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CO-CONVENER

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- Rupp Stefan, Maschinenfabrik Reinhausen, Germany
- Schichler Uwe, Technical University of Graz, Austria
- Vočko Jan, PRE Distribuce a.s., Czech Republic
- Yu James, Scottish Power Energy Networks, United Kingdom

CONTACT

m.delville@aim-association.org

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WORKING GROUP
#2019-1

DC distribution networks

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Summary

When we look at power grids and their transition to Smart Grids, a growing number of sources and consumers of electricity are natively producing or using direct current (DC), for example Renewable Energy Sources such as PV panels and wind turbines, e-mobility solutions, storage units and a majority of new electric appliances from domestic to industrial sectors. A lot of progress is reported in terms of high-power electronic components and adapted DC breakers. This paves the way for DC network demonstration projects and raises the question of the place these technological solutions may have in a decarbonized future. The CIRED WG 2019-1 will investigate this thematic.

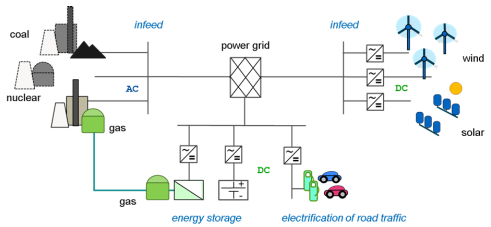

Fig. 1: DC Sources and consumers connected to power grids (Stefan Rupp, Maschinenfabrik Reinhausen)

Report Elaboration

The main goal of the WG in its first phase with focus on Low Voltages (LV) and Medium Voltage (MV) networks is to present a report that evaluates the state-of-the-art of DC technologies, in which distribution network situations DC solutions could be most effective and the possible impact of DC solutions on network architecture. Relevant stakeholder questionnaires, first pilot projects and potential use-cases are presented in the report including, when available, lessons learned from these projects.

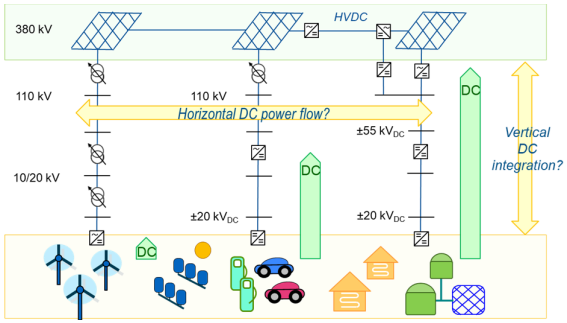

Fig. 2: DC technology integration into power grids (Stefan Rupp, Maschinenfabrik Reinhausen)

Structure of the report

The report will have a structure which considers six main chapters:

i) Summary of report and introduction;

ii) Main drivers, needs, for DC distribution networks, deduction of a vision/goal;

iii) Use Cases and functionalities of DC distribution networks;

iv) State-of-the-art of components and technologies;

v) State-of-the-art of standardization and regulatory framework;

vi) Conclusion with open points and challenges for the future.

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