

ICHQP 2022

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SPECIAL SESSIONS

Session Title

Standardization of measurements for low-voltage DC electricity grids

Abstract

The energy transition with its increasing use of distributed energy generation and storage has led to local low-voltage DC trial grids becoming an extension to traditional AC distribution networks. Like AC grids, DC grids must fulfil power quality (PQ) limits to guarantee reliable operation. However, knowledge about PQ in public DC systems and its impact on DC electricity metering is currently lacking, as is the related metrology and standardization. The behavior and origin of PQ for DC grids is fundamentally different from AC, and therefore, equipment used for AC is not suitable for DC and usually DC equipment is not sufficiently broadband.

This lack of knowledge is addressed in a recently started project in the framework of the European Metrology Programme on Innovation and Research (EMPIR) with five national metrology institutes (VSL, LNE, METAS, PTB, INRIM), four academia (CIRCE, and the universities of Strathclyde, Campania, and Eindhoven), and the largest utility in Europe (EDF). The overall goal is traceable measurement and characterization of PQ parameters, to support standardization in the further development and use of DC grids and to ensure future customer confidence. Accurate on-site measurement equipment will be developed, and broadband distortions will be measured in at least two DC grids. Measurement data will be analyzed to define a set of DC PQ parameters and disturbances for grid monitoring and electricity meter testing. Reference systems will be realized to provide traceability for these new parameters. To support regulators and grid operators, equipment specifications and methodologies for PQ compatibility and planning level surveys in DC grids will be defined.

In this special session the following topics will be addressed:

- Definition of PQ parameters in DC distribution grids
- PQ measurements in a DC microgrid
- Traceability of DC power and energy
- DC electricity meter testing with distorted signals

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