

CASE STUDY

Ethiopia - Wolisso Hospital

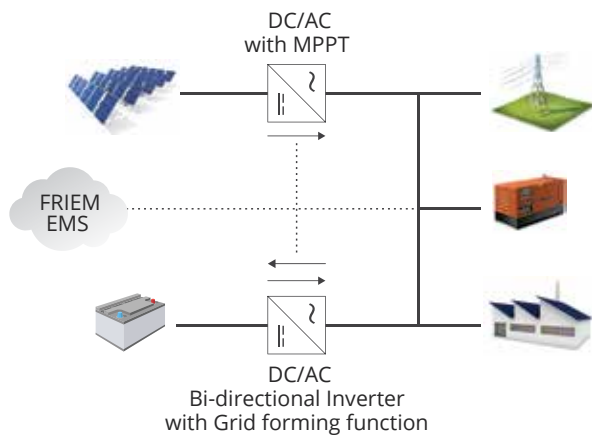


Solution to reduce the hospital's genset dependency and improve the power quality.

Project General Information

- Wolisso Hospital Project - Ethiopia
- End Customer - Elettrici Senza Frontiere - CUAMM Medici con l'Africa
- EPC - Italian Company
- Application: PV & Energy storage System / Micro-grid
- Connection: Grid Tied & OFF Grid
- Installed Power:
 - PV Plant 150 kWp
 - BESS 400 kWh (technology LA OPzV)
 - Genset

AC Coupled Solution



FRIEM's Role

FRIEM has supplied a complete system for PV and energy storage. With the AC coupling configuration, the power can be dispatched by using PV and batteries independently or together.

The system grants a constant supply of energy to hospitals generally subjected to continuous blackouts, dangerous for medical equipment and patients. The plant also minimizes the genset dependency.

System devices supplied by FRIEM

Air-cooled PCS equipped with:

- PV inverter equipped with grounding kit and associated string boxes
- ESS system composed by bidirectional inverter
- EMS (Energy Management System)
- Automatic transfer switchgear
- Monitoring System
- Environmental Sensors

Operation Mode

Main grid available



The PV system gives the priority to battery charging



If batteries are full, PV will supply the load reducing energy got from the grid

Main grid unavailable



The load is supplied by PV + Batteries



If PV is unavailable and batteries are empty, the diesel generator starts. The inverters provide reactive power and manage the genset activities.

More info available on www.friem.com

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CASE STUDY

Eritrea - Ministry of Agriculture

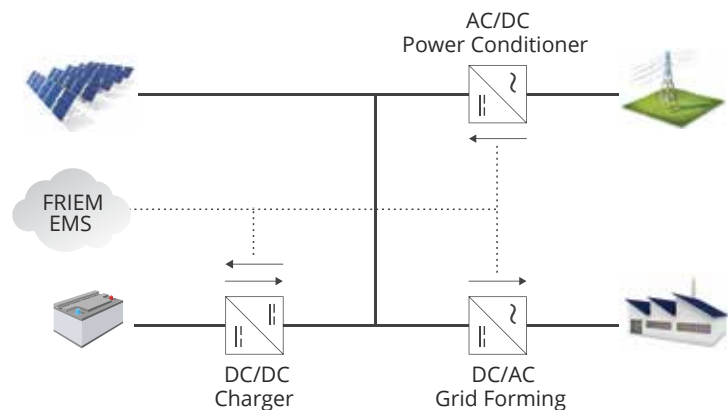


Solution to grant the energy continuity to loads.

Project General Information

- Ministry of Agriculture - Eritrea
- Customer - Eritrea Ministry of Agriculture
- Application: PV & Energy storage System / Micro-grid
- Connection: Grid Tied and/or OFF Grid
- Installed Power for a total of 13 plants:
 - PV Plant from 2,5 - 300 kWp
 - Total BESS 2 MWh (technology LA OPzV)

DC Coupled Solution



FRIEM's Role

FRIEM has supplied a complete system for PV and energy storage. With a DC coupled configuration, the loads can be supplied by the grid, by PV and batteries working together or independently.

System devices supplied by FRIEM

Air-cooled PCS equipped with:

- PV inverter
- ESS system composed by bidirectional inverter
- EMS (Energy Management System)
- Monitoring System

Operation Mode

Main grid available



The PV system gives the priority to battery charging



Power Conditioner adjusts the grid parameters

Main grid unavailable



The load is supplied by PV + Batteries

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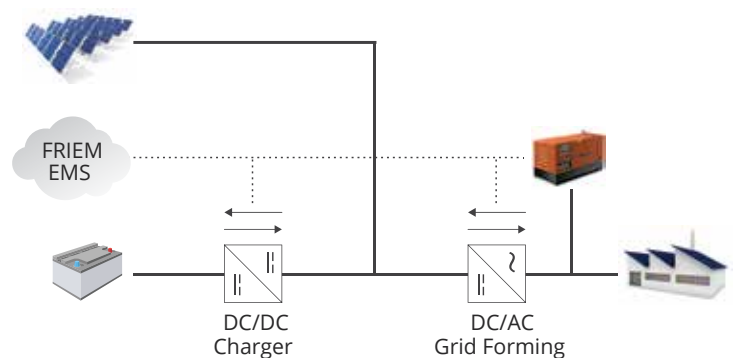
Angola - Chiulo Hospital



Solution to reduce the hospital's genset dependency.

Project General Information

- Chiulo Hospital Project - Angola
- Customer - Elettrici Senza Frontiere
- CUAMM Medici con l'Africa
- Application: PV & Energy storage System / Micro-grid
- Connection: OFF Grid
- Installed Power:
 - PV Plant 55 kWp
 - BESS 112 kWh (technology LA OPzV)
 - Genset 120 kVA



FRIEM's Role

FRIEM has supplied a complete PCS for energy storage, equipped with a transformer.

The PCS allows the hospital to store and use power generated by its solar panels. The system grants a constant supply of energy to hospitals generally subjected to continuous blackouts, dangerous for medical equipment and patients. The plant also minimizes the genset dependency.

The common DC bus allows the control of the charging and discharging cycles by the DC/DC converter.

System devices supplied by FRIEM

Air-cooled PCS equipped with:

- AC/DC converter
- DC/DC converter for DC bus control
- Transformer
- String-box for the connection to the PV field
- EMS (Energy Management System)

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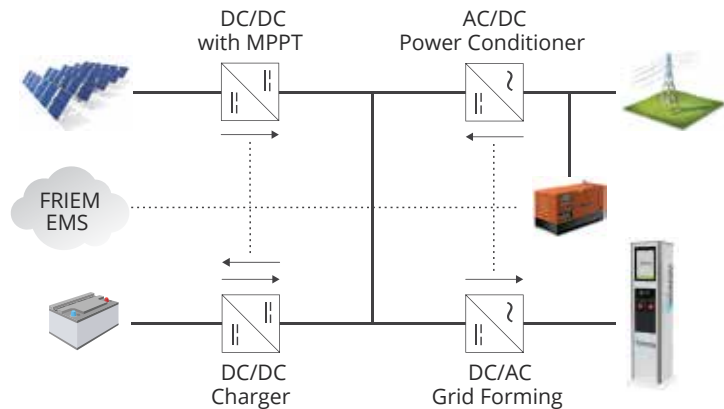
Italy - ENEA Multi Source System



Experimental project with multi energy sources and EV Charging Station.

Project General Information

- Multi Source System - Italy
- Customer - ENEA
- Application: PV & Energy storage System for experimental project
- Connection: Grid Tied & OFF Grid
- Installed Power:
 - PV Inverter 45 kWp
 - DC/DC converter 30 kW
 - Genset



FRIEM's Role

FRIEM has supplied a complete system for an experimental project to test the energy exchange in a multi-source system. The system supplies different loads including an EV Charging Station.

System devices supplied by FRIEM

Air-cooled PCS equipped with:

- PV inverter
- ESS system composed by bidirectional inverter
- EMS (Energy Management System)
- Monitoring System

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