

La Plana Hybrid Facility

HIGREEW Battery test

In Pilsen and Online

Siemens Gamesa



The research leading to these results has received funding from the European Union under Grant Agreement no. 875613

HIGREEW - 875613 – 1st Project workshop

Introduction

La Plana R&D hybrid facility has been in operation for over 5 years. The project is designed to enhance and expand the development and performance of our hybrid solutions.

The site is used in the following ways:

- 1. As a Test Bench: Before any new asset is commissioned by our internal customer, we are able to validate it in a real environment, minimizing as much as possible any risk .
- 2. For Research and Development: The facility incorporates a range of energy generation and storage technologies and test scenarios. This strategy provides many options for in-depth study and enhancing technical expertise within the SGRE team.
- **3. As a Commercial Tool:** Several tours are conducted each month, giving customers the opportunity to view and assess our hybrid solution capabilities.



La Plana Overview

COLUMN DE



Wind Turbine	850 kW
Photovoltaic	245 kW _p
Diesel	3 x 222 kW
Lithium Storage	572 kW (4C) – 143 kWh
Vandium Storage	200 kW (1C) – 400 kWh
Load	1100 kW – 372 kVAr

Test Site Controller: Operation Modes



Test Site Controller (TSC)

Virtual Power Plant

- Grid synchronization
- Emergency recovery from zero .

Weak Grid

Hot Standby

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Technical aggregator for ٠ hybrid plants



Connection to a VPP service •



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Communications Network

Characteristics:

- Two fiber optic rings connect redundantly all the sub-plants
- Control ring is exclusively dedicated to control tasks
- The plant can be operated both on site and remotely through a secured VPN connection.
- The network segregation creates separated zones for hosting devices under test, while preserving the facility data storage and the essential operations of the plant.



Slide 5

La Plana Models

La Plana Hybrid Power Plant is represented by several models, used to simulate its assets performance in different scenarios. Currently, there are three types of models complementing La Plana Hybrid Power Plant.



La Plana Capability Tests

Possibility to analyze the operation of new assets in a real hybrid plant and its integration into the different control modes available in the TSC.

Mass storage of data in different forms:

- Insertion of data by the BMS into local NAS.
- Record oscilloperturbography of inputs and outputs in TSC algorithm every 20 ms.
- Independent data acquisition from different equipment with own software (DAS):
 - Meteo
 - Power Meter
 - Power Electronics



HIGREEW INNOVATIONS & EXPECTED TARGETS



Validation Test in a Real Environment

Validation tests with other renewable generation sources and storage. The operating limits of the battery in a real environment will be known, as well as its performance or its capacity to respond to a variation in the renewable resource.



Zero Diesel Operation (ZDO)

P Dispatch Strategy without ZDO P Dispatch Strategy with ZDO





- Diesel groups generate the grid (voltage and frequency control).
- The TSC minimizes diesel consumption, taking the generators to their technical minimum power (Objective: Minimize LCoE).
- In order to optimize the LCoE, each project studies the implementation of the ZDO mode in those time zones where the energy demand can be covered with the battery and the renewable energies.
- In order to turn off the diesel groups as much as possible, the batteries would have to be sized to give the peak power of the load, and the renewable would have to be oversized to produce 100% of the energy needed in time.

CURRENT RESULTS





Preparations

- Place definition: Take in account the place, power connections, communication connections, wind direction, etc.
- •Electrical materials ordered: Electrical cabinet is defined. Important task because the COVID delays.





Communications Network Ready

Plug and play connection for devices under test.

Possibility of VPN access for third parties to their installed equipment.

Available secured data storage for HIGREEW project.





NEXT STEPS





Battery Integration

- •Connect the HIGREEW battery electrically to a 400 V bus.
- Inverter configuration
- •Transformer calculation



Control definition

•Include the HIGREEW battery in the TSC algorithm and in the plant SCADA.

•Definition of the control algorithms.

•PLC coding.







Thank you!





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