

Professor Xavier Guillaud

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Xavier Guillaud is Professor at École Centrale de Lille since 2002 and researcher at L2EP. He works on power converter modeling and control, HVDC systems, integration of renewable energy into power systems and stability of AC power systems.

He started his activity on HVDC in 2010 with two main topics — multiterminal DC grid (MTDC) dynamics and Modular Multilevel Converter (MMC) modeling and control — within several European projects and RTE-funded projects. The rigorous methodology developed for decades at L2EP was applied to the modeling and control of these complex systems. Deep work on energy control in the MMC was conducted, and the principle of the virtual capacitor was introduced to improve MTDC stability.

Then grid-forming control became the central axis of his research. Several PhDs were carried out within various projects to study different aspects of this control: general principles on a simplified power converter, application to HVDC and wind turbines, and behavior under large power-system disturbances inducing current limitation. This led to a rigorous methodology for analyzing the fundamental concepts of this control and proposing improvements to existing controls. More recently, the question of power system stability under massive integration of power electronic converters has emerged as a continuation of these previous topics.

All this work has been conducted in close cooperation with the main stakeholders in power systems: transmission system operators (RTE in France, ENTSO-E, Elia...), distribution system operators (Enedis), electric power producers (EDF), and HVDC manufacturers. Xavier Guillaud is a member of IEEE and Cigré, and an expert for the IEC.