

# PROJECT REFERENCE 2017

## OFF-GRID SOLUTIONS





## 1. Project Scope

Mechanical Electrical and Plumbing design and implementation

Design, supply and installation of following systems :

- **Off-grid power system** with **solar photovoltaic** as main power source and back-up generators
- Centralized and individual **solar hot water**
- Deep well **water filtration**, clean **water storage and distribution**
- Waste **water treatment** plant and **water recycling**
- All water and energy **automation** and **monitoring**
- Air conditioning, fire fighting (100 m<sup>3</sup> dedicated storage)

## 2. Hybrid PV Power System

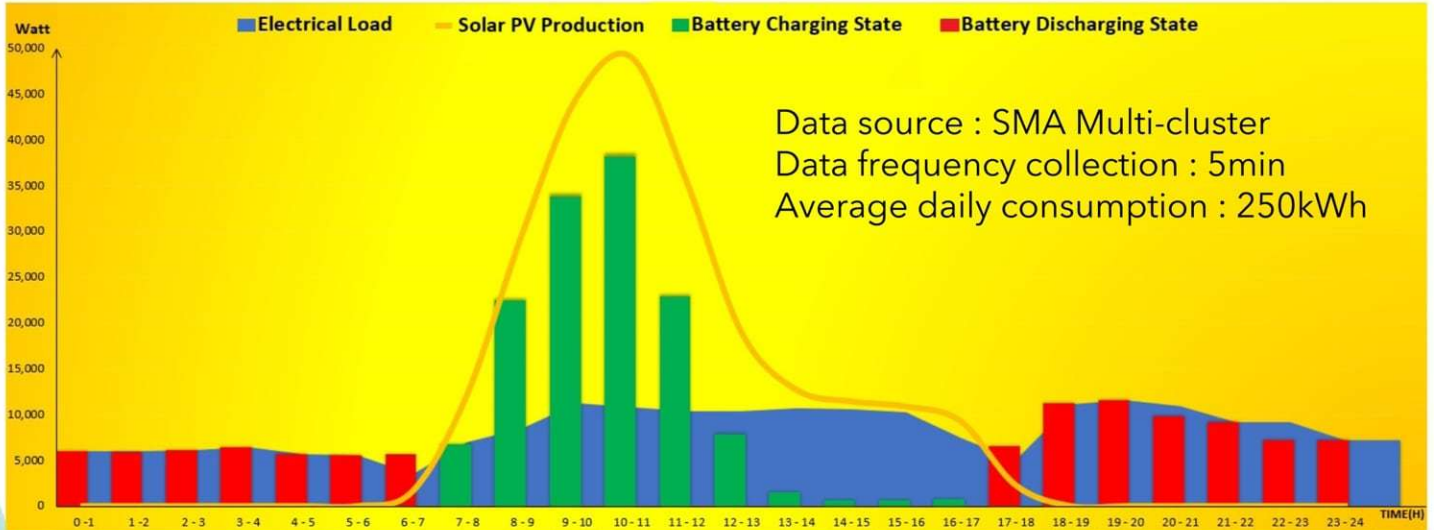
The PV hybrid system mainly consists of :

- A 80kWp array = 286 JA Solar Percium Mono solar modules
- 3 battery banks = 72 Hoppecke OPzV batteries with a total capacity of 288kWh at C10
- 4 SMA Sunny Tripower 20000TL inverters
- 9 SMA Sunny Island 6.0H battery inverters
- 2 Perkins back-up diesel generators of 80kVA and 44kVA
- Full remote monitoring and energy management system





## Solar PV off-grid power system - Typical daily energy curves - No back up !



On a typical day with average sun irradiation and standard occupancy, the battery banks are fully recharged during the day and reach less than 50% discharge at the end of the night. The solar array delivers an excess of power and diesel generators are not used at all. In the worse case scenario as for now, the generators are running 4h during the night.

### 3. Solar Hot Water Systems

The main centralized Solar Hot Water system mainly consists of :

- 6 arrays of 30 evacuated tubes each
- A 1,500l fully isolated storage tank
- A Resol controller for close loop operation
- A full hot water circulation loop to all points of use

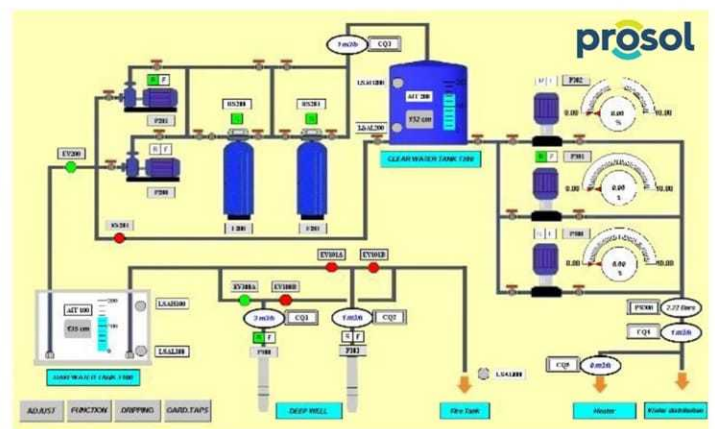


The second centralized SHW system operates similarly with 1 array of 30 tubes and 300l storage tank, dedicated to the kitchen and bar.



## 4. Clean Water Systems

Raw water is pumped in a timely manner from 2 different deep wells. It is filtered and stored in 2 tower tanks of 5 m<sup>3</sup> and 10 m<sup>3</sup> at 15 m height. This enables to distribute **clean water** mostly by **gravitation**. **Variable speed booster pumps** achieve a very energy efficient and stable process for water supply.



The **waste water** treatment plant is using Sequencing Batch Reactors, which enables **100%** of black and grey waters (15 m<sup>3</sup>/day) to be recycled and reused for irrigation and farming purposes through dripping process.

## 5. Automation and Monitoring Systems

From power plant, energy usage and supply, to clean water supply, storage and waste water treatment plant, dedicated automation programs allow to manage and supervise each system remotely through dedicated controllers. This closes the loop of efficiency as most potential operational problem can be instantaneously detected and addressed.

This project does not only comply or exceed **quality and safety international standards**, but it proves that **sustainable off-grid solutions** for all energies can also be cost-effective, and of **high value-added**, compared to conventional solutions.

Please don't hesitate to contact us for more info via: [www.prosol.co.id](http://www.prosol.co.id)