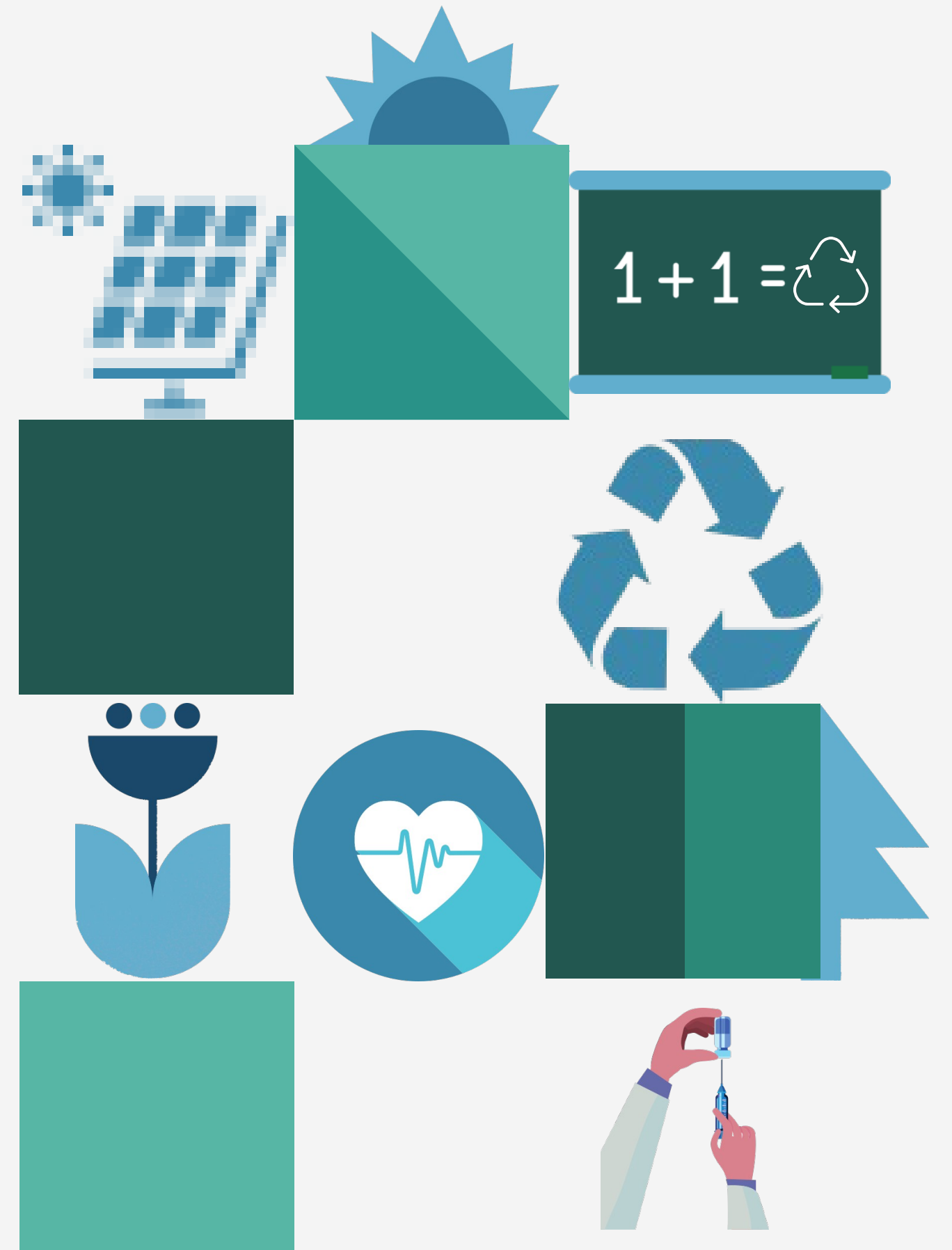




UNHCR
The UN Refugee Agency

KAKUMA - A HUB OF GREEN ENERGY SOLUTIONS

An Update On Our Progress with the Green Energy Plans



UNHCR Kakuma Sub-Office, November 2021

Priority Energy Areas



Energy for Cooking

Facilitate transit to cleaner energy solutions 2021 - 2025 through adopting 4+1 products diversity approach



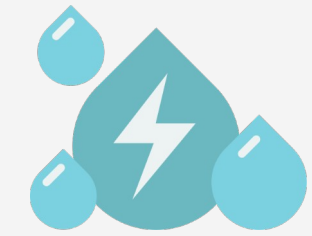
Energy for Health

Achieve 100% Green Electrification for health facilities by end of 2022



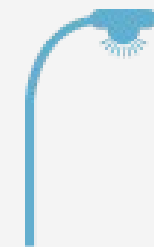
Energy for Education

Achieve 100% Green Electrification for education facilities by mid-2022



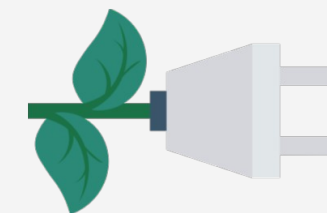
Energy for Water

Achieve 100% Green Electrification for Boreholes by mid-2023



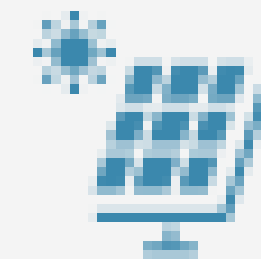
Energy for Protection & Security

Set up standalone renewable energy systems for street and security lighting



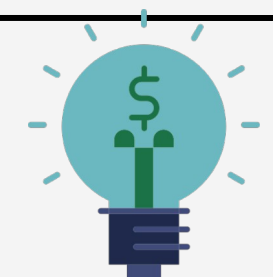
Greening the Operation

Solarize the UNHCR compound and replace diesel generators in the field by solar power systems



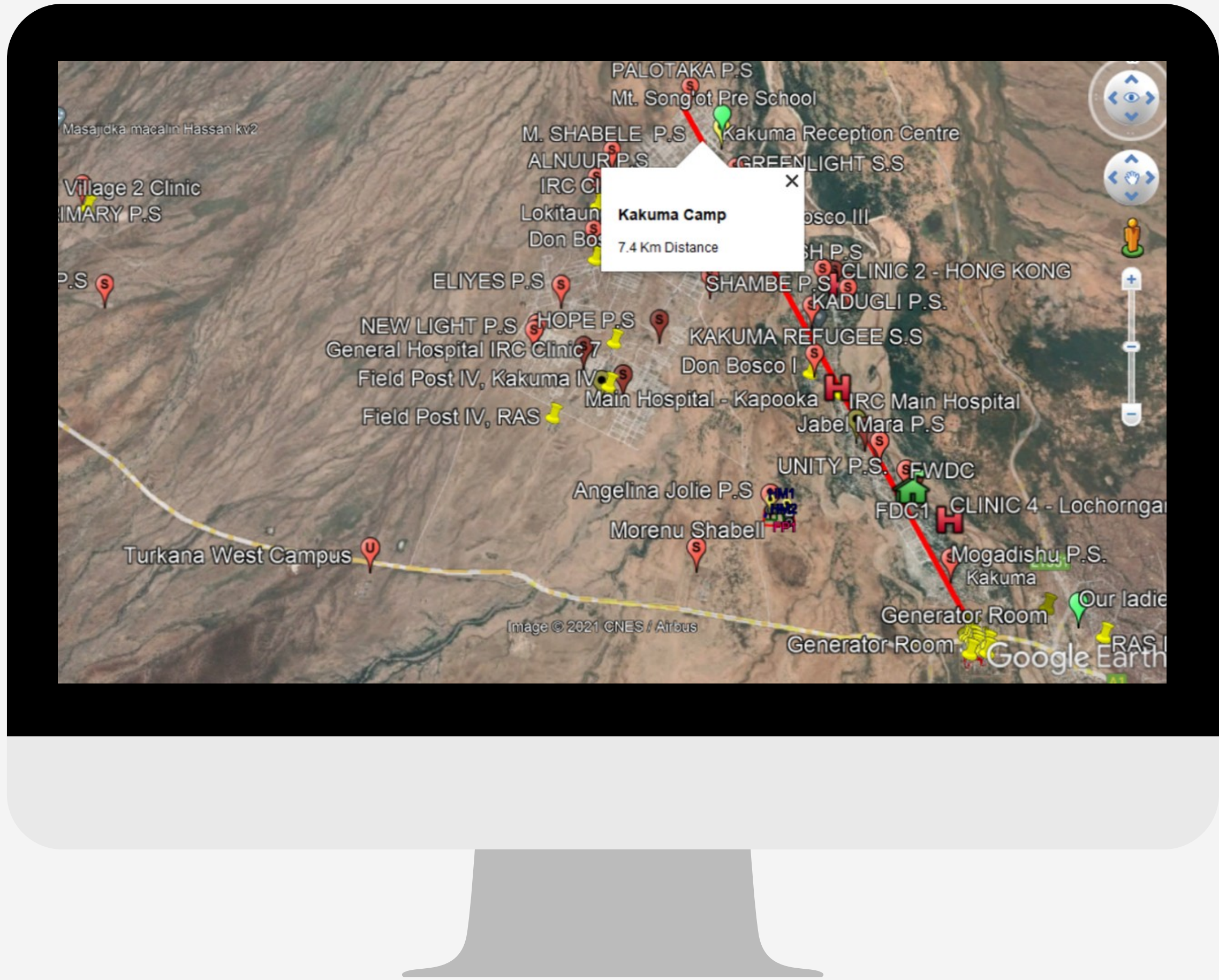
Camp Electrification

Engage the development agencies and the private sector to set up large scales electricity grids for houses connectivity.



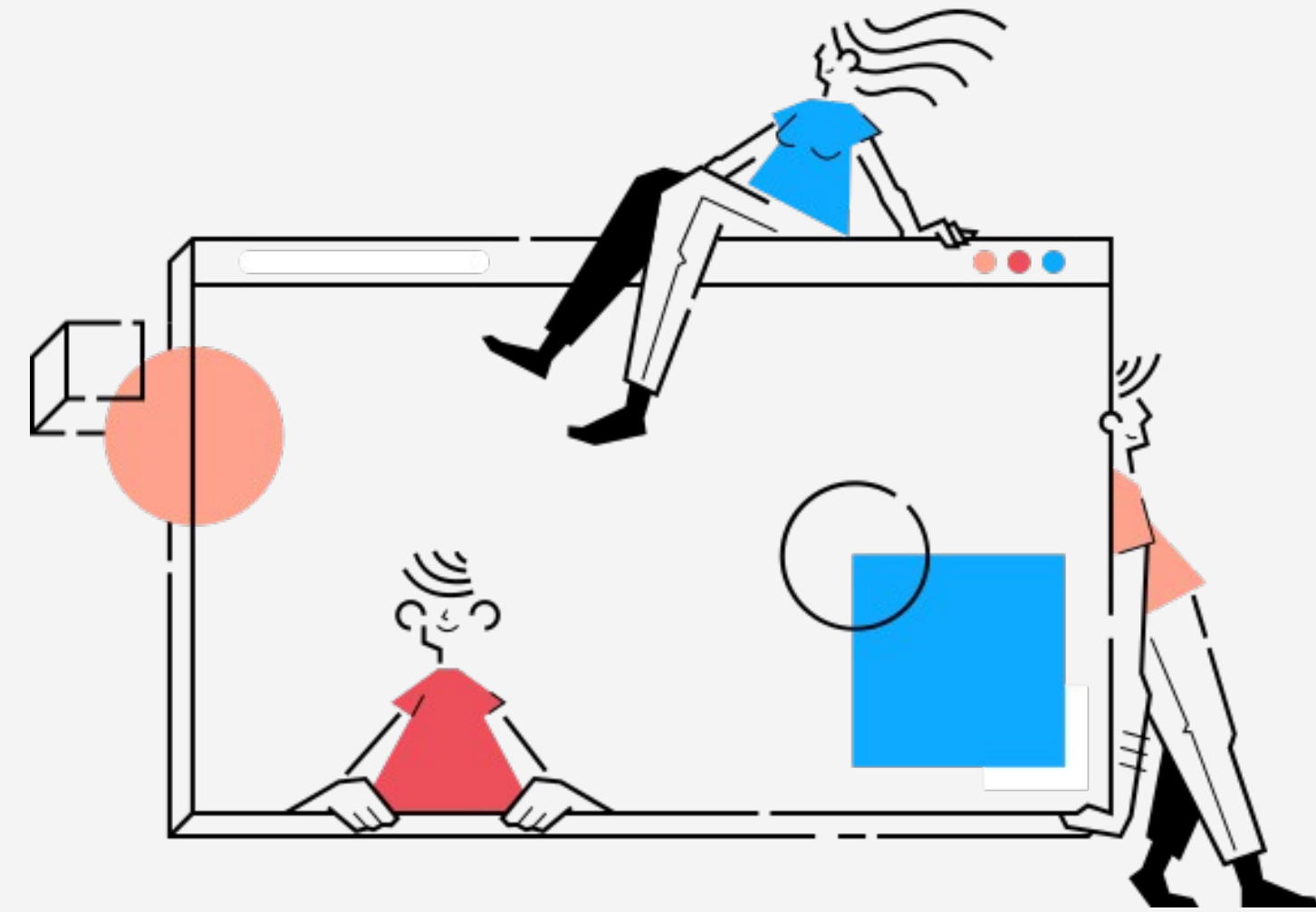
Energy for Productive Use

Attract the private sector to develop mini-grids to connect more businesses to reliable yet clean power sources

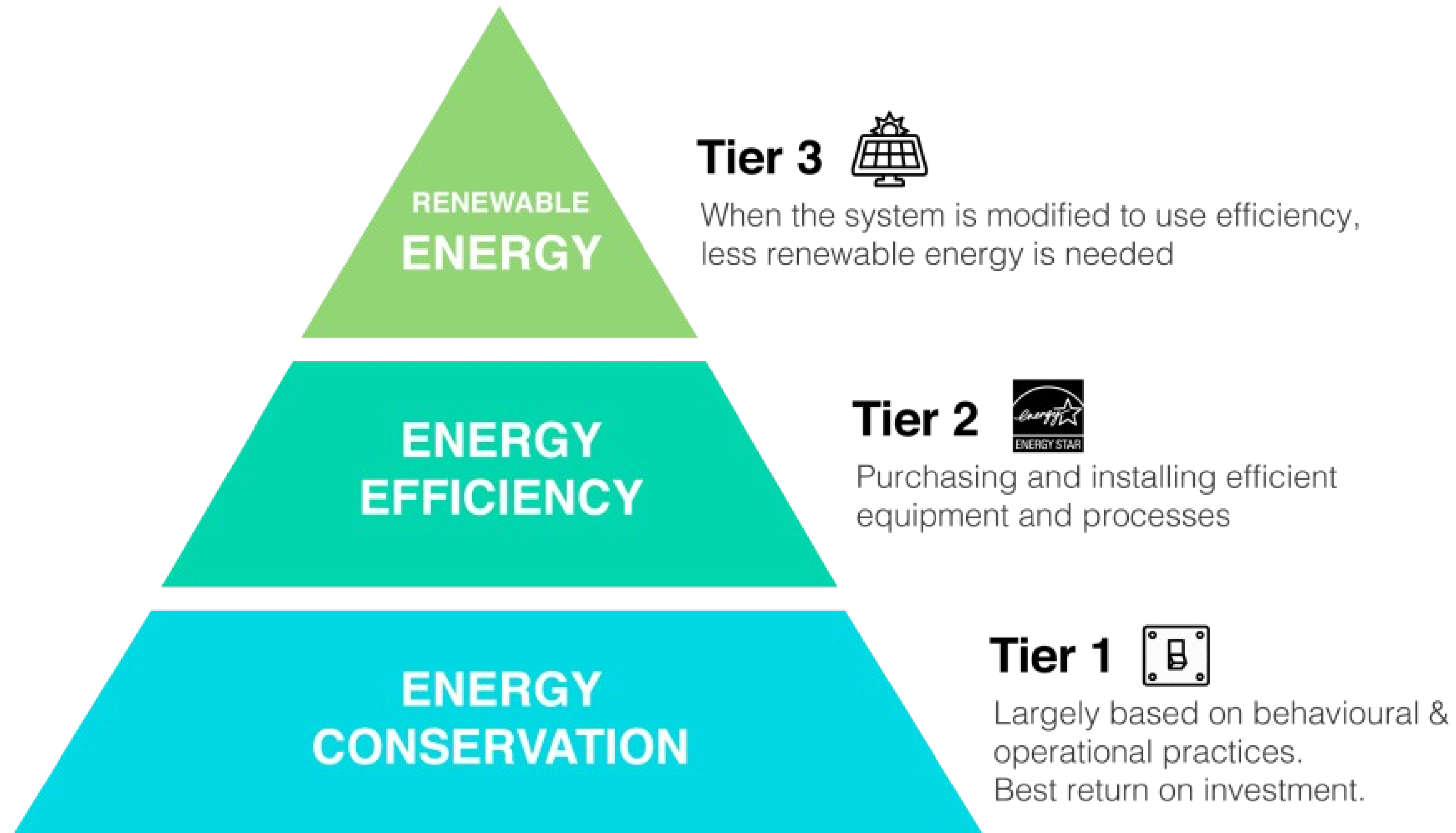


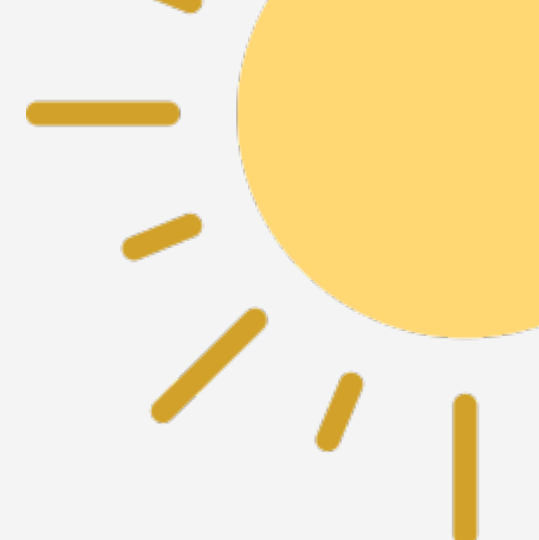
Projects Development Activities

31 schools, 7 health facilities, and 6 UNHCR Field Facilities
+ UNHCR Compound Solarization (~900 KWp W/storage and 20% diesel generators)



Transition Process and Priorities

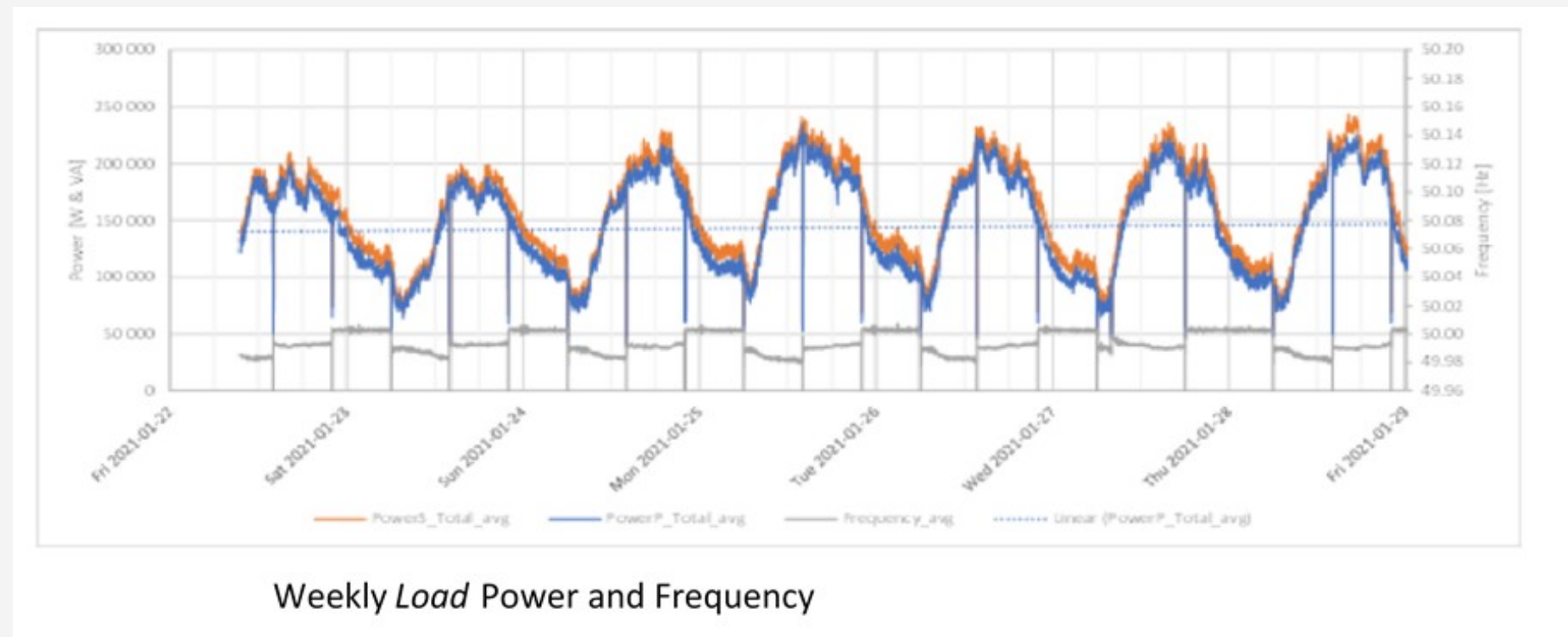


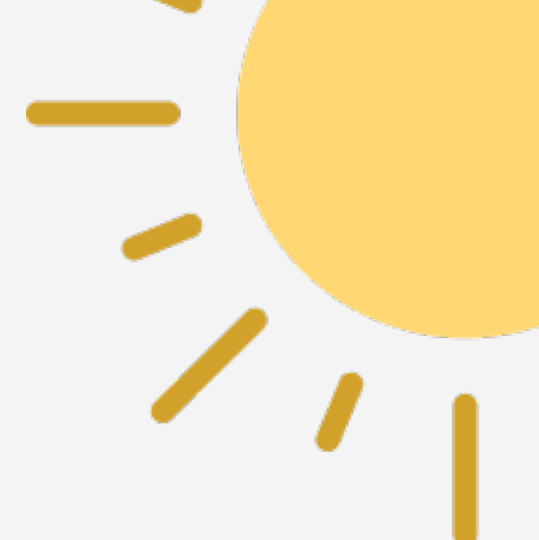


Energy Audit

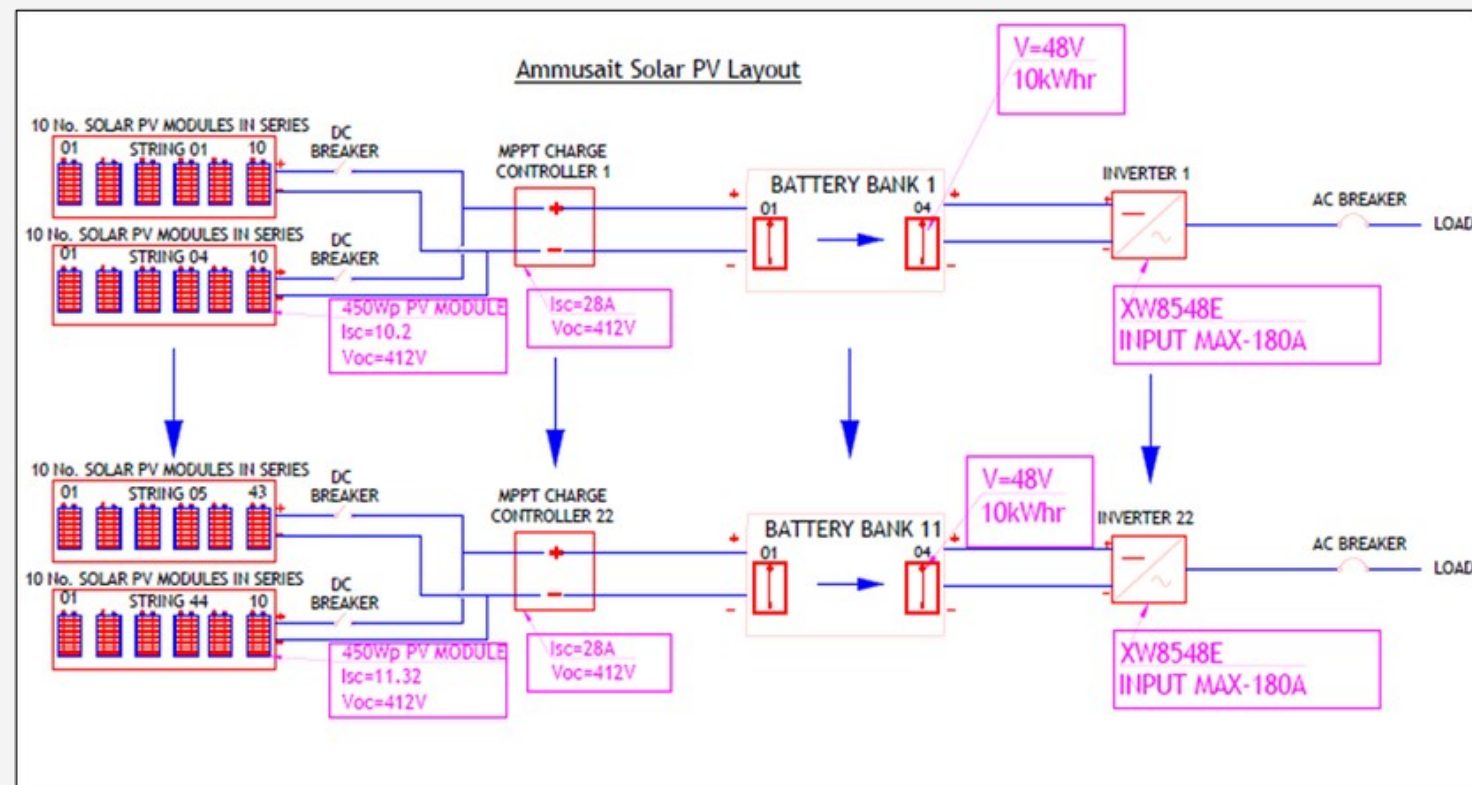
Load Profiling

Location/Area	Type of A/C System	Manufacturer	Model	Refrigerant	Cooling Capacity		Quantity	Rated Current	Rated Power	Total Wattage
					Btu/hr.	kW		A	kW	kW
OUT-PATIENT DEPARTMENT										
Dispensing Pharmacy	Highwall Split A/C	VON	VAA244HMW	R-410A, 1.75Kg	23,987	7.03	1	16.5	2.7	2.7
EMERGENCY WING										
Office	Highwall Split A/C	VON	VAA124HMW	R-410A, 0.74Kg	12,011	3.52	1	8	1.65	1.65
ADMINISTRATION BLOCK										
Board Room	Highwall Split A/C	LG	KSUC1264NA2	R-22, 0.57Kg	12,500	3.66	1	6.1	1.37	1.37
Matron's Office	Highwall Split A/C	VON	VAA124HMW	R-410A, 0.74Kg	12,011	3.52	1	8	1.65	1.65
Store	Highwall Split A/C	VON	VAA124HMW	R-410A, 0.74Kg	12,011	3.52	1	8	1.65	1.65
DRUG STORE										
Cold Room A	Highwall Split A/C	VON	VAA244HMW	R-410A, 1.75Kg	23,987	7.03	1	16.5	3.3	3.3
Cold Room B	Highwall Split A/C	VON	VAA124HMW	R-410A, 0.74Kg	12,011	3.52	1	8	1.65	1.65
	Highwall Split A/C	LG	KSUC1264NA2	R-22, 0.57Kg	12,500	3.66	1	6.1	1.37	1.37
Drug Store Office	Highwall Split A/C	LG	S1865C	R-22, 0.77Kg	18,000	5.28	1	7.5	1.8	1.8
IRC EYE UNIT										
Store Room	Highwall Split A/C	VON	VAA124HMW	R-410A, 0.74Kg	12,011	3.52	1	8	1.65	1.65
Theatre	Highwall Split A/C	VON	VAA244HMW	R-410A, 1.75Kg	23,987	7.03	1	20	4	4
GBV SUPPORT CENTRE										
Examination Room	Highwall Split A/C	SAMSUNG	AR24MRFQAWKX	R-410A, 1.650Kg	23,987	7.03	1	20	2.325	2.325
LABORATORY										
Biochemistry Lab	Highwall Split A/C	VON	VAA124HMW	R-410A, 0.74Kg	12,011	3.52	1	8	1.65	1.65
Store	Highwall Split A/C	SAMSUNG	AR24FCFSAWKX	R-22, 850g	24,000	7.03	1	11.8	2.695	2.695
Lab Main Working Area	Highwall Split A/C	LG	S306GC	R-22, 2Kg	27,980	8.2	1	14	3.15	3.15

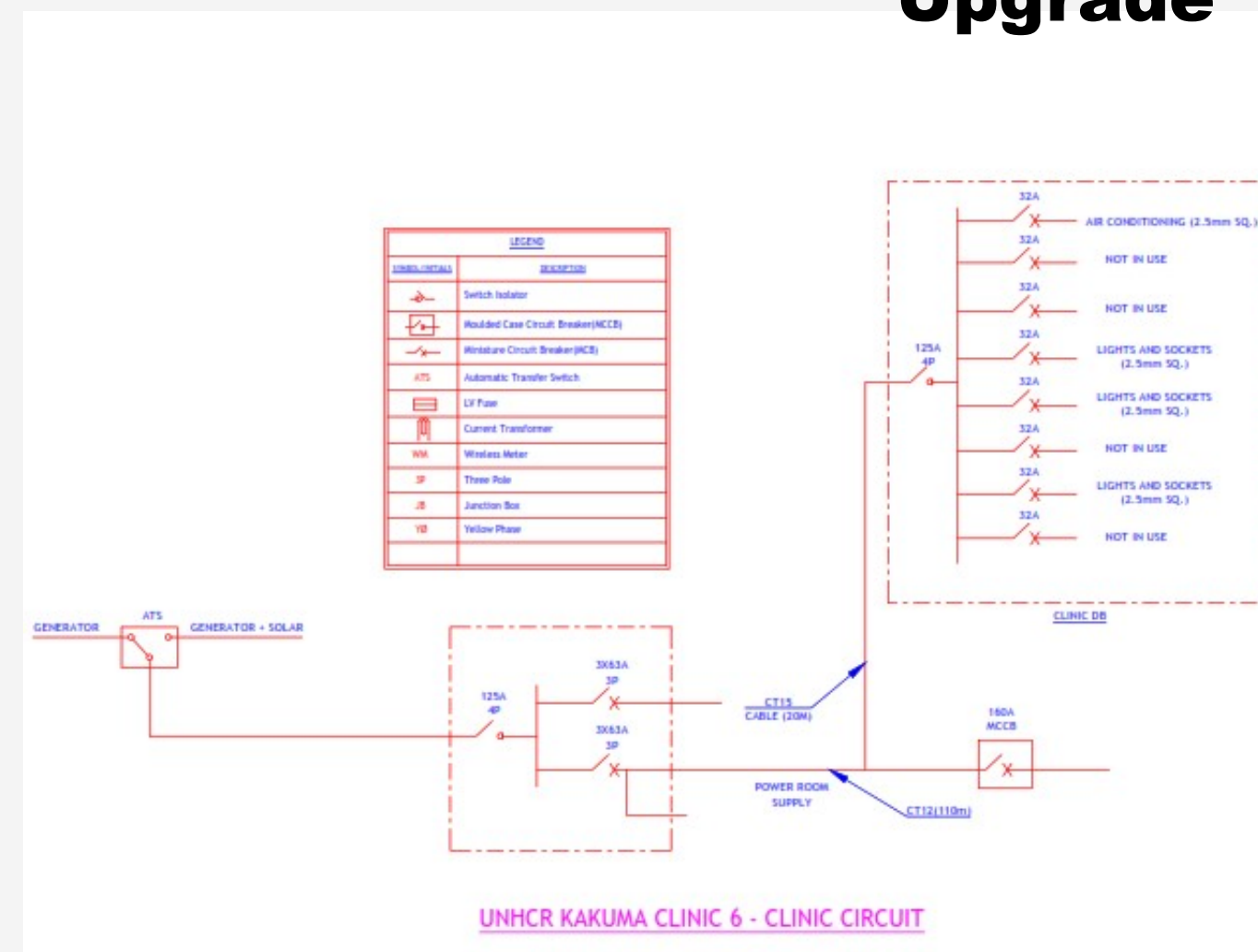


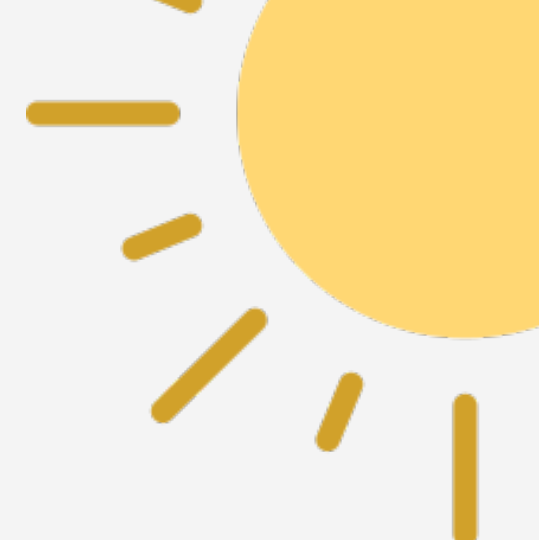


Solar PV System Design

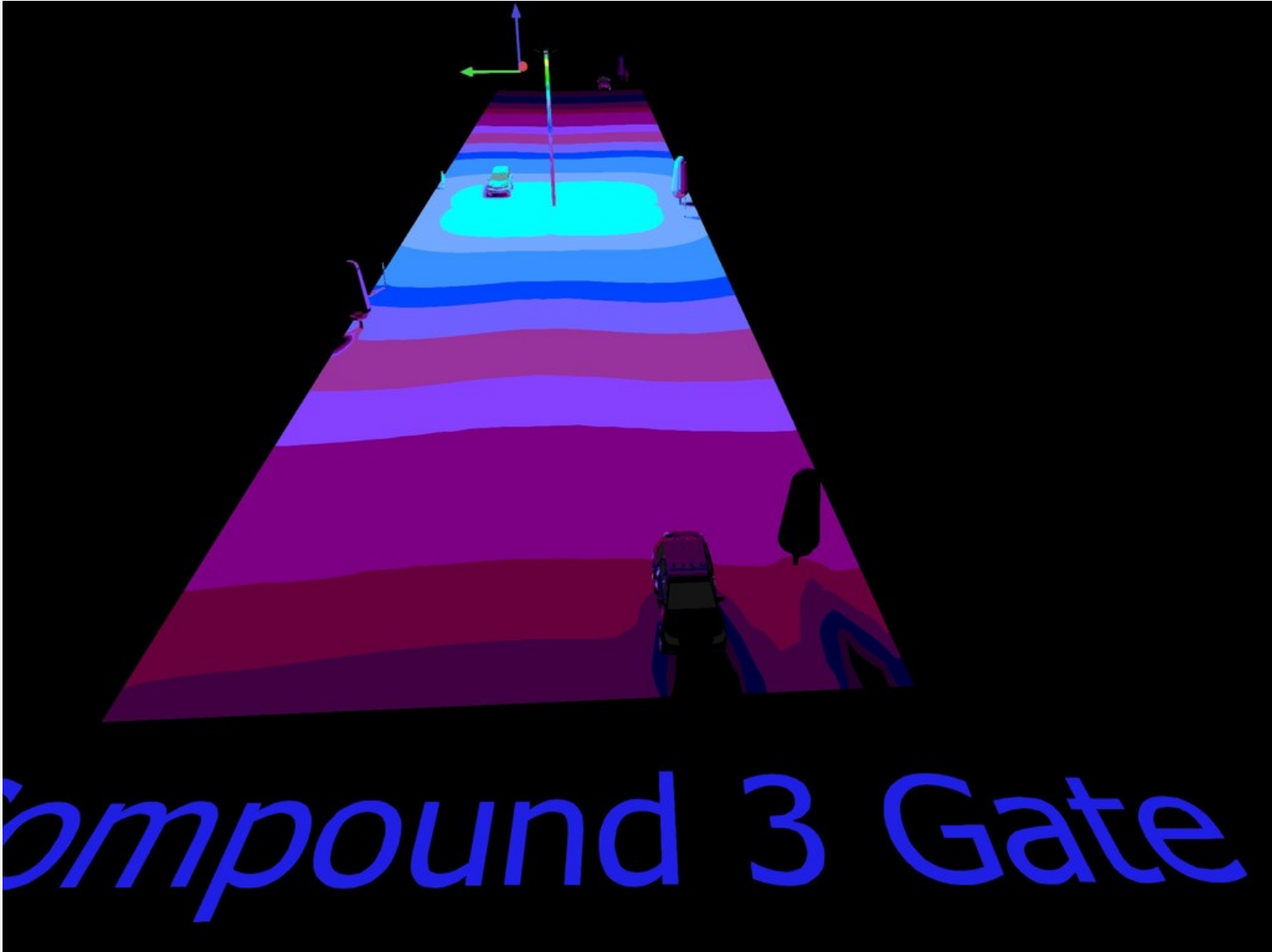
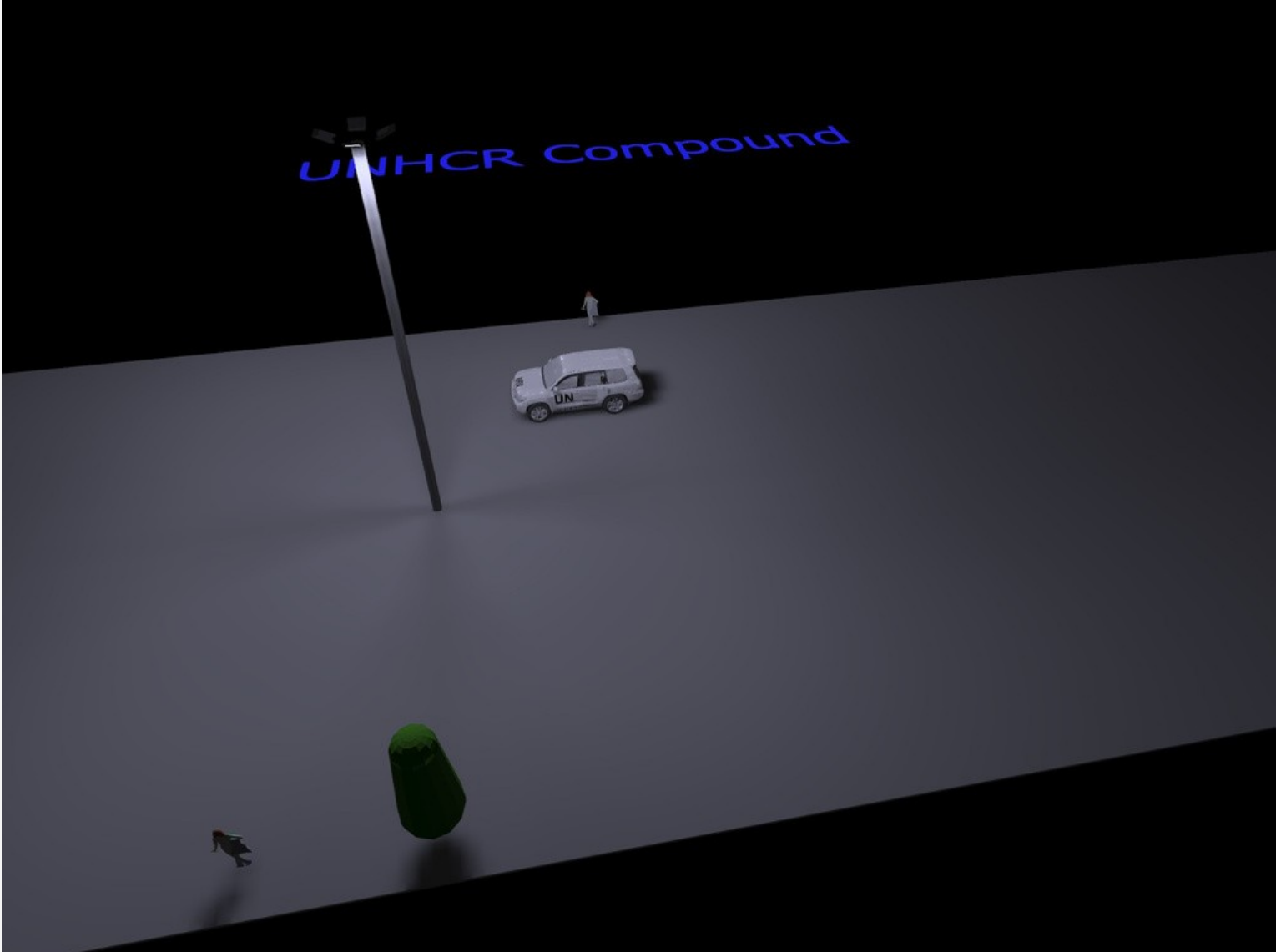


Distribution Network Upgrade

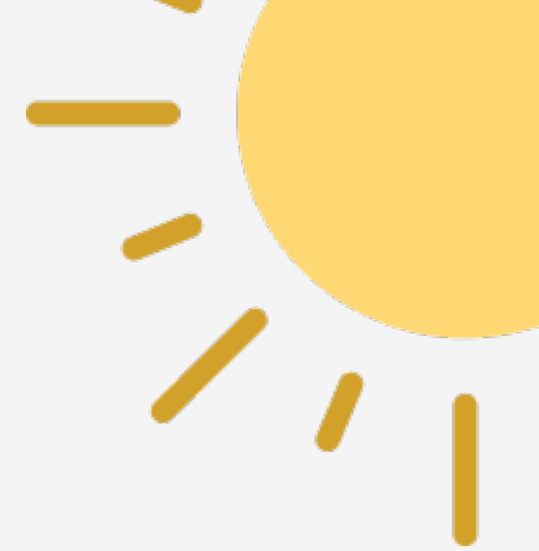
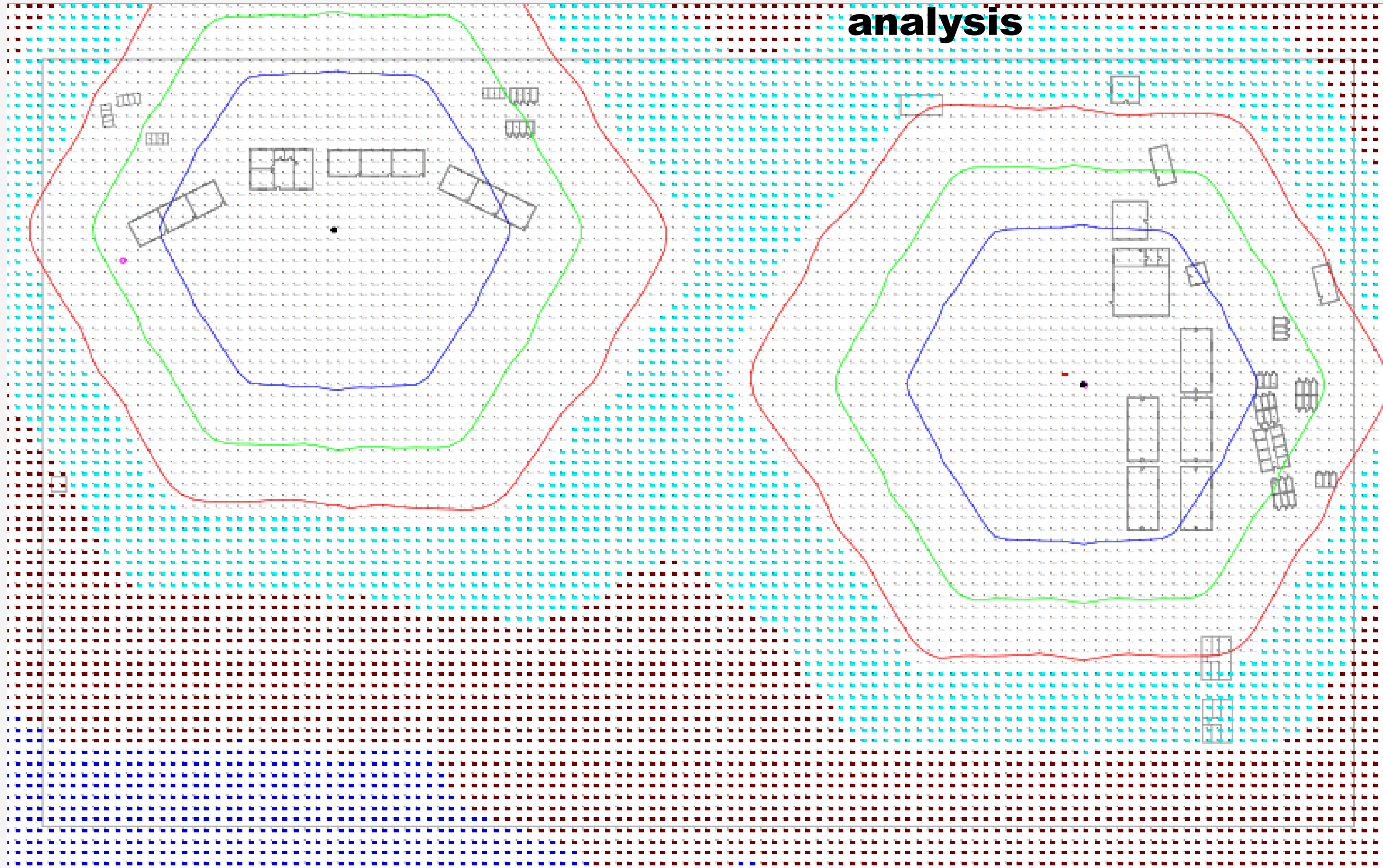


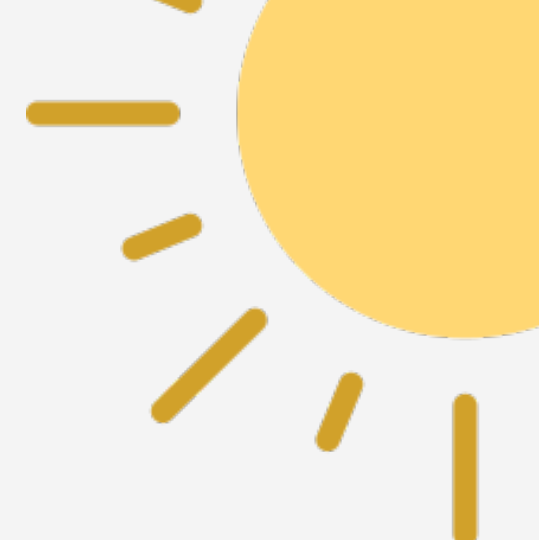


30 meters high-mast lighting analysis

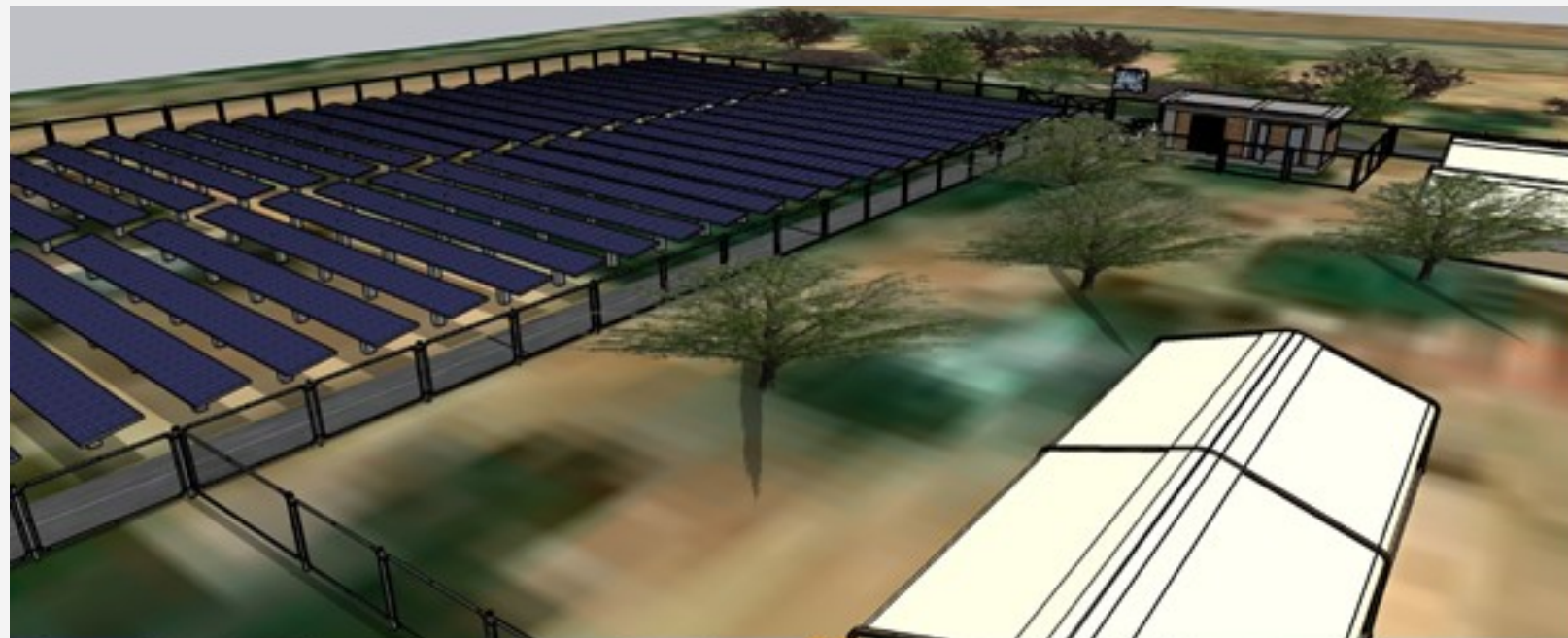


30 meters high-mast lighting analysis

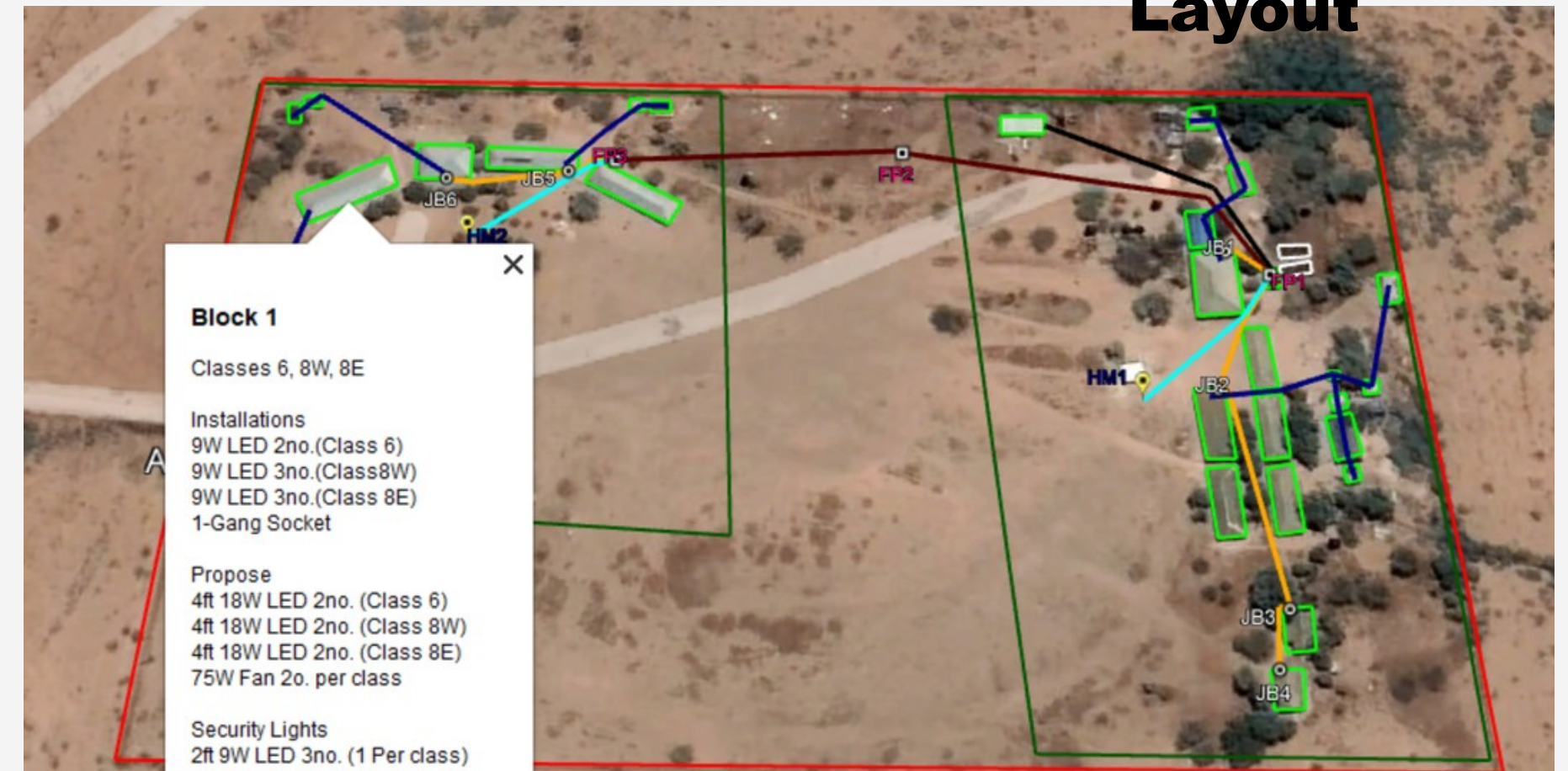




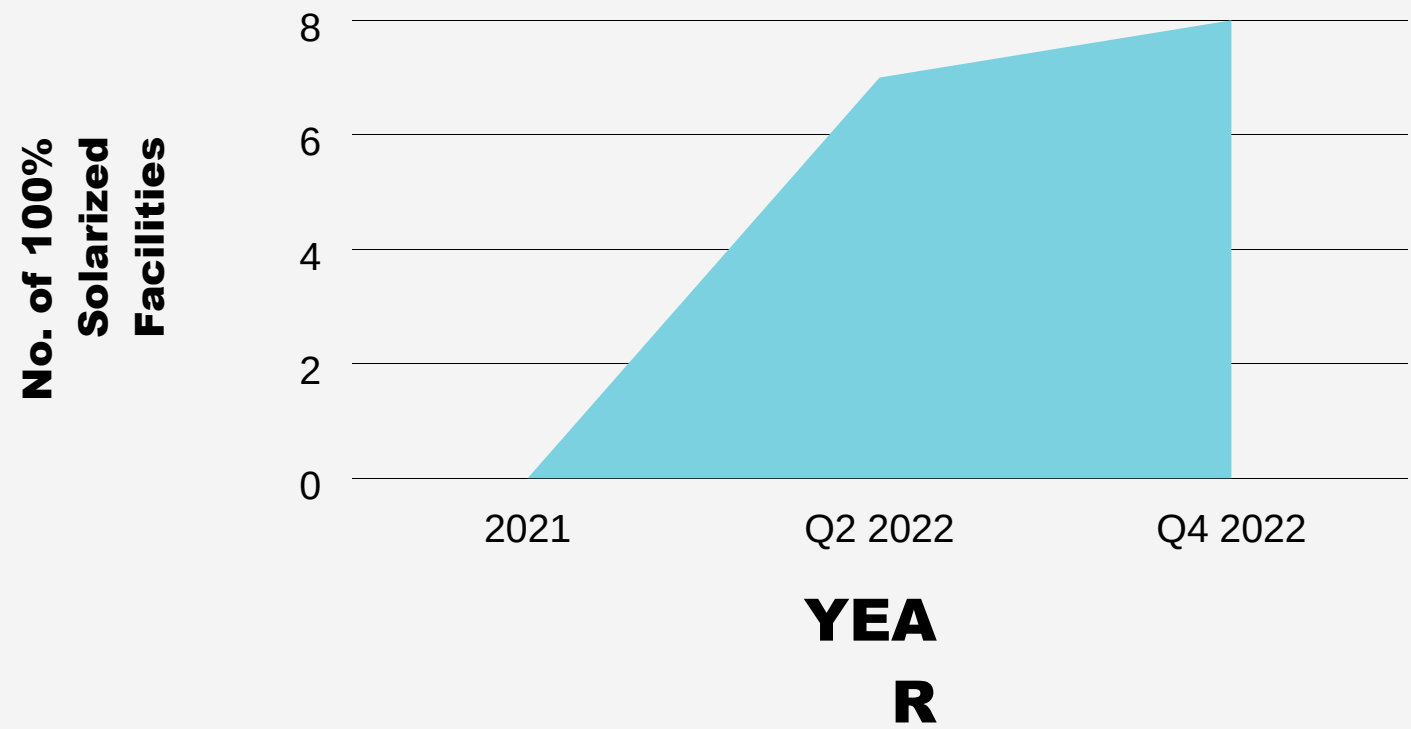
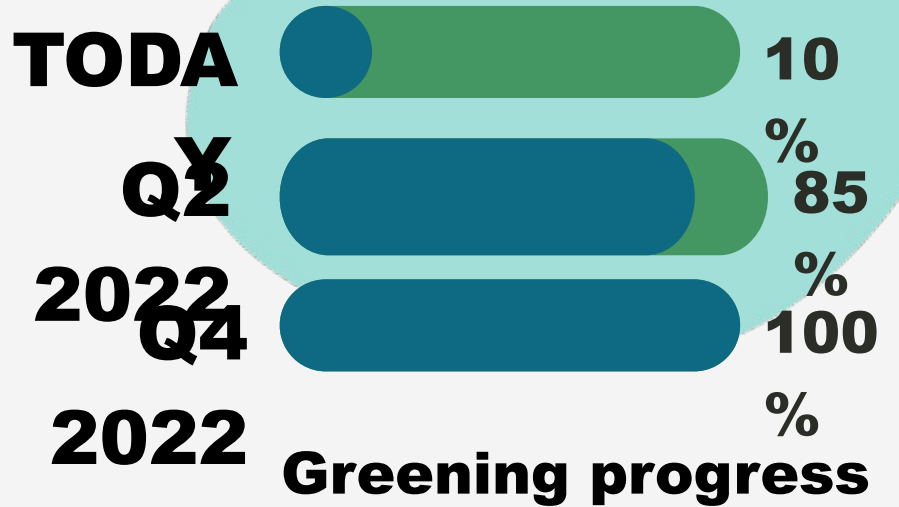
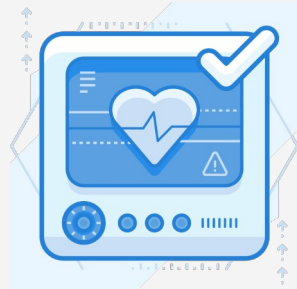
3D Design



Land Availability and Facility Layout

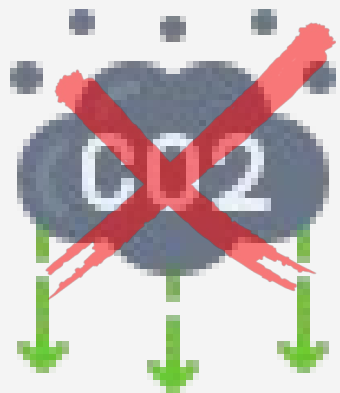


Energy for Health

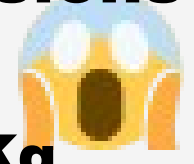


UNHCR Kakuma Sub-Officer will fully solarize 7 out of the 8 health facilities in Kakuma and Kalobeyei by Q2 2022. Achieving 100% Green Electrification is planned before the end of 2022.

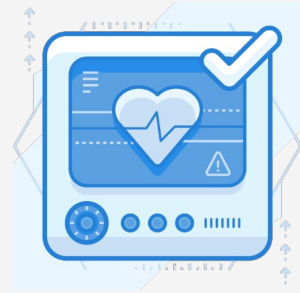
The smallest solar mini-grid is 25 KWp with a storage system for night operations. Diesel generators will be available at the facility on standby or in case of emergencies and unscheduled maintenance.



Avoided CO2 Emissions
279,471 Kg CO2e/Year



Energy for Health



Job Opportunities?

Extensive hands-on and theoretical capacity building training for refugees and host communities members for at least 28 female and male members



All solar PV projects offer a training opportunity for at least 4 refugees and host communities members, part-time and full-time employment opportunities are anticipated after the commercial operation date of the projects.

125 Renewable Energy Technicians 
Pool mid-2022

Energy Systems Servicing

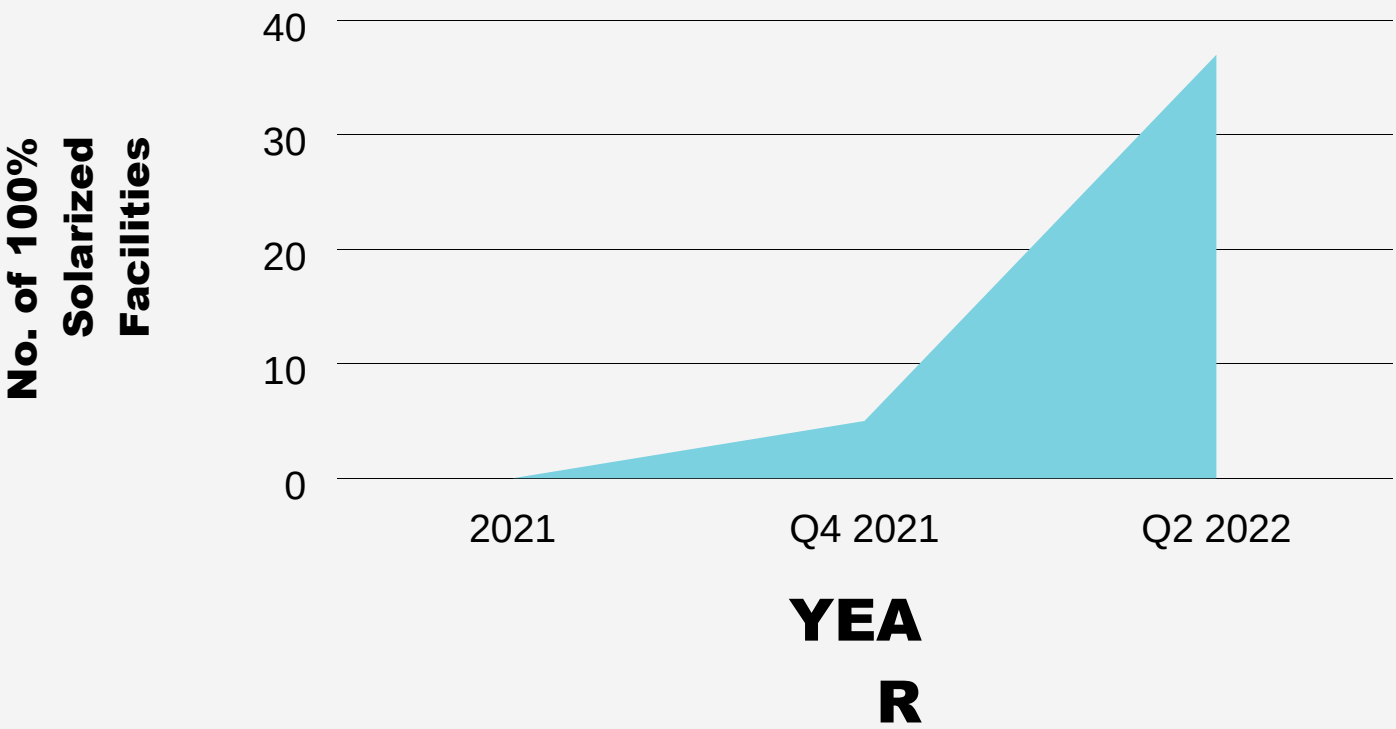


- The projects receive two years of operation and maintenance service from the mini-grids contractor. O&M activities are essential to ensure the system is serviced correctly for extended systems lifetimes.
- Live online monitoring feature

Energy for Education

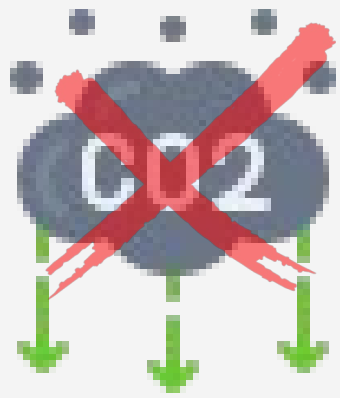


Greening progress bar



UNHCR Kakuma Sub-Officer will fully solarize a total of 37 Education facilities. Achieving 100% Green Electrification is planned before mid-2022.

The smallest solar mini-grid is 15 KWp with a storage system for night operations.



Avoided CO2 Emissions

365,949 Kg CO2e/Year



Energy for Education



Job Opportunities?

Extensive hands-on and theoretical capacity building training for refugees and host communities members for at least 62 female and male members



All solar PV projects offer a training opportunity for at least 2 refugees and host community members, part-time and full-time employment opportunities are anticipated after the commercial operation date of the projects.

125 Renewable Energy Technicians Pool mid-2022



Energy Systems Servicing






- The projects receive two years of operation and maintenance service from the mini-grids contractor. O&M activities are essential to ensure the system is serviced correctly for extended systems lifetimes.
- Live online monitoring feature

Energy for Protection & Security



High-mast security lights installation

The solar mini-grids considered for the education, health and UNHCR facilities will be connected to 20-30 m height grid-connected lighting fixtures. The fixtures will serve the facility and the neighboring community.

- Mast design 
- Project budget 
- Considered Locations* 

Standard Lighting designs for Future Needs

The energy and environment unit considered the future needs to light up more areas in the camp using the same lighting specifications, therefore, standard designs will be made available during October 2021.

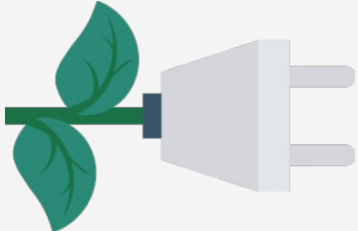
Standard mini-grids designs

The design of the mini-grids to provide the masts with reliable source of power is also in place.

3 different options will be made available to meet the unique need of each future location.

The team will not need to invest more time or resources to design and budget future lighting and power requirements.

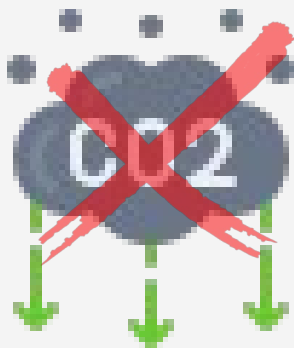
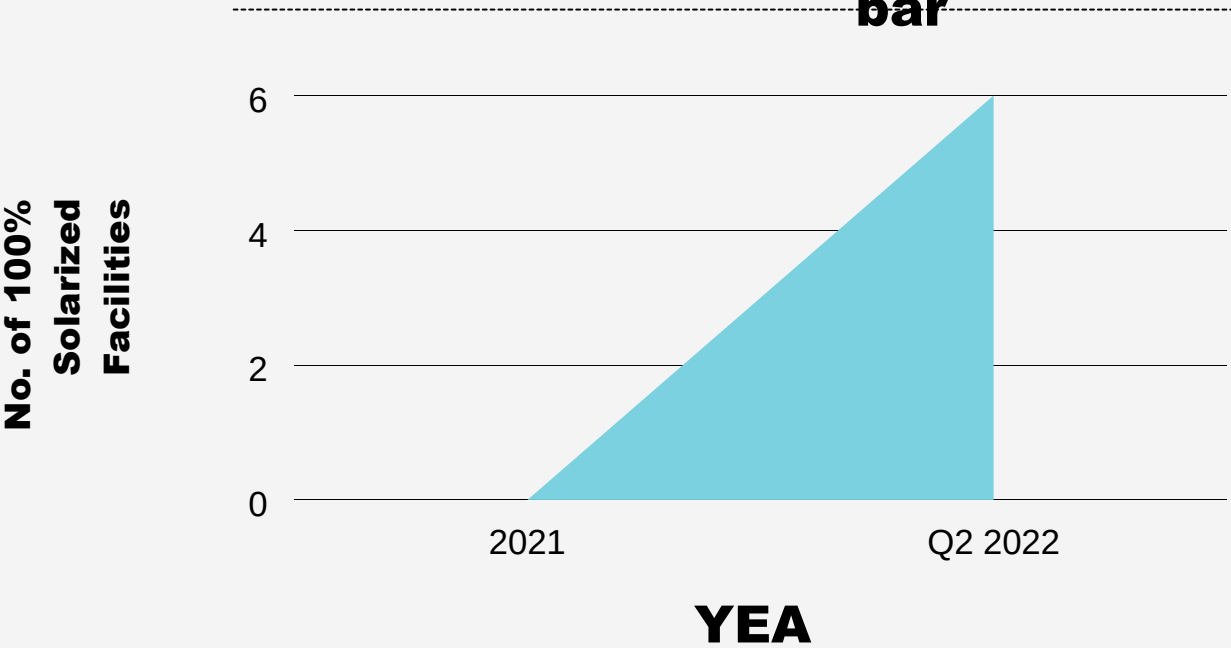
Greening the Operation



UNHCR Field Posts and Reception Centres

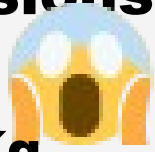


UNHCR Kakuma Sub-Officer will 100% solarize the UNHCR field posts and reception centers in Kakuma and Kalobeyei, this will elemental the usage of diesel generators at all times. The facilities will rely fully on solar generators and storage systems.

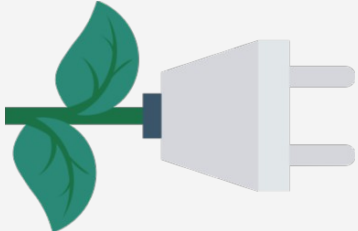


Avoided CO2 Emissions

118,260 Kg CO2e/Year

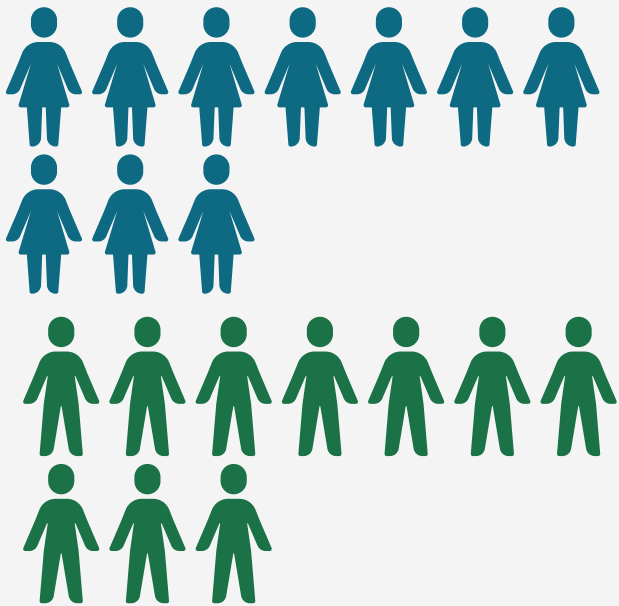


Greening the Operation



Job Opportunities?

Extensive hands-on and theoretical capacity building training for refugees and host community members for at least 20 female and male members



All solar PV projects offer a training opportunity for at least 4 refugees and host community members, part-time and full-time employment opportunities are anticipated after the commercial operation date of the projects.

125 Renewable Energy Technicians Pool mid-2022

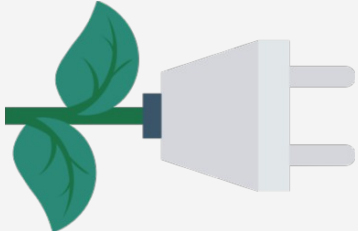


Energy Systems Servicing

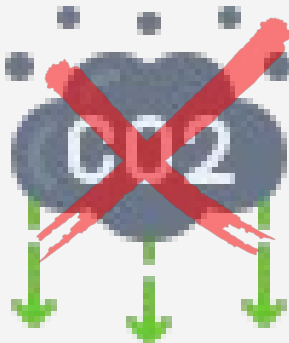
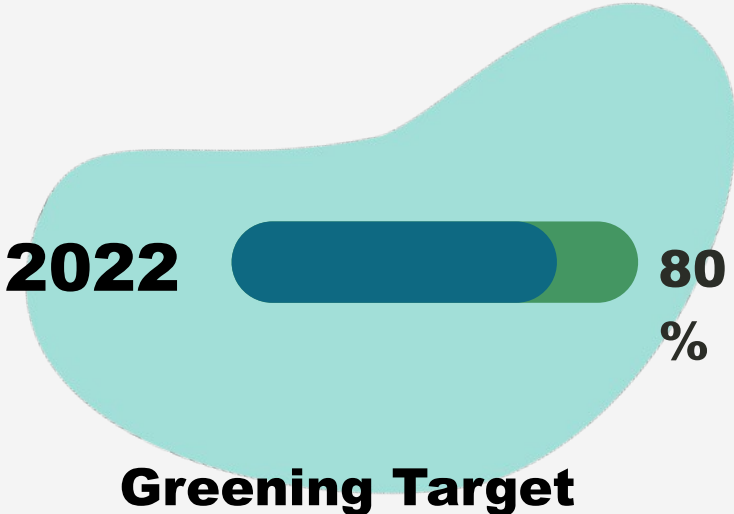


- The projects receive two years of operation and maintenance service from the mini-grids contractor. O&M activities are essential to ensure the system is serviced correctly for extended systems lifetimes.
- Live online monitoring feature

Greening the Operation



UNHCR Compound



Avoided CO2 Emissions

917,000 Kg CO2e/Year



Electricity Bill Savings
25%



UNHCR
The UN Refugee Agency

END OF

Mustafa Almomani

Energy and Environment
PRESENTATION
Specialist

