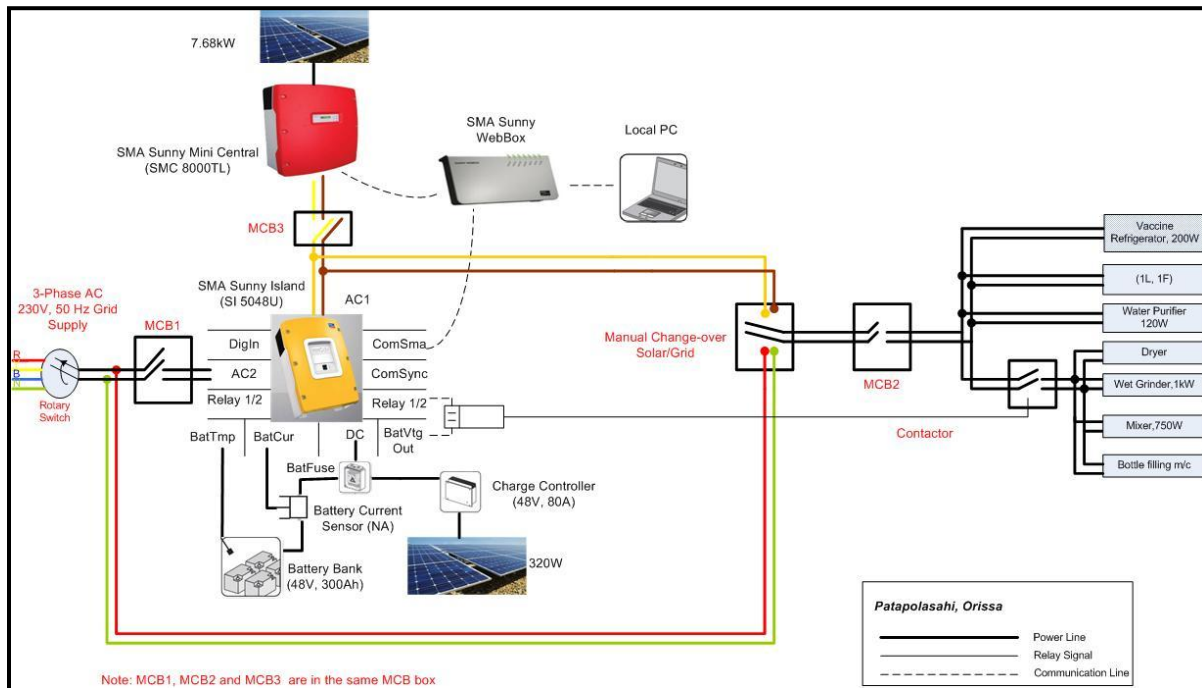


Plant layout of AC microgrid installed at three of the NFA site:

The SMU installed in the entire three sites consists of the hybrid AC microgrid, supply power to the livelihood generation activities and lighting.

Schematic Diagram of the system



Plant specification:

S.No	Components	Manufactures	Description
	Solar Photovoltaic Modules	Sharp 80Wp	Total Capacity 8kWp
	Battery Bank	Exide Tubular 12V, 150Ah	Total 48V, 300 Ah
	Hybrid Inverter	SMA SI 5048U	Hybrid inverter with inbuilt battery management system Power frequency shift control
	PV Inverter	SMA SMC 8000TL	Connected directly with

			7.68kWp solar modules
	Sunny WebBox	SMA	For monitoring the real time performance of PV plant
	Load Shedding Contactor	C&S 48V, 40A	To prevent the battery from drainage
	Charge Controller	80A, 48V	320Wp is connected directly to CC to charge the battery

Performance assessment of SMU:

In the SMU, sunny Web-box has been installed to log the plant data related to PV inverter, hybrid inverter, and Batteries bank. There are two ways to carry out the performance assessment of the plant:

1. Through the data stored in the Web-box
2. And Manual data logging

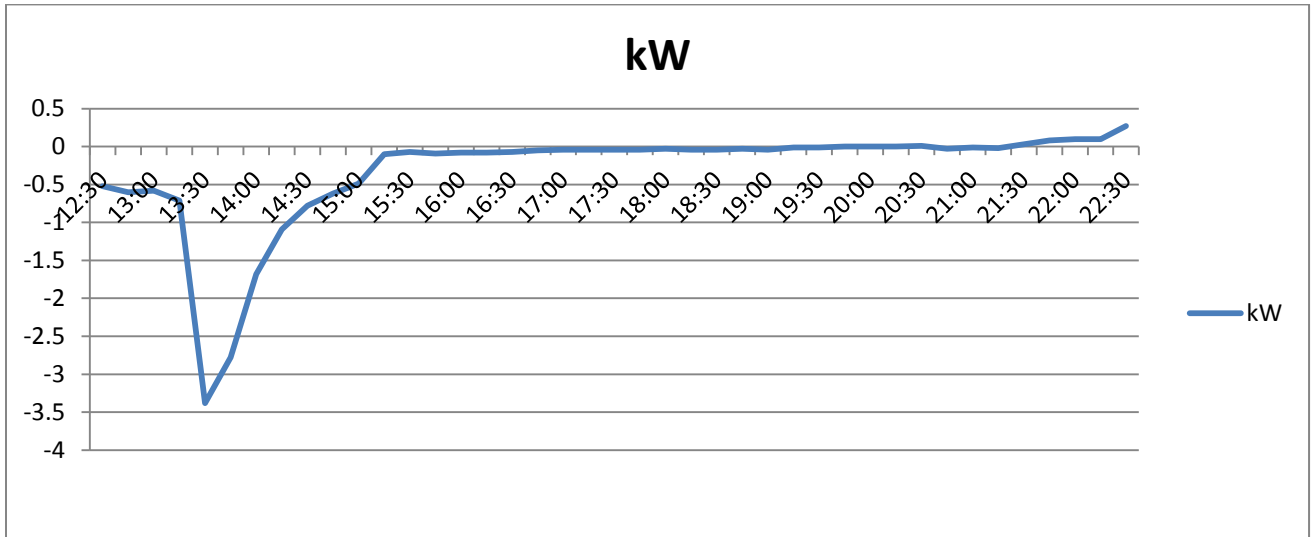
Web-box logs the data every 15 min, the following parameters are monitored throughout the day

1. Energy generated though out the day
2. Time v/s power analysis
3. Voltage and current profile
4. Battery charging characteristics
5. Battery current v/s time
6. Time v/s frequency

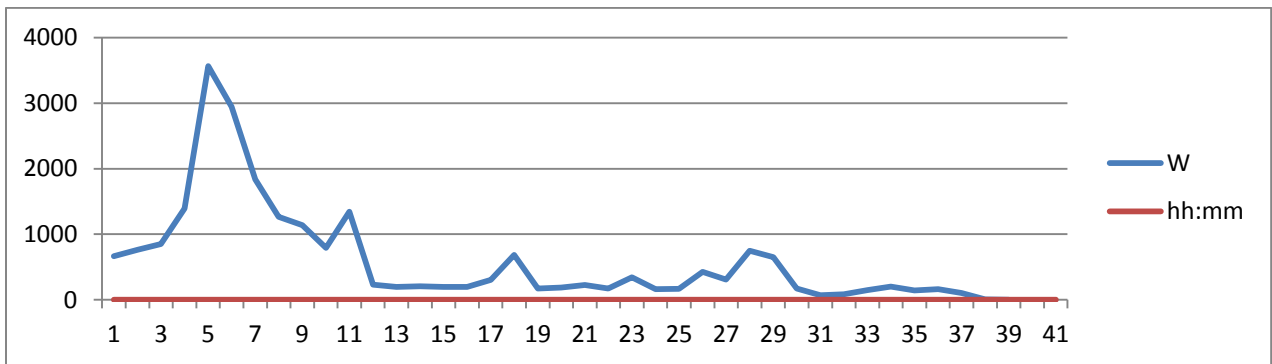
Note: The above data can be extracted from the excel sheet stored in the memory card of the Web-box.

Following graphs will be plotted from the data obtained from the Web-box

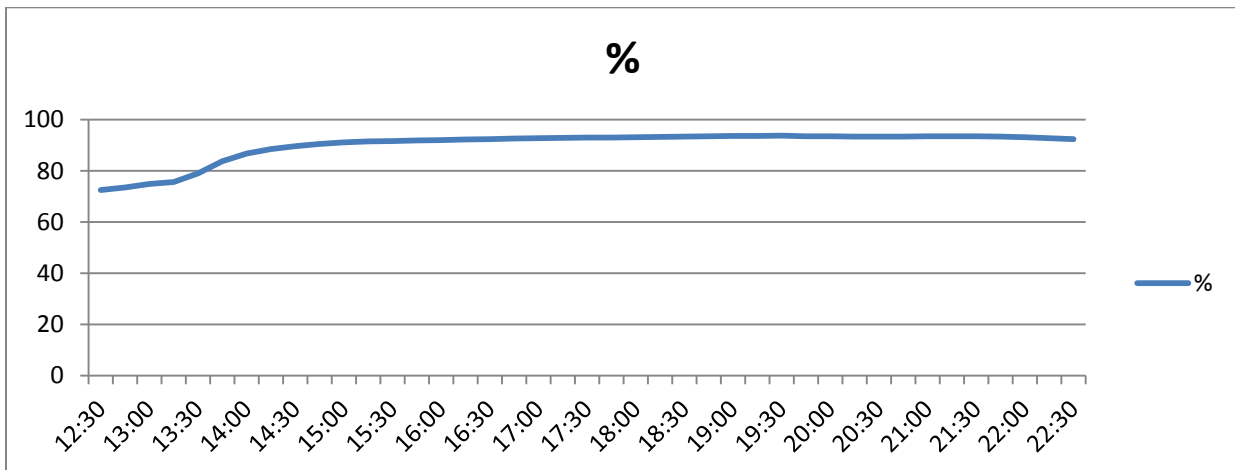
- Daily load profile from SMA Sunny Island



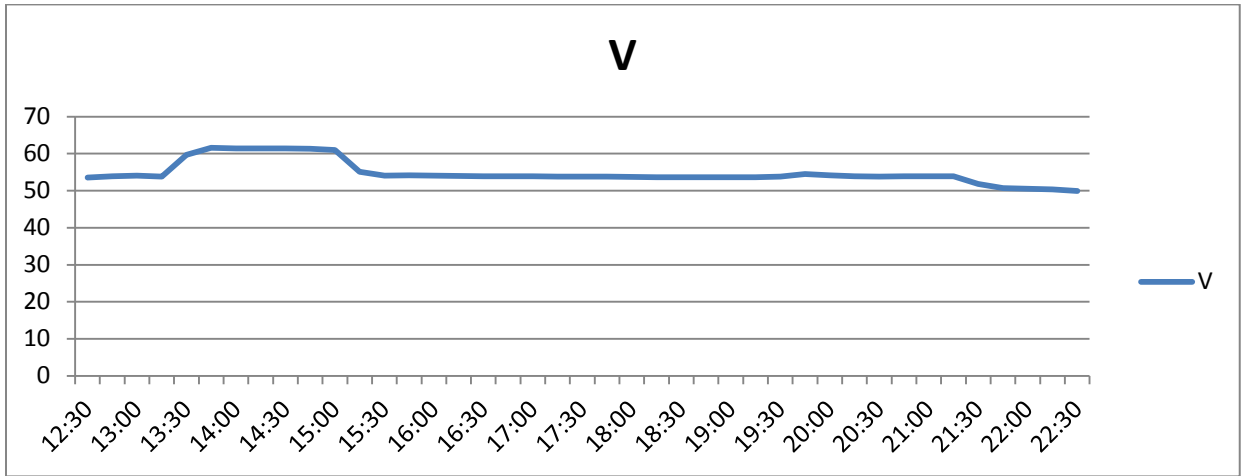
- Daily PV generation from SMA Sunny Mini Central



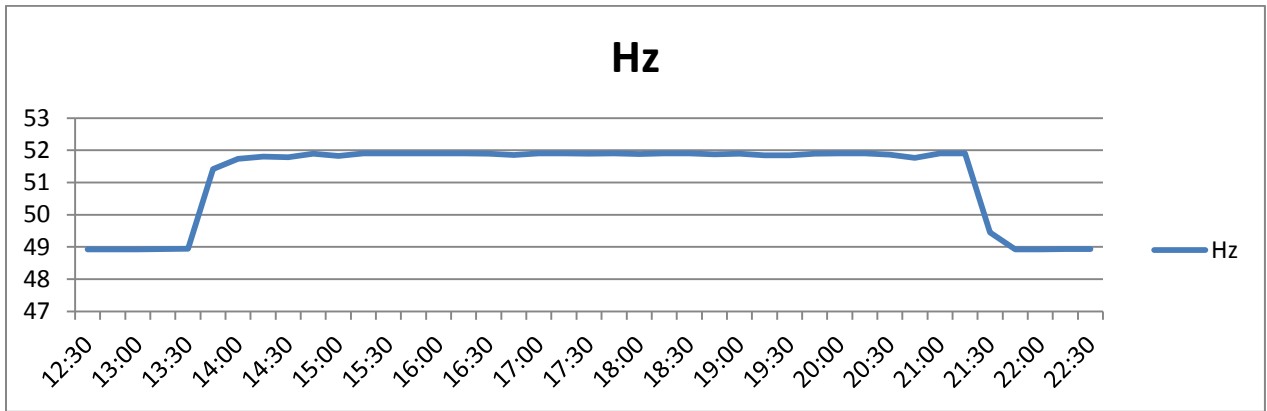
- SOC status of battery from SMA Sunny Island



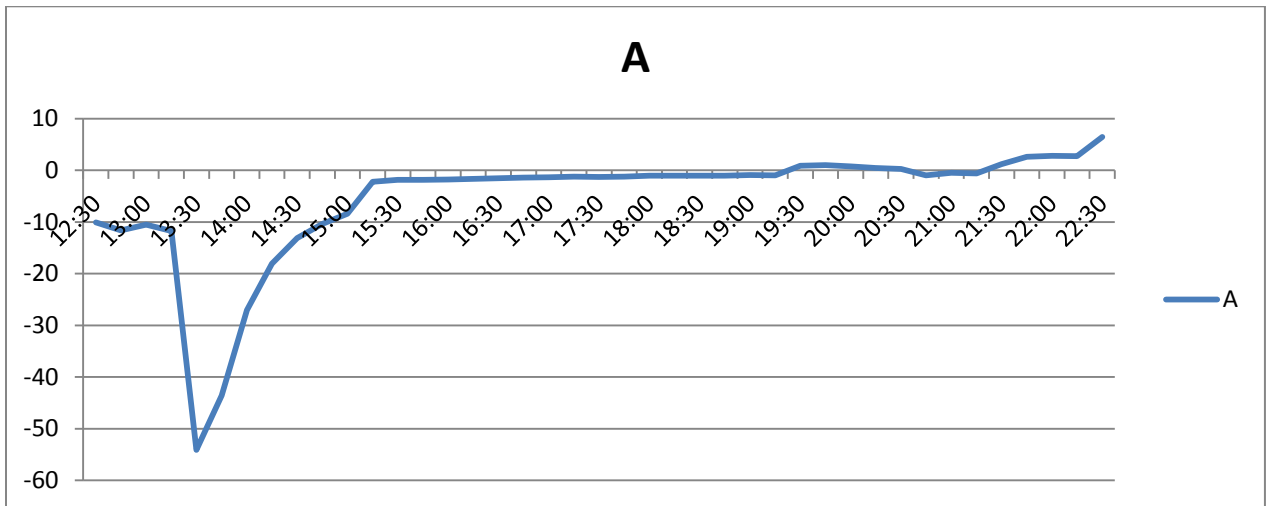
- Battery voltage profile



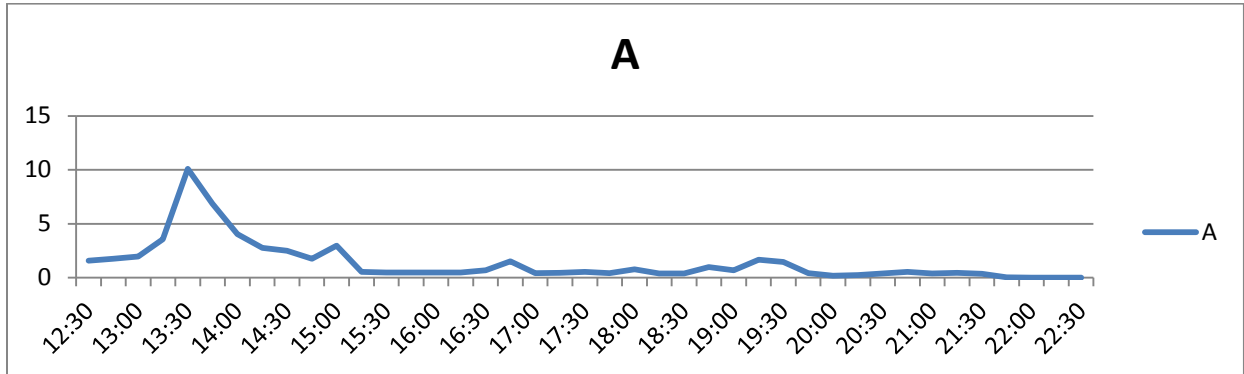
- Frequency profile from Sunny Island



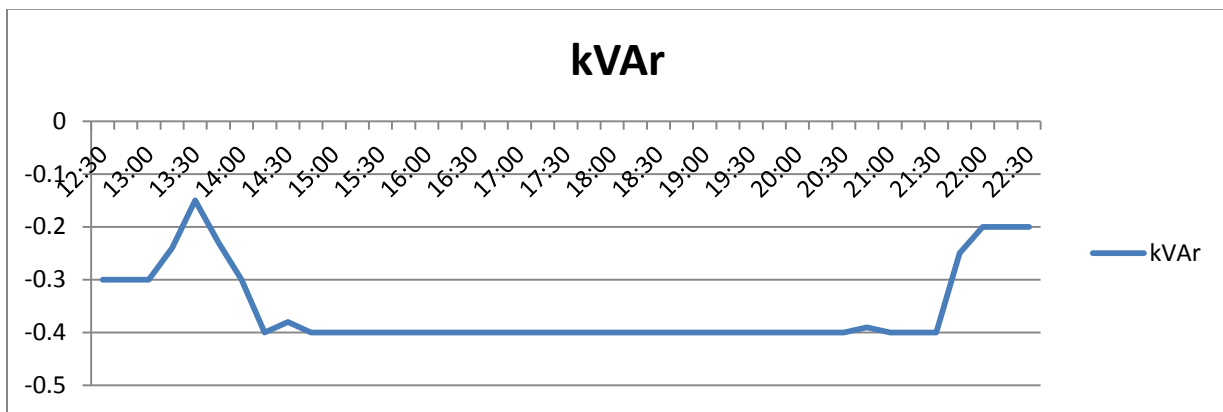
- Net battery current flow profile



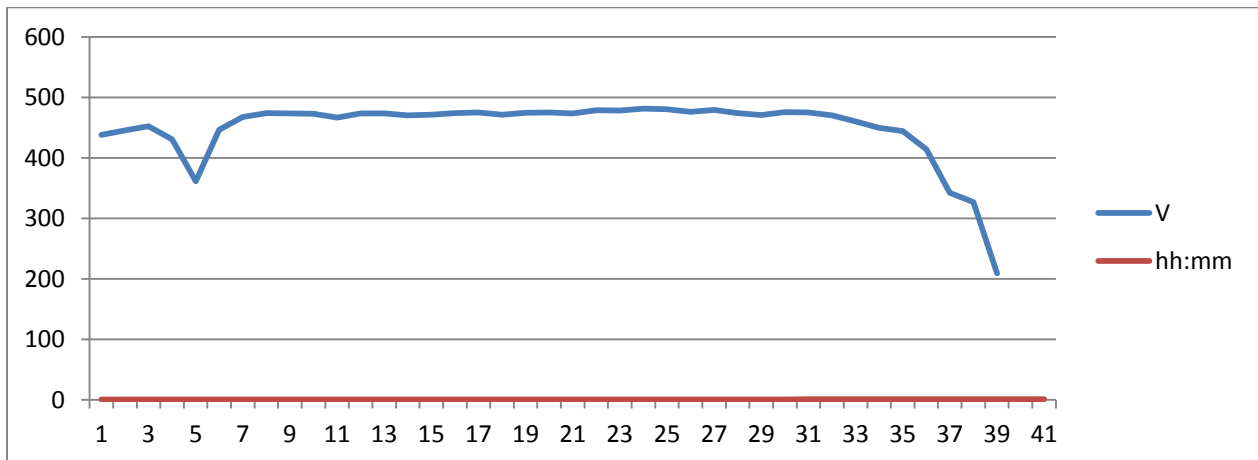
- PV current (I_{pv}) Profile from SMC



- Reactive power profile



- Voltage Profile (V_{pv}) from SMC



Manual data logging:

1. Solar radiation v/s power
2. Solar radiation v/s current
3. Solar radiation v/s voltage
4. Temperature v/s current
5. Temperature v/s current
6. Temperature v/s power
7. Surge current of equipment (having motor as load)
8. Actual power consumed by the equipment
9. Resources side measurement string current, voltage etc. (if possible)

Instrument Required:

1. Multi-meter with temperature probe or clamp meter
2. Solar power meter

Format for Manual data logging: PV Inverter (Sunny Mini Central)

S.No	Time	Temperature	Solar Irradiance (Global)	Voltage	Current	power	energy
1.							
2.							
3.							
4.							
5.							
6.							
7.							
						E total	

Batteries characteristics:

S.No.	Time	Voltage	Current	Power	Energy	Watt-hour
1.						
2.						
3.						
4.						
5.						

Livelihood Generation Equipment:

1. Name of Equipment: **Grinder**

Operating voltage:

Starting current	
Steady state current	
Starting Power	
Steady state power	

2. Name of Equipment: Mixer

Operating voltage:

Starting current	
Steady state current	
Starting Power	
Steady state power	