

RENEWABLE ENERGY GRID INTEGRATION

PROFIT-GRID / Autonomous Renewable Generation Solution

PORTABLE RENEWABLE OPERATIONAL FACILITY INDEPENDENT- GRID IS A POWER SUPPLY SOLUTION FOR ON AND OFF-GRID APPLICATIONS. PROFIT-GRID IS A CONTAINERIZED HYBRID MICROGRID WHERE ALL THE TECHNOLOGICAL ASSETS ARE INCLUDED INSIDE THE CONTAINER: CONTROL AND MONITORING SYSTEM, ENERGY STORAGE SYSTEMS, NON-RENEWABLE SOURCES AND RENEWABLE SOURCES TO BE DEPLOYED ON SITE.

Microgrids based on Renewables are a good solution to provide energy in remote and ravaged areas where grids and/or power supply are not available and even in areas with energy based on costly fossil fuels. These autonomous power supply systems can be used for many applications such as remote and rural communities, telecommunications, sites which have suffered the consequences of natural disasters, as back-up systems and UPS, and Forward Operating Bases (FOBs).



Renewable Equipment Store

Battery and Control Room

Genset Room

COMPETITIVE ADVANTAGES

PORTABILITY

PROFIT-Grid is extremely portable as all the required elements (electrical buses, generation and electrical storage assets, communication networks, supporting infrastructure and frames) for a totally operational microgrid are included and packed in a standard container.

OPTIMAL DESIGN

Design maximizes renewable generation and autonomy in a standard container with a special supporting structure for the PV array and Li-batteries, smaller and lighter than conventional ones. This configuration minimizes the diesel consumption by increasing the energy demand covered by renewables.

MODULARITY

Each container has a rated power in terms of generation, power, storage capacity, charging and discharging power. Each container can be used as a brick to scale up the rated values to higher desired levels. The connection between different containers is intended to be as fast and simple as possible, keeping the connection works at minimum. This way, through a "fast plug system" several containers can share the same communication and electrical infrastructure with a same purpose.

RELIABILITY

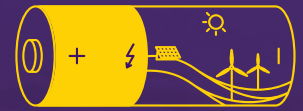
Control system is designed according to the customer needs (load profiles), implemented and simulated in a Virtual Platform developed by Cener. Once the optimum energy management strategy is identified, simulations are validated in a real microgrid in CENER premises. Control and operation are warranted by test in real conditions.

CUSTOMIZED PRODUCT

Basic container can be modified according to the customer needs and local resources available. Wind microturbines, genset based on biofuels and different control strategies can be added easily.

FEATURES

1. Reliable and autonomous power supply for sites with no electric supply available or not cost effective supply alternative (FOBs, remote sites, sites under severe blackouts or sites undergoing the aftermath of natural disasters).
2. Portable solution easily transportable including all the required system and devices.
3. Flexible and scalable.
4. Easy to configure and install.



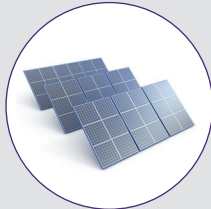
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TECHNICAL INFORMATION

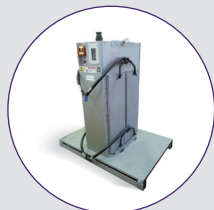
BASIC EQUIPMENT



Isolated and refrigerated Container
12 m x 2.5 m x 2.9 m (W-H-D)
Weight (packed) - 10TM



PV Array
15 m x 12 m (W-H)
Variable angle (25°-50°)
depending on location
Peak Power = 25.2 kWp



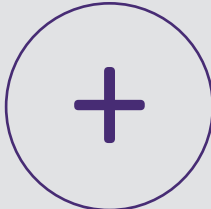
Li-Ion Battery
Capacity = 150 kWh
BMS + Chiller included



Power Converter (3 modules)
Battery Charger Module (30 kVA)
Inverter Module (30 kVA)
PV Module



Diesel Generator
Rated Power = 13.4 kVA
Fuel Reservoirs = 107L + 2 x 500 L



Loads (30 kVA)
Monophasic and triphasic loads

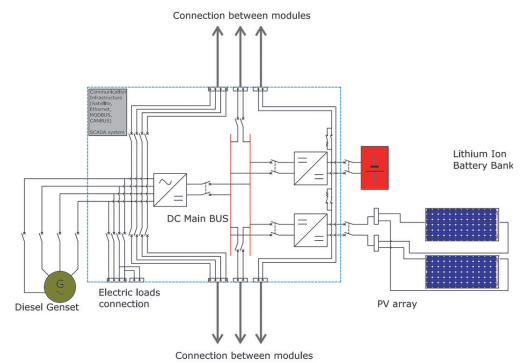
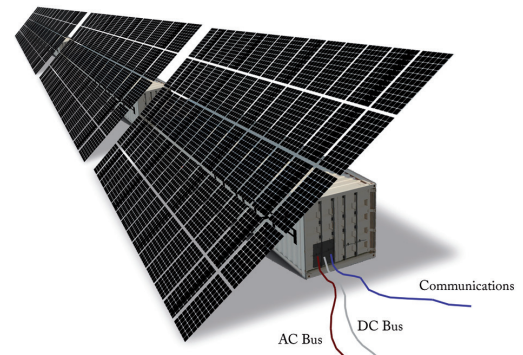
MODULARITY

Increased storage capacity and instantaneous power with only one management.

- DC Bus Connection
- AC Bus Connection
- Communications

Parallel coupling with 3 quick-plug hoses:

Connection Between Modules:



COMMUNICATION AND CONTROL SYSTEM

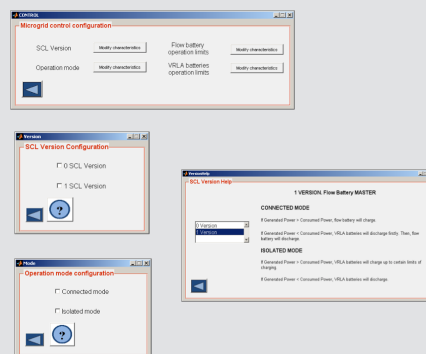
- PROFIT-grid design and control algorithms based on CENTER Management Software CeMOS® and validation in a real plant. It allows a customizable product according to customer needs and available natural sources.

- SCADA Control System (Hardware & Code). Ethernet, ModBus, CanBus Communication + Satellite Communication (remote control).

PROFIT-grid Configuration



Control Strategy



Control Algorithms

