



Introduction to Phase 1B HC PV Power supply system

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Outline

- Training objective
- Overview
- Main components introduction
 - PV array
 - Technical room
 - Health Electrical appliances
 - Health Center community
- Load management
- Routine maintenance
- Follow-up and reporting



Training objective

- At the end of this training the trainees will:
 - Identify main parts of Health Center PV power supply system
 - Perform routine service for the installed PV system
 - Practice safe operation and appropriate utilization of the system



Overview

Background

- Installed 50 PV 1.43KWp systems (Phase 1A) and are operational since 2008
- Installed 50 PV 1.7KWp systems(Phase 1B)
- The systems are distributed in nine regional states based on the Federal resource distribution method
- 8 local companies have installed the PV systems
- Installation is supervised by GIZ-ECO
- All installations are performed as per the preset minimum standard



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- First level end-user training conducted-by each Installing company- for all employees of Health center at site
- This training is a continuation of the first one

Target Group:

- Health center representatives and
- Woreda health desk representative



Main components of the system

Phase 1B HC PV power supply system is an AC coupled system

1. PV Power Generator
 - A. PV Array
 - B. Sunny Boy
2. Technical Room
 - A. Sunny Island including Sunny Remote Controller
 - B. Battery Fuse
 - C. Battery Bank
 - D. PV main distribution board
3. Health center electrical appliance
4. Health center community



PV Power Generator



- PV modules Converts solar energy to electrical energy
- Types of PV modules
 1. Crystalline
 - Mono crystalline
 - Poly Crystalline
 2. Tin film
 - Amorphous



Health Center PV Module

Mono Crystalline

- Module 1 x 170W=170 Wp
- String 5 x 170W= 850 Wp
- Array 2 x 850W=1700 Wp





Sunny Boy

- Is also called string inverter
- Converts DC to AC

SB 1700

- Input :
 - Power: 1850 Watt (max)
 - Voltage: 139- 400V DC
- Output :
 - Power : 1700Watt (Max)
 - Voltage : 220-240V @50Hz



Sunny Boy

- Invert DC to AC
- Create an opportunity for AC coupling
- Function on wide range of input voltage (139-400V DC)





Technical room

- Is Power control house of the PV power supply system
- Is a room for Sunny Island, Battery Fuse , Battery Bank, Sunny Remote Controller, PV-MDB
- Requires Scheduled Cleaning
- Do not store any material in TR
- Put all forms and manuals properly in box file provided



Technical Room





Sunny Island (SI)

- SI is system manager, also called battery inverter
- Converts AC to DC when charging the battery
- Converts DC to AC when supplying to the system
- Battery state Manager



Sunny Island - SI2224

Inputs

- Input AC:
 - Voltage: 172.5-250V @50Hz
 - Power: 5.75KW max
- Battery
 - Voltage :24V DC
 - Charging Current: 90A Max
 - Battery Capacity: 100-10000AH

Output

- Voltage: 202- 250V AC @ 45-65Hz
- Power: 2200 W



Main Tasks

- Battery Management
 - Efficient battery charge and discharge
- Load management
 - disconnect load at deep discharge and
 - connect load when recharged
- System Management
 - Regulation of energy source
 - Regulation of load/ consumption
- Over load protection



Sunny Remote Controller

- The Sunny Island is controlled via the external display (Sunny Remote Control) (SRC)
- SRC is Sunny island and system controller
- Monitoring and displaying device



Bat Fuse

- Protects battery from short circuit
- Isolate battery bank from Sunny Island





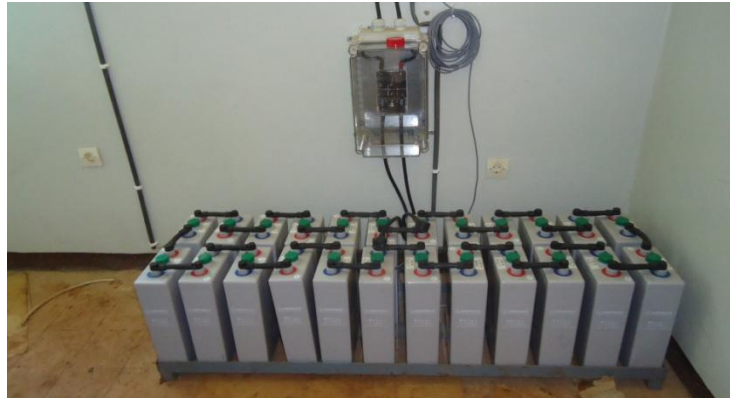
Battery Bank

- Store electrical energy in a form chemical energy
- Supply the load in the evening and foggy days
 - Battery cell : 200AH @ 2V
 - Battery Bank: 12 cells 200AH @2V, connected in series= 200AH @24V
 - Battery Bank: 2 of the above battery banks connected in parallel = 400AH @ 24V



Battery Bank:

- Store the generated electrical energy
- Supplies the load during night and foggy season



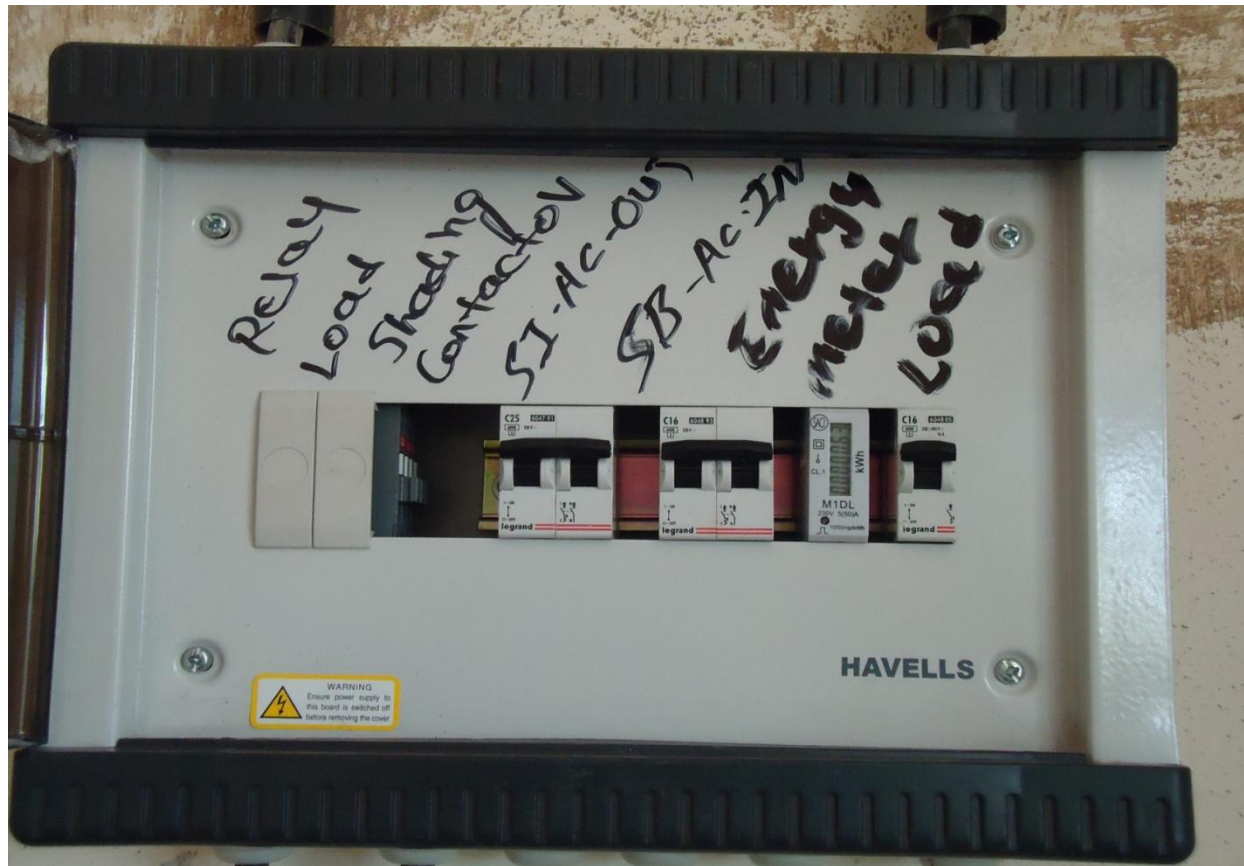


PV Main Distribution board

- Is the protection center of the PV system
- Is main controller of the PV system
- Interconnect and protect SB, SI and loads
- Integrate the PV system with the building electrical system
- Register the Energy consumed via the Kilo- watt hour meter (KWh-meter)



Main Distribution Board (PV)





Health Center Electrical appliances

Medical

- Energy saving lamps , 220V AC 11W, and 8W
- Vaccine refrigerators:
 - Sibir:
 - Domatics: 3000/2000
- Vaccine deep Freezers
- Centrifugal machines:
- Microscopes:
- Suction pumps:
- Starilizers:

Non Medical

- Energy saving lamps , 220V AC 11W, and 8W
- Audio-Visual appliances:
- Radio, TV, VCD/DVD players
- Mobile, telephone:
- Computers:
- Printers:



Load management

Fridge

- Operation hour:
- Power:

- Energy Consumption:

- Daily generated Energy:
- Daily Consumed Energy:

Veranda Lighting

- Operation Hour:
- Watt:

- Energy Consumption:

Sterilizer

- Operation Hour:
- Watt:

- Energy Consumption:



Sterilizer/ fridge/verandah lighting/ tape











HC Community

- HC employees
 - Medical staff
 - Support staff
- Woreda Health Bureau



Routine maintenance

- Daily
- Weekly
- Monthly
- Annual service (twice every sixth month)



Follow up and reporting

- Compile report
- Submit every xxxxx to



Thank You



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