

A) General Information



Acronym:	RESSIC – 20110531-04
Title of the User-Project:	Renewable Energy Sources and Storage for Integrated Control in electric distribution system
TA Call:	4 th CALL - 31-05-2011
Host Research Infrastructure:	RISØ DTU (Syslab)
Starting Date:	2011-11-14
End Date:	2012-03-29
Lead User :	Federico Silvestro
Additional Users:	Mattia Marinelli Francesco Baccino

B) Summary of the User-Project

The project aims at describing the models of generation sources, such as wind and solar, and storage systems for implementing integrated control strategies of the whole renewable generation park. The main aim of the project is to validate models of small wind turbines and storage systems and integrated control strategies of the whole resulting system thus describing and testing the benefits that the storage system can provide. The storage system is characterized from an electrochemical and thermal perspective, while the wind turbines have an electro-mechanical characterization and the solar photovoltaic system an electrical characterization. The purpose of the energy storage system is to be coupled to the wind generation system in order to realize different tasks: to have the generation output power smoothed and to grant no power transfer, for a certain period on Distribution System Operator (DSO) request, at the point of common coupling (PCC) in any battery state-of-charge condition. Moreover the already acquired experience and the results from the previous DERri experience (W&S_IC) in the Risø facility are a stimulus to prosecute the validation of the storage system model within new measurements (i.e. thermal characterization) and to test new integrated control strategies of the whole resulting system (i.e. storage plus wind turbine and storage plus PV system).

C) Main Achievements

The model for the analysis of short and long term dynamics has been validated. Moreover the demonstration, on a laboratory scale, of the coupling between wind generation and storage have been measured and documented in detail. Indication has been reached on the ability of storage to compensate wind fluctuations and on the number of charge/discharge cycles necessary to perform such task.

D) Dissemination of the Results

F. Baccino, O. M. Forero Camacho, F. R. Isleifsson, M. Marinelli, P. B. Nørgård, F. Silvestro: "Experimental validation of control strategies for a microgrid test facility including a storage system and renewable generation sets", CIREN Workshop, pp. 1-4, Lisbon, 29-30 May 2012

F. Baccino, M. Marinelli, S. Massucco and F. Silvestro: "Low Voltage Microgrid under Islanded Operation: Control Strategies and Experimental Tests", full paper submitted to IEEE MedPower 2012, pp. 1-7, Cagliari, Oct. 2012

F. Baccino, M. Marinelli, S. Massucco and F. Silvestro: "Vanadium Redox Flow Battery

Dynamic Modelling and Experimental Validation", Energy Storage, full chapter submitted, pp. 1-24, ISBN: 979-953-307-768-9, InTech Edition, expected publishing date Sep 2012

E) Use of the Resources

Nr. of Users involved:	3
Access Days:	20
Stay Days:	48