ENERGY IN TUNE WITH YOU.

ENGINEERING AND RESEARCH DIVISION
RESEARCH TECHNICAL AREA

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ENEL Storage Test Facility

Enel Research department designed and built up a specific test facility able to fully characterise energy storage system performances and generation and load shaping capabilities under different operating conditions and to assess actual technical suitability of the most promising technologies for different applications.

The Enel Energy Storage Test Facility is located at Enel Livorno Experimental Area and it is equipped with two emulators able to reproduce both generation and load profiles up to 100kW, a diesel generator to test micro grid configuration and, finally, a management system for control and data acquisition. The roof of the Test Facility is covered by photovoltaic panels with a maximum power of 19kWp, a micro wind turbine with 1kWp and a weather station. The energy storage systems are located under the facility roof on a concrete basement.

The objective of the Livorno Test Facility is to characterise and verify emerging different technologies and suppliers products under identical conditions and to identify which of these products are suitable for electric system future needs for energy storage. Hence the experimental characterization enables the definition of optimal storage technologies and operation modes to use storage to support the several levels of the electric system, namely from renewable plants to distribution grids and

end users, allowing optimized energy management and provisions of new services to clients.

The facility offers “comprehensive” testing of performance, interoperability and integration of energy storage systems. Testing also enables, for manufacturers aiming at verify products, to identify optimal applications such as renewable integration, peak shaving, and frequency regulation. System supplier are able to use the experimental characterization results to optimize their products for each specific application.

Actual performances, O&M requirements, capability to operate power-frequency and reactive-voltage regulation, reliability and suitability of each technology to provide the different services is assessed through field tests at Livorno test rig.

Storage islanding capability (disconnection/reconnection) and its suitability to support microgrid operation, with high percentage of distributed generation (PV and wind), can be assessed in the Test Facility. Moreover specific tests can be carried out to determine life cycle of complete system and the optimal management strategy to be adopted under different operating scenarios.

Test procedures are intended to produce accurate and repeatable data necessary to calculate the performance metrics relevant to the different applications. Measurement procedure and collected data provide the information necessary to derive performance metrics for different applications.