
.4	قد تتلف أحد مكونات منظومة الطاقة الشمسية وبالتالي يجب توفير صيانة مناسبة ودورية			
.5	يجب توفير التدريب المناسب للكادر في المرفق على الاستخدام الأمن للمنظومة لتجنب أي أخطاء أثناء فترة التشغيل			
.6	عدم التخلص الآمن من البطاريات والمعدات الإلكترونية التالفة قد يؤدي إلى الإضرار بالبيئة المحيطة			
.7	قد تنتج حوادث بسبب عدم اتخاذ إجراءات السلامة المطلوبة وبالتالي يجب إضافة معدات مناسبة وتوفير التدريب اللازم لموظفي المرفق			
.8	أي مخاوف أخرى يمكن إضافتها.....			

أي ملاحظات أو احتياجات أخرى يمكن تضمينها

1. .....
2. .....
3. .....

يمكن إرسال الملاحظات والاستفسارات بخصوص هذا المشروع (المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية) عبر القنوات التالية والتي تقع تحت مسؤولية مكتب الأمم المتحدة لخدمات المشاريع (يونوبس):

Toll Free Number	**8000190**	رقم مجاني
Landline	**01 504914 and 01 504915**	رقم هاتف أرضي
SMS and WhatsApp	**739888388**	رسائل نصية أو واتساب
Email	grm-yemen@unops.org	بريد إلكتروني

2. Schools Questionnaire

المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية استبيان حول تزويد المدارس بالطاقة الشمسية					
اسم الباحثة		التاريخ			
اسم المدرسة		المديرية		المحافظة	

يجري تنفيذ المشروع الممول من البنك الدولي في اليمن عبر مكتب الأمم المتحدة لخدمات المشاريع (يونوبس). من أهداف المشروع الرئيسية توفير الطاقة الكهربائية المطلوبة للمدارس في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناجمة عنه. سينتج عن هذا التدخل تحسين الخدمات في المرافق وتوفير الكهرباء بشكل مستمر والتغلب على العوائق المتعلقة بتوفر الوقود و تذبذب أسعاره.

وعلى ضوء ما تقدم تم ترشيح المرفق المذكور تفاصيله أعلاه كأحد المشاريع الفرعية والتي سيتم فيها توفير منظومة طاقة شمسية بغرض توفير الكهرباء وخدمة سكان المنطقة.

وعليه يرجى إكمال الاستبيان أدناه لما فيه المصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)							
الاسم							
الجنس	☐ ذكر	☐ انثى	الفئة العمرية	☐ اقل من 15	☐ 15 إلى 24	☐ 25 إلى 46	☐ أكثر من 46
العنوان	القرية.....العزلة.....المديرية.....						
المهنة		رقم الهاتف (اختياري)					

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط, ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
.1	استخدام الطاقة الشمسية سيقلل من الكلفة المادية المستخدمة لتوفير الكهرباء المتمثلة في قيمة الوقود (الديزل) أو قيمة فاتورة الكهرباء			
.2	يساعد استخدام الطاقة الشمسية في ديمومة توفير الطاقة الكهربائية اثناء انقطاع المشتقات النفطية وارتفاع أسعارها وبالتالي يساهم في تقديم الخدمات التعليمية في جميع الأوقات			
.3	يساعد استخدام الطاقة الشمسية كمصدر للكهرباء في الحفاظ على البيئة والحد من التلوث			
.4	تساهم الطاقة الكهربائية في توفير الخدمات التعليمية العصرية ومن ضمنها الحاسوب وتشغيل الأجهزة المختلفة وتوفير الإضاءة المطلوبة في المرافق المختلفة			
.5	تساهم الطاقة الكهربائية في توفير مناخ تعليمي صحي للطلبة والمدرسين وبالتالي تحسين التحصيل العلمي			
.6	وجود الطاقة الكهربائية يشكل عامل جذب لاستقطاب الطلبة ويشجع على استمرارية التعليم وتوسيع الخدمات المقدمة			
.7	تنفيذ المشروع سيساهم في رضا المجتمع بشكل عام وبالتالي يجري دعمه من كافة فئات المجتمع			
.8	أي آثار إيجابية أخرى تتوقعها.....			

رقم	المخاوف المتوقعة من تنفيذ التدخل المخطط, ما مدى موافقتك على ما يلي:	نعم	لا	لا أعرف
.1	من الممكن أن ينتج عن أعمال المقاول وحركة العمال إعاقة العملية التعليمية وبالتالي يجب ترتيب توقيت الأعمال وأماكنها مع إدارة المدرسة			
.2	من الممكن عدم كفاية المنظومة لتشغيل المدرسة بشكل كامل وكذلك قد تنخفض القدرة الكهربائية أثناء وجود عوامل مناخية قد تمنع شحن البطاريات بشكل كامل			
.3	قد تتلف البطاريات المستخدمة وتؤدي الى تقليل القدرة الكهربائية المطلوبة لتشغيل الأجهزة في المدرسة			
.4	قد تتلف أحد مكونات منظومة الطاقة الشمسية وبالتالي يجب توفير صيانة مناسبة ودورية			
.5	يجب توفير التدريب المناسب للكادر في المرفق على الاستخدام الأمن للمنظومة لتجنب أي أخطاء أثناء فترة التشغيل			
.6	عدم التخلص الآمن من البطاريات والمعدات الإلكترونية التالفة قد يؤدي إلى الإضرار بالبيئة المحيطة			
.7	قد تنتج حوادث بسبب عدم اتخاذ إجراءات السلامة المطلوبة وبالتالي يجب إضافة معدات مناسبة وتوفير التدريب اللازم لموظفي المرفق			
.8	أي مخاوف أخرى يمكن إضافتها.....			

أي ملاحظات أو احتياجات أخرى يمكن تضمينها

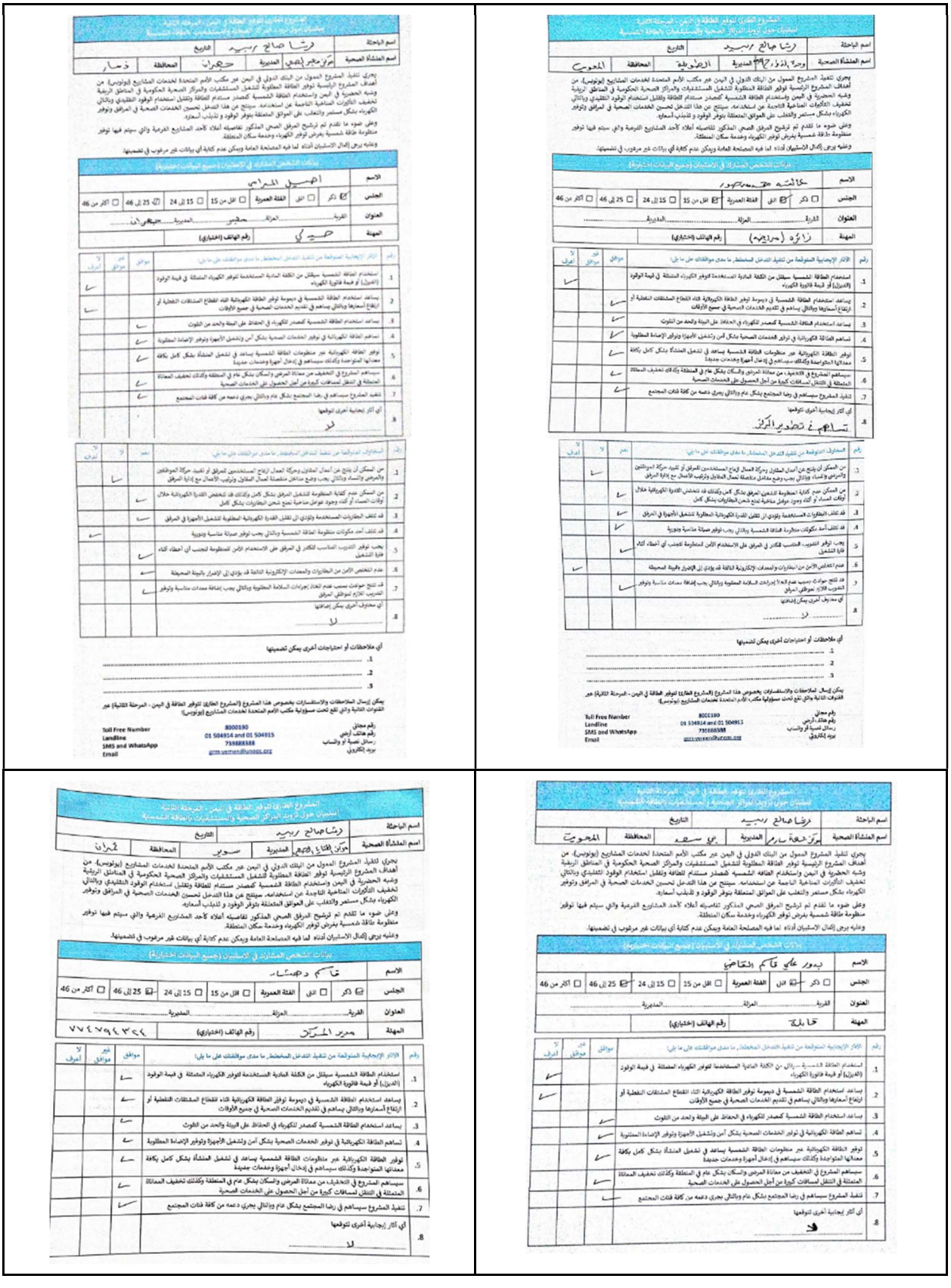
1. .....
2. .....
3. .....

يمكن إرسال الملاحظات والاستفسارات بخصوص هذا المشروع (المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية) عبر القنوات التالية والتي تقع تحت مسؤولية مكتب الأمم المتحدة لخدمات المشاريع (يونوبس):

Toll Free Number	**8000190**	رقم مجاني
Landline	**01 504914 and 01 504915**	رقم هاتف أرضي
SMS and WhatsApp	**739888388**	رسائل نصية أو واتساب
Email	grm-yemen@unops.org	بريد إلكتروني

3. Consultation Records Samples

Samples only, full list of consultation records is very long and it will significantly increase the number of papers and document size.



المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية
استبيان حول تزويد المراكز الصحية والمستشفيات بالطاقة الشمسية

اسم الباحثة	سمر محمد خالد ناجي		التاريخ	١٢/٣/٢٠٢٣م	
اسم المنشأة الصحية	مركز الزاوية	المديرية	مقبنة	المحافظة	تعز

يجري تنفيذ المشروع الممول من البنك الدولي في اليمن عبر مكتب الأمم المتحدة لخدمات المشاريع (يونوبس). من أهداف المشروع الرئيسية توفير الطاقة المطلوبة لتشغيل المستشفيات والمراكز الصحية الحكومية في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناجمة عن استخدامه. سينتج عن هذا التدخل تحسين الخدمات الصحية في المرافق وتوفير الكهرباء بشكل مستمر والتغلب على العوائق المتعلقة بتوفر الوقود و تذبذب أسعاره.

وعلى ضوء ما تقدم تم ترشيح المرفق الصحي المذكور تفاصيله أعلاه كأحد المشاريع الفرعية والتي سيتم فيها توفير منظومة طاقة شمسية بغرض توفير الكهرباء وخدمة سكان المنطقة.

وعليه يرجى إكمال الاستبيان أدناه لما فيه المصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)

الاسم	شيماء احمد عبداللطيف احمد						
الجنس	☐ ذكر	☑ انثى	الفئة العمرية	☐ اقل من 15	☐ 15 إلى 24	☑ 25 إلى 46	☐ أكثر من 46
العنوان	القرية: الغول	العزلة: بني سيف	المديرية: مقبنة				
المهنة	طالبة	رقم الهاتف (اختياري)	776364248				

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط، ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1.	استخدام الطاقة الشمسية سيقلل من الكلفة المادية المستخدمة لتوفير الكهرباء المتمثلة في قيمة الوقود (الديزل) أو قيمة فاتورة الكهرباء	✓		
2.	يساعد استخدام الطاقة الشمسية في ديمومة توفير الطاقة الكهربائية اثناء انقطاع المشتقات النفطية أو ارتفاع أسعارها وبالتالي يساهم في تقديم الخدمات الصحية في جميع الأوقات	✓		
3.	يساعد استخدام الطاقة الشمسية كمصدر للكهرباء في الحفاظ على البيئة والحد من التلوث	✓		
4.	تساهم الطاقة الكهربائية في توفير الخدمات الصحية بشكل آمن وتشغيل الأجهزة وتوفير الإضاءة المطلوبة	✓		
5.	توفير الطاقة الكهربائية عبر منظومات الطاقة الشمسية يساعد في تشغيل المنشأة بشكل كامل بكافة معداتها المتواجدة وكذلك سيساهم في إدخال أجهزة وخدمات جديدة	✓		
6.	سيساهم المشروع في التخفيف من معاناة المرضى والسكان بشكل عام في المنطقة وكذلك تخفيف المعاناة المتمثلة في التنقل لمسافات كبيرة من أجل الحصول على الخدمات الصحية	✓		
7.	تنفيذ المشروع سيساهم في رضا المجتمع بشكل عام وبالتالي يجري دعمه من كافة فئات المجتمع	✓		
8.	أي آثار إيجابية أخرى تتوقعها: تحسين الوضع الصحي			

المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية
استبيان حول تزويد المراكز الصحية والمستشفيات بالطاقة الشمسية

اسم الباحثة	سمر محمد خالد ناجي		التاريخ	٢١/٣/٢٠٢٣م	
اسم المنشأة الصحية	مركز صحي جبيل جبل	المديرية	ردفان	المحافظة	لحج

يجري تنفيذ المشروع الممول من البنك الدولي في اليمن عبر مكتب الأمم المتحدة لخدمات المشاريع (يونوبس). من أهداف المشروع الرئيسية توفير الطاقة المطلوبة لتشغيل المستشفيات والمراكز الصحية الحكومية في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناجمة عن استخدامه. سينتج عن هذا التدخل تحسين الخدمات الصحية في المرافق وتوفير الكهرباء بشكل مستمر والتغلب على العوائق المتعلقة بتوفر الوقود و تذبذب أسعاره.

وعلى ضوء ما تقدم تم ترشيح المرفق الصحي المذكور تفاصيله أعلاه كأحد المشاريع الفرعية والتي سيتم فيها توفير منظومة طاقة شمسية بغرض توفير الكهرباء وخدمة سكان المنطقة.

وعليه يرجى إكمال الاستبيان أدناه لما فيه المصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)

الاسم	هاني ناصر القاضي						
الجنس	☑ ذكر	☐ انثى	الفئة العمرية	☐ اقل من 15	☐ 15 إلى 24	☑ 25 إلى 46	☐ أكثر من 46
العنوان	القرية: جبل جبيل	العزلة: ردفان	المديرية: ردفان				
المهنة	عامل	رقم الهاتف (اختياري)	٧٧٢٥٠٤٢٨٨٢				

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط، ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1.	استخدام الطاقة الشمسية سيقلل من الكلفة المادية المستخدمة لتوفير الكهرباء المتمثلة في قيمة الوقود (الديزل) أو قيمة فاتورة الكهرباء	✓		
2.	يساعد استخدام الطاقة الشمسية في ديمومة توفير الطاقة الكهربائية اثناء انقطاع المشتقات النفطية أو ارتفاع أسعارها وبالتالي يساهم في تقديم الخدمات الصحية في جميع الأوقات	✓		
3.	يساعد استخدام الطاقة الشمسية كمصدر للكهرباء في الحفاظ على البيئة والحد من التلوث	✓		
4.	تساهم الطاقة الكهربائية في توفير الخدمات الصحية بشكل آمن وتشغيل الأجهزة وتوفير الإضاءة المطلوبة	✓		
5.	توفير الطاقة الكهربائية عبر منظومات الطاقة الشمسية يساعد في تشغيل المنشأة بشكل كامل بكافة معداتها المتواجدة وكذلك سيساهم في إدخال أجهزة وخدمات جديدة	✓		
6.	سيساهم المشروع في التخفيف من معاناة المرضى والسكان بشكل عام في المنطقة وكذلك تخفيف المعاناة المتمثلة في التنقل لمسافات كبيرة من أجل الحصول على الخدمات الصحية	✓		
7.	تنفيذ المشروع سيساهم في رضا المجتمع بشكل عام وبالتالي يجري دعمه من كافة فئات المجتمع	✓		
8.	أي آثار إيجابية أخرى تتوقعها: تحسين الخدمة الصحية للمستشفى			

المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية
استبيان حول تزويد المدارس بالطاقة الشمسية

اسم الباحثة	سمر محمد خالد		التاريخ	٢١/٣/٢٠٢٣م	
اسم المدرسة	مدرسة الحصرة	المديرية	مودية	المحافظة	أبين

يجري تنفيذ المشروع الممول من البنك الدولي في اليمن عبر مكتب الأمم المتحدة لخدمات المشاريع (يونوبس). من أهداف المشروع الرئيسية توفير الطاقة الكهربائية المطلوبة للمدارس في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناجمة عنه. سينتج عن هذا التدخل تحسين الخدمات في المرافق وتوفير الكهرباء بشكل مستمر والتغلب على العوائق المتعلقة بتوفر الوقود و تذبذب أسعاره.

وعلى ضوء ما تقدم تم ترشيح المرفق المذكور تفاصيله أعلاه كأحد المشاريع الفرعية والتي سيتم فيها توفير منظومة طاقة شمسية بغرض توفير الكهرباء وخدمة سكان المنطقة.

وعليه يرجى إكمال الاستبيان أدناه لما فيه المصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)

الاسم	ناصر محمد ناصر بازقامة						
الجنس	☑ ذكر	☐ انثى	الفئة العمرية	☐ اقل من 15	☐ 15 إلى 24	☑ 25 إلى 46	☐ أكثر من 46
العنوان	القرية: الحصرة	العزلة:	المديرية: مودية				
المهنة	معلم	رقم الهاتف (اختياري)					

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط، ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1.	استخدام الطاقة الشمسية سيقلل من الكلفة المادية المستخدمة لتوفير الكهرباء المتمثلة في قيمة الوقود (الديزل) أو قيمة فاتورة الكهرباء	✓		
2.	يساعد استخدام الطاقة الشمسية في ديمومة توفير الطاقة الكهربائية اثناء انقطاع المشتقات النفطية وارتفاع أسعارها وبالتالي يساهم في تقديم الخدمات التعليمية في جميع الأوقات	✓		
3.	يساعد استخدام الطاقة الشمسية كمصدر للكهرباء في الحفاظ على البيئة والحد من التلوث	✓		
4.	تساهم الطاقة الكهربائية في توفير الخدمات التعليمية العصرية ومن ضمنها الحاسوب وتشغيل الأجهزة المختلفة وتوفير الإضاءة المطلوبة في المرافق المختلفة	✓		
5.	تساهم الطاقة الكهربائية في توفير مناخ تعليمي صحي للطلبة والمدرسين وبالتالي تحسين التحصيل العلمي	✓		
6.	وجود الطاقة الكهربائية يشكل عامل جذب لاستقطاب الطلبة ويشجع على استمرارية التعليم وتوسيع الخدمات المقدمة	✓		
7.	تنفيذ المشروع سيساهم في رضا المجتمع بشكل عام وبالتالي يجري دعمه من كافة فئات المجتمع	✓		
8.	أي آثار إيجابية أخرى تتوقعها: تحسين خدمة التعليم			

المشروع الطارئ لتوفير الطاقة في اليمن - المرحلة الثانية
استبيان حول تزويد المراكز الصحية والمستشفيات بالطاقة الشمسية

اسم الباحثة	سمر محمد خالد ناجي		التاريخ	٢٧/٣/٢٠٢٣م	
اسم المنشأة الصحية	مستشفى ردفان	المديرية	ردفان	المحافظة	لحج

يجري تنفيذ المشروع الممول من البنك الدولي في اليمن عبر مكتب الأمم المتحدة لخدمات المشاريع (يونوبس). من أهداف المشروع الرئيسية توفير الطاقة المطلوبة لتشغيل المستشفيات والمراكز الصحية الحكومية في المناطق الريفية وشبه الحضرية في اليمن واستخدام الطاقة الشمسية كمصدر مستدام للطاقة وتقليل استخدام الوقود التقليدي وبالتالي تخفيف التأثيرات المناخية الناجمة عن استخدامه. سينتج عن هذا التدخل تحسين الخدمات الصحية في المرافق وتوفير الكهرباء بشكل مستمر والتغلب على العوائق المتعلقة بتوفر الوقود و تذبذب أسعاره.

وعلى ضوء ما تقدم تم ترشيح المرفق الصحي المذكور تفاصيله أعلاه كأحد المشاريع الفرعية والتي سيتم فيها توفير منظومة طاقة شمسية بغرض توفير الكهرباء وخدمة سكان المنطقة.

وعليه يرجى إكمال الاستبيان أدناه لما فيه المصلحة العامة ويمكن عدم كتابة أي بيانات غير مرغوب في تضمينها.

بيانات الشخص المشارك في الاستبيان (جميع البيانات اختيارية)

الاسم	صالح احمد سعيد						
الجنس	☐ ذكر	☐ انثى	الفئة العمرية	☐ اقل من 15	☐ 15 إلى 24	☐ 25 إلى 46	☑ أكثر من 46
العنوان	القرية:	العزلة:	المديرية:				
المهنة	خدمات عامة	رقم الهاتف (اختياري)	٧٧٧٠٢١٩١٥				

رقم	الآثار الإيجابية المتوقعة من تنفيذ التدخل المخطط، ما مدى موافقتك على ما يلي:	موافق	غير موافق	لا أعرف
1.	استخدام الطاقة الشمسية سيقلل من الكلفة المادية المستخدمة لتوفير الكهرباء المتمثلة في قيمة الوقود (الديزل) أو قيمة فاتورة الكهرباء	✓		
2.	يساعد استخدام الطاقة الشمسية في ديمومة توفير الطاقة الكهربائية اثناء انقطاع المشتقات النفطية أو ارتفاع أسعارها وبالتالي يساهم في تقديم الخدمات الصحية في جميع الأوقات	✓		
3.	يساعد استخدام الطاقة الشمسية كمصدر للكهرباء في الحفاظ على البيئة والحد من التلوث	✓		
4.	تساهم الطاقة الكهربائية في توفير الخدمات الصحية بشكل آمن وتشغيل الأجهزة وتوفير الإضاءة المطلوبة	✓		
5.	توفير الطاقة الكهربائية عبر منظومات الطاقة الشمسية يساعد في تشغيل المنشأة بشكل كامل بكافة معداتها المتواجدة وكذلك سيساهم في إدخال أجهزة وخدمات جديدة	✓		
6.	سيساهم المشروع في التخفيف من معاناة المرضى والسكان بشكل عام في المنطقة وكذلك تخفيف المعاناة المتمثلة في التنقل لمسافات كبيرة من أجل الحصول على الخدمات الصحية	✓		
7.	تنفيذ المشروع سيساهم في رضا المجتمع بشكل عام وبالتالي يجري دعمه من كافة فئات المجتمع	✓		
8.	أي آثار إيجابية أخرى تتوقعها: تحسين اداء المستشفى			

Annex 7 Site Specific Data and Facilities Details

To reduce the ESMP file size and number of pages, the facilities details, layout, drawing and photos can be found in the below link:

Annex 7 Site Specific Data and Facilities Details - Supply and Installation of Solar Power Systems to 83 Facilities ESMP