



# Solar Installation

Lagos /Nigeria. March, 2019



The 40 solar modules are connected in 8 strings with 5 modules in series. The maximum Voltage per module is 43.2V which gives a maximum voltage (STC) of  $5 \times 43.2V = 216V$ . Since the temperature in Lagos is never below  $25^{\circ}C$  (STC), the maximum Voltage will be always less than the allowed 250V of the charge controller.

The maximum charge current to the batteries will be  $13.6kWp / 48V = 283A$ . Since we have a high irradiation in Lagos (at least if the smog is not too strong), we can expect  $1.3 \times 283A = 378A$ . The batteries should be charged with maximum C10 of the capacity at C20 ( $2 \times 925Ah = 1.850Ah$ ) which gives us 185A. Therefore the maximum charge current of the batteries is too high and has to be programmed at the MPPT Charge Controller accordingly to 46A each. Originally we had planned a higher battery capacity and then the modules would have matched perfectly. But because of limited financial resources we reduced the size of the batteries.

The strings from the solar modules are protected with surge protectors and can be switched off by a PV insulator. The power to the load is provided by two 48V / 5000VA Victron MultiPlus inverter/ charger. In case the batteries are in a stage of low charge and there is not enough sun shine (clouds and rain), the batteries can be charged by the grid via the MultiPlus chargers. In case of any problem with the solar system, it can be connected back to the grid by a change over switch.

- The weak construction of the roof, which had to be first reinforced before we could install the modules on the roof.
- The limited financial resources to buy the needed size of the battery bank.

# Facts

## Location

Delegate House in Iju / Lagos in Nigeria, at the 3rd floor.

## Installation Date

March, 2019

## End Users

Delegate House of the Salesians of Don Bosco, Nigeria Delegation.

## Technical Data

- Victron Charge Controller 250V / 100A, 4pcs
- Victron MultiPlus Inverter / Charger 48V/5000 VA, 2pcs.
- Batteries: 6V / 1200Ah@C100, 16pcs, Trojan, Total 115.2kWh.
- Solar modules 144 half cells, 40pcs, each 340Wp, Total 13.6kWp.
- GX Color Control.
- Battery monitor BM700.

