

A) General Information



Acronym:	MoDERN
Title of the User-Project:	Modelling of Distributed Energy Resources Networks
TA Call:	4th
Host Research Infrastructure:	D-NAP, University of Strathclyde
Starting Date:	2 nd August 2012
End Date:	3rd September 2012
Lead User :	Theofilos Papadopoulos - Aristotle University of Thessaloniki - Greece
Additional Users:	Panagiotis Papadopoulos- Aristotle University of Thessaloniki - Greece

B) Summary of the User-Project

The scope of the project is the evaluation of a microgrid model built in the concept of the technical Virtual Power Plant (VPP) and Distribution Network Cell (DNC) based on Prony analysis and measurements. The model is dynamic and the main target of the model is to simulate dynamic phenomena such as transient/dynamic stability, voltage stability and frequency stability for Dynamic Security Assessment (DSA) purposes. Each VPP will be able to connect with other similar models using appropriate inputs and outputs in order to represent large areas of the power network.

Experimental measurements from the test facility were used to calibrate the model parameters as well as to evaluate the results from the simulations. For this purpose, the dynamic measurements recorded in the test facility were used in combination with variable control strategies of the power sources. Moreover the available measurements at each node of the network identify the best possible network reduction in order to simplify the model and prove its relevance to large scale simulations of power systems.

C) Main Achievements

- Useful experimental data suitable for the implementation of a dynamic model was recorded. This will be used in the simulation of the dynamic behaviour of microgrids.
- The influence of several parameters on the dynamic performance of a microgrid has been examined, including the effects of dynamic load variation and DG penetration.
- Simulation results also revealed that dynamic equivalent network cells based on Prony analysis and data from measurements can be efficiently used for Dynamic Security Assessment (DSA) purposes.
- Analysis of responses obtained from measurements showed the possibility to implement reduced equivalent models individually for different types of distributed generation units.
- Some guidelines regarding the application of Prony analysis on field test results are proposed.

D) Dissemination of the Results (Planned)

Initial results presented in UPEC 2012 Conference, London, Brunel University, 4-8 Sept. 2012.

A further conference paper for IEEE PES General Meeting 2013

A journal paper in IEEE Transactions on Power Systems

E) Use of the Resources

Nr. of Users involved:	2
Access Days:	20
Stay Days:	34