

Flexible Electrical Networks FEN Research Campus

FEN Research Campus is an association of institutes of the RWTH Aachen University and of industrial partners from different disciplines. In order to successfully cope with the challenges of our future energy supply, a high degree of transdisciplinary research and collaborations is necessary, because many different areas of expertise are involved. In FEN Research Campus, this transdisciplinary research between academia and industry is conducted under one roof.

The aim of FEN Research Campus is to investigate and to develop the flexible power grid. This grid will safeguard the future energy supply with a high share of fluctuating and decentralized renewable energy sources. At the same time this grid will enable a reliable and affordable energy supply in the future.

The change of the electrical supply system to more environmentally-friendly energy sources requires the development of a new grid infrastructure. Many decentralized energy sources like solar systems on roofs produce energy which needs to be distributed over the whole country. This means that the formerly exclusive consumer type customer becomes now a producer. At the same time large scale power generators, like offshore wind farms, have to be connected, sometimes over long distances. Consequently, the transmission, distribution and storage of electricity need to be more efficient and flexible, than it is currently possible in the existing three-phase alternating current (AC) supply system. This supply system was designed as a “top-down distribution” with few central power stations and is not constructed for decentralized feed-in and distribution of renewable energy sources. While this was an appropriate solution for the requirements and available technologies from the past, the situation has now fundamentally changed. Sustainable energy sources and new electronic power conversion technologies have become technically and economically feasible and AC transmission and distribution technology is no longer a must, but an obstacle.

The transdisciplinary research of FEN Research Campus focuses on the integration and development of direct current (DC) technology in six research topics: grid planning and operation, automation and control, standards and norms, cloud platform for smart energy services, components and power electronics and non-technical aspects, like social acceptance as well as biological, urbanistic and economical aspects. The research activities of FEN Research Campus are located amid the RWTH Aachen Campus Melaten.

FEN Research Campus is organized into three consortia associated with the main voltage levels (low, medium, high voltage) in the electrical utility grid. Each consortium is headed by a professor of the RWTH Aachen University and is supported by a Chief Scientific Officer assigned to the consortium.

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Further information: www.FENaachen.net