

Off-Grid Cabin Project

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Off-Grid Cabin

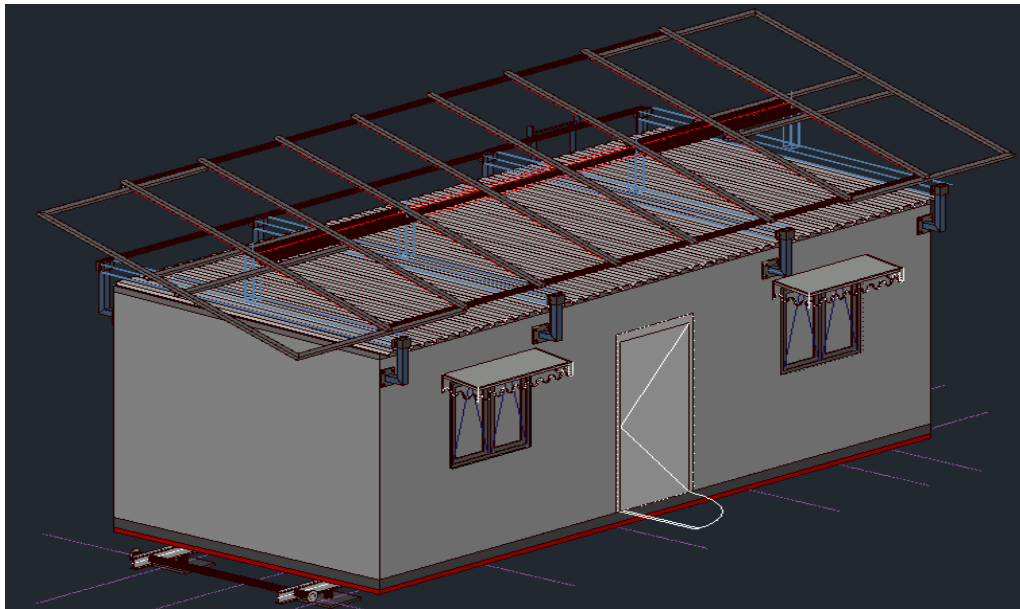
- 100% Solar powered cabins with battery backup
- Project uses TESVOLT's Energy Storage System
- Challenges and assumptions
 - Disconnected from the grid and generator
 - Consider peak temperature of 50°C
 - Consider 6-8 hours/day of direct sunlight
- Objective:
 - Target 24 hours operation time
 - Maintain room temperature of 25°C
 - Savings in CO2 emission and Money
- Projects:
- UAE, Oman & Qatar

Off-Grid Cabin



System Design

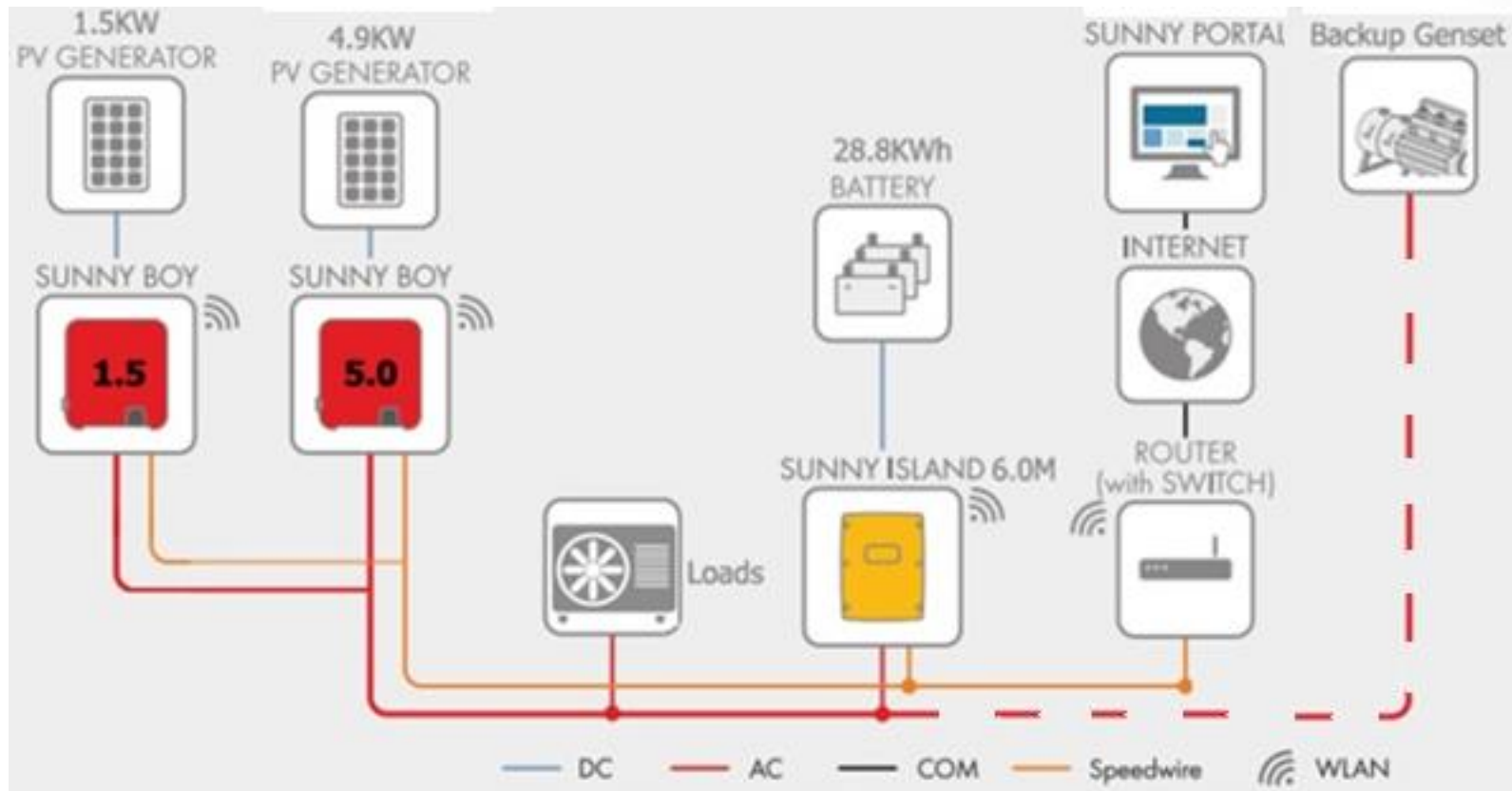
- Factors taken into consideration:
 - The direct sunlight duration during the day
 - The angle and position of the PV modules
 - The tidiness (dust free) of the modules
 - Inverter efficiencies
 - The battery's surroundings temperature
 - The peak load/demand of power during the summer months



System Design

- Loads considered:
 - Air-conditioner (AC): 18000BTU cooling, 220V dual inverter technology AC with a rated consumption of 1.812Kw. 24hours/day but with different demand factors
 - Desktop computer & Networking: desktop computer, a LTE modem, and a local area network switch
 - Power sockets: for convenience 2 double sockets (13A each)
 - Lights: 4 LED AC lights consuming an average of 35W each.

Electrical Single Line Diagram



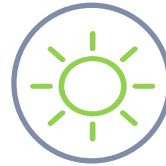
Equipment Used



**18x350W
polycrystalline
PV modules
(3 strings)**



**6x4.8kWh Lithium
Ion Batteries**



**Rockwool
Insulation with
reinforced
aluminum foil**



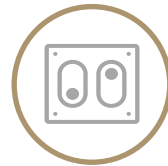
**220V AC unit 18000 BTU
dual inverter with rated
consumption
of 1.812kW**



**4x35W LED
AC Lights**



**Desktop PC
with LTE
router**



**1xDC to AC
Battery Inverter
4.6kWh, 220VAC
output rating**



**2xPV DC to AC
Inverter
output of
230VAC 33Amp.**

Construction Steps

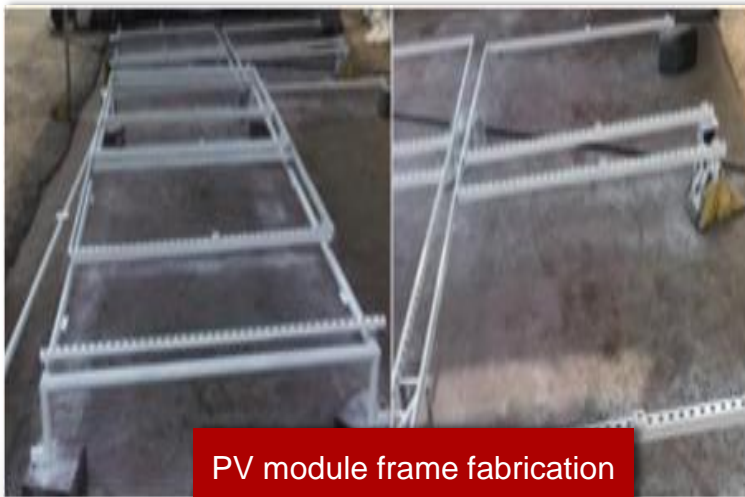


Initiation



Dismantling

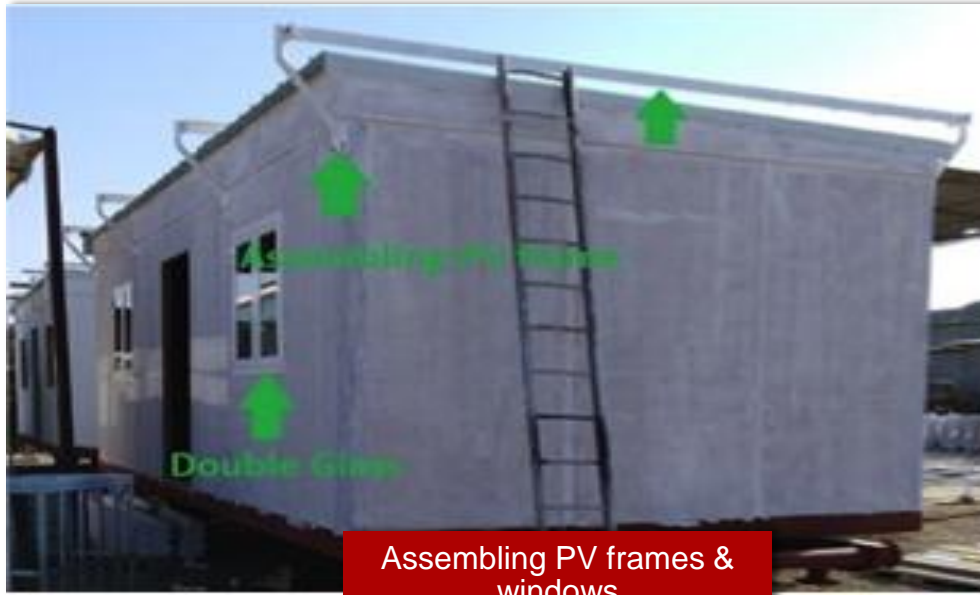
Construction Steps



Construction Steps



Construction Steps



Assembling PV frames & windows



Installing sliding rails & channels



Final touches

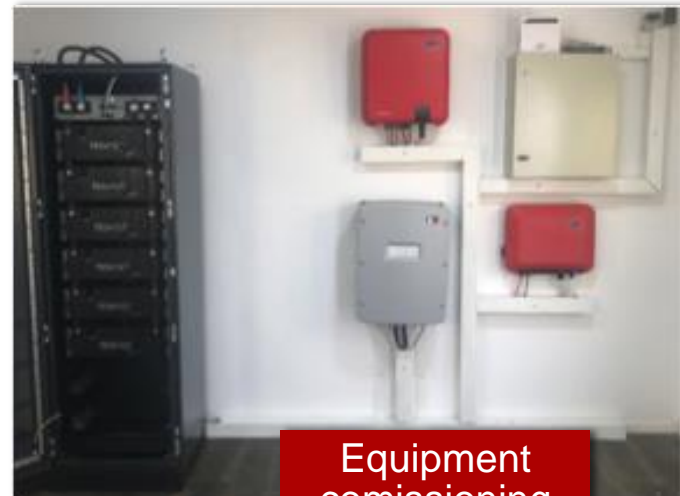
Construction Steps



Modules installation

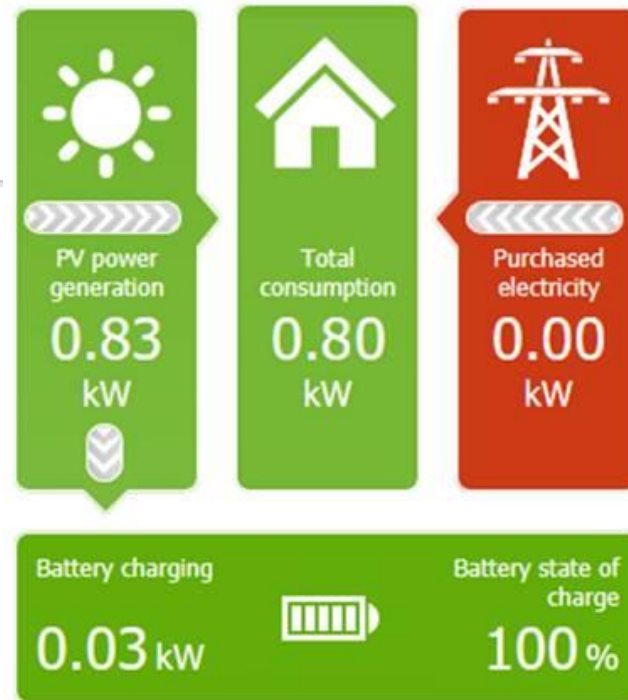
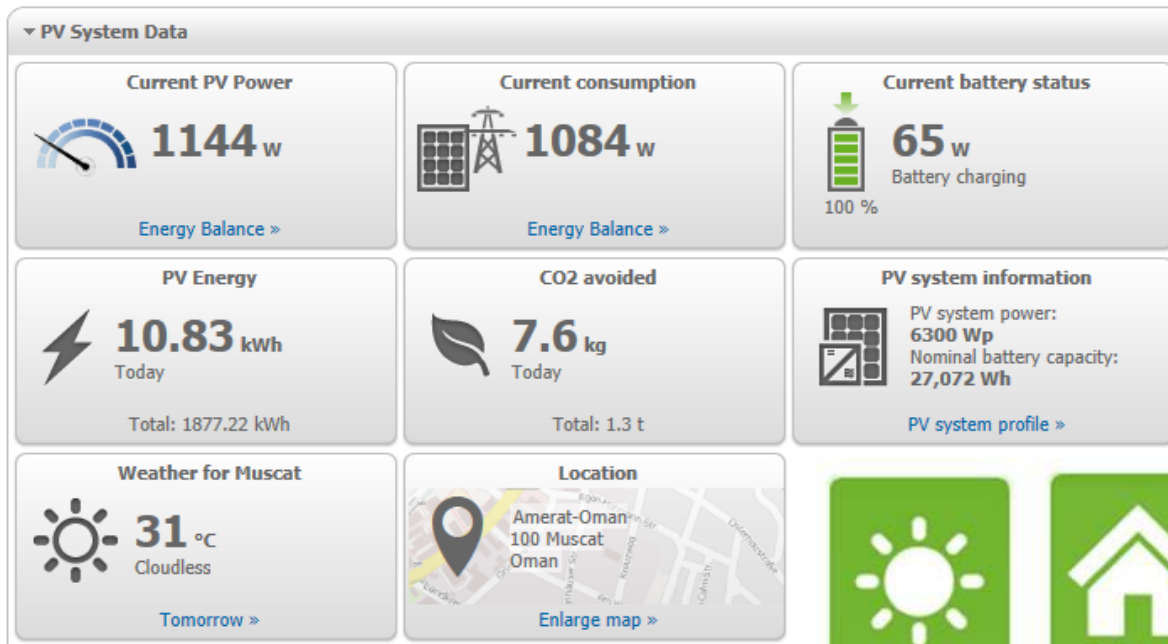


Equipment installation



Equipment
comissioning

System monitoring



Verification of System Performance

- Minimum System Requirement Testing
 - Allowed for 24 hours operation time with room temperature of 25°C.
- Battery Storage System Capabilities Testing
 - PV modules shut down
 - Batteries fully charged
 - Load running
 - → Continuous 38.75 hours (target was set at 24 hours).
- PV Modules Capabilities Testing
 - Batteries fully drained
 - Load running
 - → PV modules fully charge the batteries in 10.5 hours.

Next Steps

- Test technology on larger scale
- Make 17% of our camps powered by PV panels
- Use in combination other system such as zero-mass panels

Thank you!