

Overview of Test Facilities for Large-Scale DER inverters in the DERri consortium



New opportunities for full-scale testing of large-scale inverters for RES and DER application

With to the rapid development and cost reduction of power electronics in the recent years, DR inverters have been growing significantly in capacity as well as in innovative functionality – which requires complementing test infrastructure.

For this purpose an inventory of available facilities in the consortium has been made to improve and expand the DERri offer for testing and R&D of large RES inverters.

DERri infrastructure for testing DER inverters up to the MW range

As of mid 2012, two members of the consortium, Fraunhofer IWES Systec (Germany) and KEMA FPGL (the Netherlands) are operating laboratory facilities for DER inverters in the power range of 100 kW to >1 MW. In terms of design voltage level, both labs allow the test of LV and MV equipment at voltage levels up to 24 kV.

In addition to the 2 DERri partners, which operate dedicated test infrastructures, 2 further institutes, AIT and VTT run laboratory facilities which can also be used for testing specific features and functions of large-scale DER inverters.

Overview of features and capabilities

Appropriate power sources are key components for the supply of the equipment under test. For this purpose programmable AC sources are provided for the emulation of the grid supplying the AC side of the DER inverter under test. The specifications of the controllable AC source fundamentally define the range of tests which can be performed in the laboratory. Similarly for the supply of the DC side, dedicated sources provide the necessary input power for the equipment under test including the capability to emulate PV array behaviour.

For specific tests (e.g. anti-islanding or LVRT tests) additional facilities are available, including adjustable RLC circuits and LVRT testing circuits as well as additional short-circuit current testing equipment.

New laboratories being developed in the DERRI consortium

Planning of complementary lab test facilities for large scale DER inverters is underway at the AIT (Simtech Lab) and University of Strathclyde (Power Networks Demonstration Centre), which highlights the necessity of developing dedicated test and research infrastructure for these devices.

Results:

- A comprehensive inventory of test facilities for large DER inverters available in the DERri consortium has been made to improve and expand the DERri offer, keeping pace with market developments.
- DERri members, Fraunhofer IWES (Systec) and KEMA (Flex Power Grid Lab FPGL) are already operating laboratory facilities for DR inverters in the range of 100 kW to >1 MW.
- Construction of complementary laboratory facilities for large scale DR inverters is underway at the AIT (Simtech Laboratory) and University of Strathclyde (Power Networks Demonstration Centre) both to be inaugurated in late 2012/ early 2013.
- The facilities available in the DERri consortium provide the basis to perform full scale close to reality testing of RES inverters under a fully emulated system environment.

The project is funded by the European Commission, DG Research. It is part of the 7th Framework Programme (FP7) Grant agreement number: 228449 Duration: 01.09.2009 - 31.08.2013

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