KEMA - KEMA Nederland (NL)

KEMA is an independent company with an international reputation for high-level technical and business consultancy, testing, inspections, certification and research for businesses in the energy industry, assisting over 500 clients in more than 70 countries. KEMA has established offices and subsidiaries worldwide and employs around 1,500 full-time professionals and leading experts in many facets of the electricity industry. With 80 years of experience, KEMA applies global experience and regional insight in serving the complete spectrum of participants in the energy marketplace and offers a full range of services.
In many European countries, our experts consulting teams and researchers have taken a leading role in assisting governments, agencies, utilities and customers with items like renewable energy, energy storage and actual topics related to CO2 emission and innovative grid solutions. KEMA is one of the initiators of the European Technology Platform SmartGrids programme. KEMA's CEO is at present chaiman of this platform. KEMA has been building the Power Electronic Lab (2008) and will operate this lab together with ECN, University of Delft and University of Eindhoven.
KEMA is involved in numerous relevant European (research) projects.
Within the DERRI project KEMA will contribute in testing of large scale RES inverters. KEMA will provide research access to the almost finished public-private Power Electronics Lab, built around a unique medium voltage back-to-back converter that can simulate a programmable grid or load.

Web: www.kema.com

Research infrastrusture(s):

Power Electronics Lab (Arnhem)

The Power Electronics Lab (PEL) in Arnhem takes a unique position in the world because of the voltage and power range. First of all it is essential to understand that this laboratory is not like any of the already existing KEMA laboratories, not in functionality, purpose nor organisational structure. The laboratory is owned, and will be run, by the independent foundation called the "stichting EMVT laboratorium". KEMA has 50 % share in this foundation and the dutch government the other 50 %. The use of the laboratory facilities will therefore also reflect this ratio and be available to KEMA for 50 % of the time at commercial rates and 50 % of the time for research activities coordinated by a Dutch research institute on energy, ECN, together with the technical universities in Delft and Eindhoven.
The laboratory infrastructure has been designed to enable a variety of electrical circuits, including the option to circulate power within the laboratory by connecting the virtual grid, through the device under test, back to the feeding grid. Alternatively a large diversity of passive loads are available in the lab and already set-up to be easily connected to test any circuit.
A fully equipped measuring system is provided in the safety of the command-room. Moreover, the command room overlooks the laboratory floor on which the device under test is clearly visible. The laboratory is built around a fully programmable power electronics converter that can either create a custom PQ-grid or represent a custom load. The specifications of this central piece of equipment are:
- Three-phase (plus neutral wire) power system at line-line voltages up to 3.3 kV (3 phases independently controllable);
- Bi-directional power flow capability of 1 MVA (four-quadrant operation);
- Fundamental power frequency adjustable from DC - 75 Hz;
- Overload capability 1.25 p.u. @ 10 s, 3 p.u. @ 1 s;
- Harmonic voltage distortion up to 2400 Hz;
- Dips, unbalance, voltage and frequency variations, interruptions.

The laboratory is equipped with flexible resistive (0.5 MW), inductive (1 MVAr) and capacitive (1 MVAr) loads and a connection to the utility grid with off-load tap changer (400 V...4 kV) to provide maximum flexibility for R&D and testing.
The grid has two main operation modes:
1) First is the basic static operation mode with a fixed fundamental frequency, in which it is possible to superimpose a wide variety of harmonic distortions on top of the base frequency to simulate a badly polluted grid, or a badly polluted load (in reverse power flow direction). These amplitudes of the fundamental frequency, as well as that of the harmonics voltages, can be varied online and are closed-loop controlled to a large extent.
2) Secondly, there is the dynamic mode of operation. In this operation mode all kinds of other grid phenomena can be produced, e.g. voltage and frequency variations with the ability to include voltage dips, phase jumps and rapid voltage changes.
The programmed grid will also be capable of coping with unbalanced loads/sources and still provide the capability to superimpose harmonic voltages and instigate dynamic network phenomena onto it.
For the future it is envisioned to create a connection to a Real Time Digital Simulator (RTDS) which is located in Delft University of Technology to further facilitate research on the interaction between DER units and the power system.

Web: www.kema.com

Contact:

Peter Vaessen

Email: peter.vaessen@kema.com

Tel: